

**An investigation of the barriers to information access: A study
among university students with special reference to Saudi Arabia**

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Submitted in accordance with the requirements for the degree of

Doctor of Philosophy

2007

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Acknowledgement

First, grateful thanks go to Dr Gobinda Chowdhury my supervisor for his advice, guidance and thoughtful comments throughout every stage of the study. I would also like to thank Prof. Paul F. Burton for his comments and encouragement for this thesis. My thanks are due to Dr Monica Landoni for her assistance in distributing the questionnaire. Special thanks are due to Linda Hunter and Zakia Majid for their help.

A special gratitude is due to my soul mate Reem A. Al-Rabghi for her support, comments and criticism.

Thanks are due to postgraduate students at Strathclyde University in the Department of Computer and Information Sciences (CIS) and Business Administration (MBA) who participated in this study voluntarily.

A special measure of thanks is given to Abdullah Al-Nassir, the Saudi Arabian Cultural Attaché for his continued help and encouragement. Special thanks are due to Ahmed Sabry the educational advisor for his advice and guidance. I also want to thank Prof. Hassan Al Sereihy; Dr, Anas Tashkandy; Dr Abdulrashid Hafez and all administrators, for their support in the fieldwork in Saudi Arabia. I would like to extend my thanks to all the postgraduate and undergraduate students at KAAU, KSU, and IMBSIU for participating in the survey, focus groups or interviews. I am also grateful to my friends and colleagues from the department of Library and Information Science at King Abdul-Aziz University.

I am also grateful to all the library personnel in the selected university libraries for their help and arrangements for the interviews. I would like to express my gratitude to the many people, who are not mentioned here, and who have helped me in various ways while doing this research.

Finally, I wish to show my appreciation to all the members of my family for their praying and motivation. However, the following names deserve special acknowledgment. I am extremely grateful to my husband Jalal for his support and help to complete my study, and our children Fai, Abdullah, and Reem for their

understanding and patience. Special thanks to Aunt Aisha for her support and I dedicate this work to my parents particularly, my father **Ezzat** who encouraged me to finish my study.

Abstract

This research aimed to find out the main barriers to information access facing students in culturally similar as well as distinct university environments. Using Wilson's model as a broad basis for the study, various intervening variables from (1) two culturally distinct academic environments, viz. University of Strathclyde (SU) in Glasgow, UK, and King Abdul-Aziz University (KAAU) in Jeddah, Saudi Arabia, and (3) three universities from the same environment, viz. KAAU, King Saud University (KSU) and Imam Mohammed Bin Saud Islamic University (IMBSIU) in Riyadh, Saudi Arabia, have been studied using both quantitative and qualitative research methods, and a combination of data collection techniques via questionnaire, interview and focus groups.

It was noted that university students in the UK get better information services because of the prevailing national and institutional policies and guidelines for ICT infrastructure and information support. Each university in Saudi Arabia has different ICT and information policies, which are not often clearly written, and the geographical location of the university plays a great role in the provision of ICT and information services. Similarities were noted among Saudi university students in terms of the influences of demographic variables on the use, type and preference of e-information resources, and on the access and usage patterns of Internet. Differences were noted with regard to the students' social/interpersonal variables, particularly on the type and preference of e-information resources, and the level of parental education influencing the access and user confidence in adopting ICT.

Concluded that information behaviour of university students in Saudi Arabia is influenced by the ICT and information infrastructure of the country and the specific universities, the geographical location, as well as religious and social customs and practices, and the socio-economic characteristics of the students and their ICT and information skills. The design of academic library websites needs to be improved to meet the user needs. Wilson's general model of human information behaviour, especially with regard to the barriers to information access, has been modified in accordance with the findings of this research.

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List of Abbreviation

ADSL	Asymmetric Digital Subscriber Line
BA	Business Administration
BS	Business Science
CCTV	Closed-Circuit Television
CIT	Computer and Internet Technologies
CS	Computer Science
DNS	Domain Name System
DSL	Digital Subscriber Line
GCC	Gulf cooperation Council
GDCIS	General Directorate of Computer and Information systems
HESC	Higher Education System Council
HIB	Human Information Behaviour
ICT	Information Communication Technology
IM	Information Management
IMBSIU	Imam Mohammed Bin Saud Islamic university
Inf.	Information
ISB	Information Seeking Behaviour
ISP	Internet Service Provider
ISU	Internet Services Unit
IS&R	Information Seeking and Retrieval
IU	Islamic University
JISC	the Joint Information Systems Committee
KAAU	King Abdul-Aziz University
KACST	King Abdul-Aziz City for Science and Technology
KFU	King Faisal University
KFUPM	King Fahad University of Petroleum and Minerals
KKU	King Khalid University
KSU	King Saud University
LANs	Local Area Networks
LIS	Library and Information Science
LSC	The learning and skills Council
MBA	Master of Business Administration

MEDIC	International Centre for Medical and Education data
PSTN	Public Switched Telephone Network
STC	Saudi Telecom Company
UQU	Umm Al-Qura University
WAN	Wide Area Network

Chapter 1: Introduction

1.1 Research Rationale

Since the mid 1960s, extensive research has been undertaken with the aim of understanding the information needs and information-seeking behaviour of different categories of users. Most of the early studies on Information Search and Retrieval (IS&R) in the field of Information Science were based on the laboratory model which has its origins in the Cranfield II project (Cleverdon, 1967; Johnston, 2004). This laboratory model assumes a systems perspective and has been criticised for its lack of realism, i.e. its inability to explain the impact of the user's role during the IS&R process (Ingwersen and Järvelin 2005). Although the social school has given much needed attention to understanding the role of users, it had been criticised on the grounds that it is unable to provide a great deal of assistance for designing systems, and that this has been an academic rather than a practical exercise (Bishop and Star 1996; Wilson, 1997; Dervin, 2003; Pharo, 2004).

There has, however, been a dramatic turnaround over the past two decades or so, and the cognitive school has assumed greater significance. Since the early 1990s these studies approach the IS&R process from a more holistic perspective; cognition is viewed in the context of its IS&R interaction and the relevance assessments are viewed in the context of situational relevance, making the IS&R process a dynamic concept (Ingwersen and Järvelin 2005).

1.2 Significance of the Research and the Generation of Research Questions

One of the key building blocks in the IS&R process is the trigger, which Wilson (1981) termed the "information need", a subjective experience that can only be captured in the mind of the user and cannot be observed, thereby suggesting that it is a cognitive representation of the desired future goal (Wilson, 1997).

In spite of the fact that information need acts as a trigger for IS&R, it does not necessarily lead to information-seeking behaviour (Wilson, 1997). The factors that act as barriers to information access assume significance and this research attempts to delineate the barriers to access in an electronic information environment. Wilson (1997) himself has acknowledged the need for further research in elaborating the concept of these barriers to access, i.e. intervening variables, as he believes that this will throw light on how they may impact on the IS&R process.

The rationale for using this model has been that it not only combines views from various literatures, but has also specifically identified intervening variables which will promote or act as barriers during the information-seeking process. Though this model is still a macro behaviour model, the inclusion of other theoretical models makes it a richer source of hypotheses and further research and there has been widespread acceptance that the model provides a broad framework (Ingwersen and Järvelin 2005; Niedzwiedzka, 2003; Pettigrew; Fidel and Bruce 2001). Though the Wilson model is fairly static and is a general behaviour model, it provides a good framework for understanding the various processes present during information seeking. Given that this research seeks to address barriers to information access in an electronic environment, the model serves as a good starting point.

In today's electronic environment with the emergence of hybrid libraries (Brophy, 2000) there have been significant changes to information-seeking behaviour among users. Recent studies by Case et al. (2004) have shown that Internet and online resources are the preferred sources of information gathering, which challenges the traditional "two-step flow approach" to information seeking wherein friends and acquaintances are used to obtain second-hand information. Further, web-based interactions by individual users promote remote social interaction which in turn has a bearing on individual or group information-seeking behaviour (Ingwersen and Järvelin 2005).

Several researchers (Hansen, 1999; Vakkari, 2003; Bystorm and Jarvelin, 1995; Pharo, 2004) have studied information seeking activity in relation to the work/ tasks being performed. Non-work related information-seeking studies (Dervin et al, 1976; Chen & Hemon, 1982; Savolainen, 1995; Yakel, 2003) attempt to capture the

importance of information seeking as a way of bringing an “order of things” i.e. a mastery of life. However, Savolainen (1995) uses “things” to encompass all activities, including those related to work but also to leisure and household activities. This implies that the already fine distinction between work and non-work related activities becomes extremely blurred in certain circumstances.

Spink and Cole (2004) state that information seeking is a complex information and communication activity requiring access to diverse information sources to deal with personal, social, or work-related problems. In an educational context, universities are one of the institutions which have been significantly influenced by ICTs and the Internet. Academic libraries have been identified as one of the most important dynamic institutions; they aim to support education and research methods (AL-Sereihy, 2002). Recently there have been significant changes in the nature of academic library provision since libraries have begun to use electronic information sources as an important part of their collections and have opened the window of educational change (Bundy, 2004a). University libraries can no longer provide their electronic services without using networked information (Brophy, 2000; Craven and Fisher, 1998).

However, when students enter a college or university to learn, each one comes with a different background, different prior knowledge and understanding of subjects, different levels of experience in using ICT and various levels of experience in electronic information searching. They may also not know how to use them or evaluate the relevance of what they have retrieved even if they are adept at using ICT; they may also not know how to focus their search effectively. Success in the information search task using online tools requires constant instruction from a librarian, either at the reference desk or in a workshop and with online help. As (Loeber, 2001) states, many users find it difficult to access what they seek when searching the web or they may encounter problems when they search. They do not know what is within the structure of the website, and where they can find the next page to acquire additional information. They possibly will not utilize the Internet, either because it is not a suitable information channel for their tasks or because they have previously had problems in accessing it. All these act as barriers and may hinder students' access to and use of electronic information.

This research aims to study the barriers to information access facing postgraduate and undergraduate students, mainly in Saudi Arabia. One of the main goals of this research is to discover whether there are any differences in the barriers to information access and use facing these students in geographically and culturally different environments. This study therefore attempts to identify barriers to information access among postgraduate and undergraduate students at Saudi Arabian universities where students use information from a variety of electronic and printed information resources for their learning and other activities.

1.3 Research Objectives

The research aims to assess the differentials that exist among the various universities in Saudi Arabia in terms of the ICT infrastructures, national and institutional policies, and the provision of electronic information services to the students. It also aims to identify the major barriers to access and use of electronic information services by university students in Saudi Arabia. However, this study first attempts to recognize the differentials in terms of ICT infrastructure, provision of electronic information services and the barriers to information access and use which exist for students in a typical university in the western world and a typical university in Saudi Arabia. The next stage of the study focuses mainly on students from different universities in Saudi Arabia. Here an attempt is made to investigate differences in the computer, Internet, and information-seeking skills of users to discover to what extent they are able to use the electronic resources and have the ability to find different types of electronic information. This is in order to give a better description of the differences in ICT skills among individuals and to evaluate the usability of academic library websites from users' perspective. This research aims to identify the IS&R characteristics of university students. It is assumed that even within similar or related communities there may be considerable differences in information-seeking behaviour. Moreover, it aims at identifying, describing and interpreting the elements of the socio-economic setting in Saudi that may hinder the successful integration of ICT and information services in an academic environment.

Using Wilson's model as a broad basis for the study, various intervening variables from two culturally distinct academic environments have been micro segmented and studied. These academic environments are the University of Strathclyde (SU) in Glasgow, UK; King Abdul-Aziz University (KAAU) in Jeddah; and King Saud University (KSU) and Imam Mohammed Bin Saud Islamic University (IMBSIU) in Riyadh, Saudi Arabia. These universities are considered to be typical universities in their respective countries. However, University of Strathclyde was used to shape later data collection since the major focus of this study was on the Saudi university students.

The various intervening variables have been micro segmented in an attempt to fulfil the following broad objectives:

- To recognize the differentials in terms of ICT infrastructure and policies, and provision of electronic information services, as well as management and support services in different academic environments and their impact on information access.
- To understand the role of demographic, social, user characteristic, interpersonal and environmental variables as barriers to information access.
- To understand economic, legal and social issues surrounding the use of electronic information and information-seeking behaviour in relation to electronic information services in a variety of academic disciplines in different academic institutions.
- To understand what, if any, barriers there are to information access for different disciplines within the same academic environment.
- To determine the impact of the usability of library websites as a barrier to information access.

1.4 Research Questions

By identifying the barriers to information access in an electronic environment the research seeks to answer the following broad questions:

1. Do differences in terms of access and availability of ICT infrastructure, e.g. Internet availability impact on the usage and the preferences of individual users in their choice of various electronic resources accessed during the IS&R?
2. What are the main barriers to information access facing the students in culturally distinct university environments?
3. What are the main barriers to information access in an electronic environment in culturally similar university environments?
4. What is the impact of demographic, personal, social/interpersonal and environmental factors on information access, i.e. how do they act as enablers or as barriers to information access?
5. What are the various information channels that university students use to meet their information needs?
6. What is the impact of library interfaces on usability? Do well designed library websites promote information-seeking behaviour?

1.5 Hypotheses and Sub-Hypotheses

There are seven main hypotheses originating from the study questions. These are the following:

Main hypothesis 1: Differences among universities in terms of ICT infrastructure and the provision of the electronic information services may have an effect on access to electronic information resources.

Main hypothesis 2: Personal characteristics (as defined below for the purpose of this study) may influence the usage, preference and type of electronic information resources accessed.

This hypothesis deals with user confidence in adopting technology and using the Internet, and users' computer experience and its effect on the type and preference of electronic information resources accessed. In addition, the users' subject background and current subject of study may have an effect on the preference of the type of electronic information resources accessed. Users' language may have an impact on the

ease of search, ability to obtain effective results and time taken during an IS&R process.

Main hypothesis 3: User's Internet competence may have an impact on the IS&R process.

The two parts of this hypothesis are that the user's Internet and computer competence, and the user's education and training in information literacy skills may have an influence on the extent of information obtained, the efficiency of time taken to obtain results and the ease of access to electronic resources during an IS&R process.

Main hypothesis 4: Demographic variables may have an impact on usage, type and preference of electronic information accessed.

This hypothesis addresses demographic variables and their effect on the usage, type and preference of electronic information resources accessed and the ease of access to these resources. These variables include gender, age, social status, type of household, and users' income.

Main hypothesis 5: Social/interpersonal variables may have an effect on access to electronic information.

This hypothesis is concerned with the role of the user as a student and its effect on Internet use and type and preference of electronic information resources. A set of sub-hypotheses have been developed to investigate the effect of the parental education and work of a user and their impact on the user's confidence in adopting technology.

Main hypothesis 6: Environmental variables may have an effect on access to electronic information.

This hypothesis represents variables such as location of the user (city, suburban, rural areas), economic situation and technology use at the local university, and the user's

perception of ambiance of the search environment as barriers to the continuing information-seeking process

Main hypothesis 7: IS&R, usability features and user interfaces may have an effect on the access to electronic information resources.

This last hypothesis investigates interface features of library websites and their usability in terms of users' efficiency and effectiveness when they use different electronic information resources as well as their level of satisfaction in the last part of the information-seeking process.

All the seven main hypotheses have been divided into sub-hypotheses and these are presented in the Research Design and Methodology Chapter. The main focus of this study was on the undergraduate and postgraduate students from Saudi universities. However, University of Strathclyde was chosen to conduct the first phase of the study (see Chapter 3, Figure 3.1) to create the bases for the subsequent studies focusing on Saudi universities' students.

1.6 Research Implications

Information retrieval may be studied from two different perspectives. The former view is dealt with computer systems for storage, organization and access to information, thus it is called the computer-centred view. The latter one is focused on the study of human information behaviour (HIB), understanding of human needs, information context and use, etc. (Chowdhury, 2004b). This study has embraced the second vision of the information retrieval to focus on the barriers facing users when seeking information from the source. Several factors can be used to study HIB to understand and help decision makers develop an appropriate information retrieval system.

Bibliographic control in the context of traditional libraries meant various approaches to organizing information and facilitating access to information resources. These activities included classification, cataloguing and indexing. However, in the electronic

age, users gain access to a variety of information sources and services provided and supplied through multiple channels and information service providers and consequently, the concept and role of bibliographic control has changed significantly. On the one hand, this currently means various new approaches to organizing information by using different metadata standards, mark up languages, etc. However, successful information retrieval has to be based on an understanding of a user's tasks and problems (Ingwersen, 1992). The issues of information access and use must be studied from the users' perspectives. This study has taken this line in order to find out how the information users, especially university students (undergraduates and postgraduates) access and use electronic information resources and services, and with what level of ease or difficulty, etc. The issues are more complex in the case of the samples of this study, because the users belong to different cultures and environments and use two languages (i.e. Arabic as the main and essential language, and English as the studying or working language for Saudi students) for information seeking.

Although HIB has formed a major part of LIS research, a thorough literature search revealed that no such study has taken place, especially to address the research questions formulated for this study, in the context of Saudi university students. More specifically this research aims to discover the major barriers to information seeking in a specific country with a cultural and linguistic identity that is different from the English-speaking world where most HIB studies have been carried out. It aims to shed new light on the generic HIB world, especially in the context of barriers to information and linguistic and cultural aspects of information-seeking behaviour.

It is hoped that the findings of this study will make a contribution to the general body of knowledge in information access and use, as well as bibliographic control issues in the digital age. It will identify various factors that affect students' access to, and use of, electronic information. It will also identify a number of issues, some of which are related to the nature and characteristics of the specific types of information resources while others are related to language issues, and/or network/technology issues, etc.

It is hoped that this knowledge will be of great use to various stake holders, e.g. professional bodies, libraries, government and international agencies, etc., and will assist them in making decisions as to what measures need to be taken in terms of

bibliographic control and access management so that the users – university students - can obtain easy access to, and make appropriate use of, electronic information.

This study provides some of the users' perspectives concerning the chosen Saudi Arabian academic library websites in order to be equipped to meet their information needs and information-seeking behaviour. It sheds light on the ICT facilities, and intervening factors which have an impact on the IS&R process in Saudi Arabia. It reveals the needs of the educational role for electronic information resources, and presents the guidelines for policy makers to redesign these websites.

Another novel aspect of this research lies in its exploration of the ICT facilities that are available to undergraduate and postgraduate students in Saudi Arabia. The purpose of this was to identify how they perceived themselves as users of electronic information resources and also how they categorized the main barriers to the use of these resources. By discovering the main elements affecting the information seeking behaviour of a user, this study may help to identify barriers of ICT use to which particular consideration should be given in user education and research, depending on a number of demographic, social and economic factors.

It will also contribute to the identification of digital divide, if any, that exists among Saudi students. It shows that the gap is caused not only by the physical access to ICT facilities, but by a host of other factors including the personal characteristics, social and linguistic constraints, and so on. This research has also studied the information access facilities currently provided by the chosen Saudi Universities and how they facilitate and/or hinder information behaviour of the students. In the electronic age, Saudi universities need to discover the ICT and information requirements of students and it is hoped that the findings of this research will enable them to do that.

1.7 Structure of the Thesis

This thesis is organized into nine chapters followed by, a bibliography and appendices. Rationale for the study, objectives and study questions, hypotheses and sub-hypotheses, and implications are discussed in Chapter 1. The purpose of Chapter 2

is to review the literature related to this study. Chapter 3 discusses the research design and methodology of this study. Chapter 4 provides a brief overview of Saudi Arabia providing a glimpse of the geographical and cultural aspects. It also describes higher education in Saudi Arabia and explains the education systems and practices in Saudi universities. It also presents the development of the ICT infrastructure in academic environments, and in particular it outlines the growth of the Internet in Saudi Arabia.

Chapter 5 presents relevant findings of this research and attempts to identify barriers to information access among postgraduate students at a typical UK university and a Saudi Arabian university. Chapter 6 presents descriptive as well as statistical data analysis to assess the differentials that exist among postgraduate students at selected universities in Saudi Arabia, classified into four broad sections covering various aspects such as personal details, ICT infrastructure, Internet availability, and issues pertaining to the usability of electronic resources. Chapter 7 presents another set of findings and examines the barriers to accessing electronic information resources that exist among selected universities in Saudi Arabia. While Chapters 5-7 present the findings of the quantitative analyses, Chapters 8, 9, and 10 report on the findings of the qualitative analysis of data collected from study samples in Saudi Arabia. Chapter 11 presents the conclusions and recommendations that are drawn based on the discussions and interpretations.

Chapter 2: Literature Review

2. Introduction

The aims of this review are to present the concepts of, and background to, the research reported in this study, to describe the focal findings of previous studies, and to place the study in its interrelated environment. This chapter highlights the main issues around human information behaviour. One of these issues is human information behaviour (HIB) itself. The second is information-seeking behaviour in the digital age, i.e. in the context of digital libraries, hybrid libraries, etc. The third element is ICT skills, information literacy skills and corresponding issues such as the digital divide, which have an influence on information-seeking behaviour. These are the main themes which have been covered in the literature review, although all relevant issues have been regarded from the perspective of human information-seeking and retrieval.

2.1 Changing face of Today's Information Society and Implications on Information Seeking and Access

The current global environment is not only becoming increasingly complex but geographical boundaries are shrinking due to the advent of technologies which are changing the way in which we work and live. This has resulted in a paradigm shift – i.e. move from the ownership and access to exploiting physical resources to the ability to effectively exploit information for gaining supremacy. Today's society is therefore rightfully called the “information society” in which more people need to manage more information, which in turn requires more technological support, which both demands and creates information (Borgman, 2003; Marchionini 2000; Ingwersen and Järvelin 2005). Information and knowledge have therefore become the fundamental aspects for development of organizations and societies in general.

According to the European Commission's report (2004) on the implications of human and social capital building in the knowledge society for employment and social inclusion policies, the importance of ICT is not the technology as such, but is its

enabling function in accessing knowledge, information and communications, which are increasingly important elements in today's economic and social developments. Even the United Nations Information and Communications Technologies for Development (2003) acknowledge the role of ICT by stating that it represents a novel and effective tool to help advance Sustainable Human Development (SHD).

The consequences of the information society are threefold: managing larger volumes of information, new forms and aggregations of information and new tools for working with information (Borgman, 2000a). Therefore, the ability to harness the power to access and synthesize information so as to bridge information gap is extremely vital for survival.

It is imperative to understand what is defined as information seeking behaviour and its role within the broader context of interactivity between information seekers and the electronic environments so as to appreciate the importance of barriers to information access which this study seeks to answer.

2.2 Information Seeking – a fundamental human process

Information seeking is a fundamental human process which is closely associated to learning and problem solving. Nature has supported this process by providing appropriate tools and methods (i.e. perceptual organs, cognitive and emotive engines) to support information seeking, thereby purporting the view that information seeking is a natural and necessary mechanism of human existence. However, one of the distinct changes that have taken place in today's information society is that information seeking has become a fundamental skill required among a majority of population in order to survive and prosper, which in turn has a larger dependency on the use of the latest technologies (Heinström, 2003; Steinerová and Šušal 2005).

2.2.1 Information seeking vs. learning

Though information seeking is closely associated with learning and is a high level cognitive process, there are differences between the two. While information acquired

during learning can be stored and used for future needs, information acquired during information seeking may be useful for a specific purpose and can be discarded or can be used to further develop a body of existing knowledge as in the case of scientific research. While technologies can help us to be selective about the information we store, thereby enabling us to use our mental and external resources better we need to balance this optimisation with our own abilities to spot trivia as well make connections from disparate sets of information in order to provide the much needed stimulus for intellectual breakthroughs; thus while learning can be directed as well as incidental, information seeking is a directed, purposeful activity (Wilson, 1999; Ingwersen and Järvelin 2005).

The key activity of information seeking involves gathering information from the external world, mentally integrating that knowledge with one's own knowledge thereby creating new knowledge and acting on that knowledge to achieve one's desired goals i.e. the purpose for which the information seeking took place. An individual's collection of abilities, experience and resources to gather, use and communicate information are referred to as 'Personal Communication Infrastructure' (PCI) (Marchionni, 1995). A PCI is a set of intellectual models towards information systems: these mental models include events, use's experiences, information field, general cognitive skills like inferencing, cognitive abilities required for organising and accessing information, material resources such as money and information systems, and meta-cognitive resources required for planning and observing action and thought; attitudes towards information seeking and knowledge acquisition. All these are determining elements and have influence on information seeking behaviour. ICT have also blurred the distinction between personal, formal and informal information systems (Chowdhury, 2004b; Foster, 2005, Törmä and Vakkari 2004; Wilson 2006).

Rapid developments of ICTs have also impacted the way individuals learn and use information. The primary drivers for this change has been the way ICT is able to organise and disseminate information. The emergence of the Internet and supporting technologies have increased the users' ability to access for information instantly where physical distances have become a virtual non-issue, but has also seen the emergence of other barriers which need to be addressed by users so as to access and benefit from the available information (Chowdhury and Chowdhury 2003).

According to Gibb (2002), the ability to obtain, create, store, manipulate, and use information has been influenced significantly by communications technologies.

The influence of technology on individuals has been clearly demonstrated in the work of Chowdhury and Chowdhury (2003). Their work shows that ICT developments have brought significant changes in the manner users create access, distribute and use information, and how individuals can access locally created electronic information resources remotely. Online information search services for instance, have become a regular part of information seeking behaviour and information use patterns. Consequently, information seekers have to be equipped with the skills and experience to take best advantage of these new technologies.

Given the evolution in ICT it is important to understand terms like information access and the definition of barriers in the context of the current research.

2.3 Defining Information Access and Barriers

Borgman (2003) defines that “the term access ...is used in the broadest sense: not simply electronic connectivity to information resource providers through the network, but users can be able to locate, retrieve and use the information available within different computer systems”.

Information access is a term that encompasses various issues related to information seeking and retrieval including indexing, searching and retrieval, user interfaces, interoperability etc. as well as various user related issues such information seeking, user behaviour, information context and use, etc. (Chowdhury, 2004b).

The definition of barrier as per the English dictionary (Oxford advanced learner's ..., 2000) is expressed as follows:

- anything serving to maintain separation by obstructing vision or access
- any condition that makes it difficult to make progress or to achieve an objective (i.e. which is related to psychological features–cognition knowledge and factor including language and ideological barrier)

In the context of the current research, the two definitions are of relevance, while the second definition can be viewed in the context of usability (i.e. interface design etc).

There are varied references to barriers within the information behaviour literature. Though Wilson's (1997) concept of "intervening variables" is a much broader term than "barriers", he uses the concept to highlight the factors that enable or prevent information seeking behaviour. Dervin's Sense-making theory (1999) redefines the concept of barrier as one "from that which stands between a person and what a system thinks ought to be that person's goal, to what stands between a person and her life-facing". Wilson's model of variables provides a broad framework for further investigation and indeed many researchers have studied it further e.g. Sonnenwald and Iivonen (1999) and Niedźwiedzka (2003).

2.3.1 Impact of ICT and Emerging Trends within Modern Day Libraries

Since the introduction of information technology within libraries in the 1950s the services offered by libraries have undergone major changes i.e. libraries have come to denote not merely physical places where information is held but one that is able to provide information access for users located even in remote physical locations (Marchionini and Komlodi, 1998; Chowdhury and Chowdhury, 2001a). Thanks to the advent of new technology, the emergence of ICT, Internet, and the convergence of data and voice networks, there has been a growing acceptance that libraries need to open the door to new systems on collection development and more on accessing and using information by developing ICT (Chowdhury, 2003; Ingwersen and Järvelin 2005). The availability of technology has led to the emergence of new ideas like "democratisation of information" which Dybkjaer (1997) defines as "the right and opportunity for everyone to access information and knowledge of how to use it".

According to Marchionini and Komlodi (1998), "the development of the user interface in the late 1990s points towards ubiquitous access to information resources. This access is embedded in the information activities of life and customizable to

individual preferences and abilities". Arms (2000) also illustrates how personal computers have changed the way people access information. Chowdhury and Chowdhury (2003) have reaffirmed the view that the recent developments in information and communication technologies have brought significant changes in the ways people can create access and use information.

While the first use of computers in information management was primarily used for creation of electronic indexes so as to access library collections, these services did not replace printed material in libraries, but primarily improved information access and use. Though with the advent of CD-ROMs users' choice for access of electronic information increased it had its own limitations in terms of how one could access them. The evolution of Internet has revolutionised libraries. One of the most important impacts of web technology has been the creation of digital libraries, which allow users to access digital information resources from anywhere in the world (Chowdhury, and Chowdhury 2003).

2.3.2 Digital Libraries and Hybrid Libraries - An Overview

Within the vast body of literature in the information and library sciences, there are several definitions of digital libraries. The earliest reference was made by Licklider (1965) where he coined the term "library of the future" to refer to a fully computer based library. Lancaster (1978) used the term "paperless library" around the same time when Nelson (1974) invented "hypertext". Other terms such as "electronic library", "virtual library", "library without walls" and "digital library" have all been used at various points in time. All these terms have become interchangeable implying use of electronic materials and services.

Many definitions of digital libraries have been proposed in literature, and emphasize on the digital content and online access such as those of Tennant (1999) and Arms (2000). Others have focused on the characteristics of digital libraries, e.g. the definition of Marchionini and Fox (1999) provided the dimensions within which

digital libraries operate. They stated that "*digital library work occurs in the context of a complex design space shaped by four dimensions: community, technology, services, and content*". Borgman's definition (Borgman, 2000a) emphasizes on the technical activities involved in digital libraries; she comments that digital libraries are a set of electronic resources and associated technical capabilities for creating, searching and using information. Probably, the most comprehensive definition is by Waters (1998) who defines digital libraries as

organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities.

Given that most libraries today exist as "hybrid libraries", a term used to denote such libraries which include a combination of traditional paper based as well as digital resources (Brophy 2000; Chowdhury and Chowdhury 2001 and 2003), Rusbridge (1998) states that "the name hybrid library is intended to reflect the transitional state of the library, which today can neither be fully print nor fully digital". It can be noted from the definitions above that, digital libraries transact with digital resources, while hybrid libraries transact with printed and digital resources. It is important to understand what constitutes digital libraries. From the current research perspective, understanding the changing face of ICT and the evolution of digital libraries in the context of information access will provide insights for the current research especially in understanding barriers to information access (Byrne, 2003).

2.3.3 Information Access and the Usability of Hybrid Libraries

Three main elements are defined by the "access to information" (Borgman, 2003):

- First, connectivity which is the requirement of using a computer network, resources and services it assists.

- Secondly, content and services, without connectivity this element is worthless. It includes anything from access to the network and access to the information it contains.
- Usability is the third element of access consisting of three parts (Borgman, 2003):
 1. It is a usable computer network or information infrastructure.
 2. The skills that are brought to the system by the users. Here access can be limited to this technology depending on the capabilities of the user, and the availability of information to them.
 3. The usability of content is defined as the accessed information form, which can be viewed or occupied usefully. However, when a document or file cannot be opened due to the unavailability of its software or hardware or cannot be read in that specific language, then it is considered inaccessible. (Borgman, 2003).

Chowdhury and Chowdhury (2003) confirm that Borgman's notion of access to information has its roots in different areas such as library services, telecommunications policies and so on. They present the definition for access to information that it is in a connectivity to a computer network and to the available content, and thus the technology should be usable; the user has the requisite skills and knowledge, and the content is in a usable and useful form. Accordingly, the three main aspects affecting access to information are the technology, content and interface design features.

2.3.3.1 Defining the Usability

Usability is defined as the level of effectiveness, efficiency, and satisfaction of a user towards an interface when performing a specific task, in a particular environment or group of people (Callahan, 2005, Chowdhury, 2004a; and Hilbert & Redmiles, 2002). Several researchers, such as McGillis, and Toms (2001), and Battleson, Booth, and Weintrop (2001) comment that usability is measured by the degree of which the designed goals of the overall system are achieved (effectiveness), through the resources that have to be expended to accomplish the specific goals (efficiency) and the level to which the user finds the overall system sufficient (satisfaction).

According to Hope and Li (2004) usability includes two factors: content (the information, features, and services available on an interface) and design (the way the content is offered to the interface users). In human functional terms, usability can also be described as the system's capability of being used easily and usefully by a specific group of people, provided with training and help, to accomplish a task, within a particular environment (Chowdhury and Chowdhury, 1999).

There are many dimensions to usability attributes covered by various researches (Nielsen, 1993; Kling & Elliott, 1994; Hilbert & Redmiles, 2002; Blandford & Buchanan, 2003; and Chowdhury, 2004a) as listed below:

- **Learnability:** Users should be able to use the system and get started quickly, so the system must be easy to learn and use.
- **Efficiency:** A high level of productivity is possible if the system is efficient and easy to use.
- **Memorability:** Infrequent users should be able to remember how to use the system even after some time passing, without having to start from scratch again.
- **Help and Errors:** The error rate must be low while using the system and the users should be able to recover after errors quickly and easily with the help of the system.

The usability test of web services and electronic resources is important because users may find it difficult to find information, or might not find the information they seek. Therefore, users should evaluate the construction of the library website to discover the website's weaknesses, and also whether it satisfies their information needs. This would allow the decision makers to solve the barriers facing students if there are any, because the success of a web based information service depends on its usability.

2.3.3.2 The Usability Guidelines

According to Chowdhury (2004a), there are a number of guidelines for the usability of library interfaces, which are stated below:

1.) Interface features:

- This has an impact on the usability of the entire system. Every feature of the interface ranging from the look and feel to the design, colour, fonts, and facilities has influence on the usability.
- The types of interface, e.g. simple or novice vs. expert or advanced search interface
- The language of the interface should include options for using more than one language for display of the options, query formulation, etc.
- Options for navigation, shortcuts, and easy movement among the various options/screens
- Screen features including the use of colours, typography, layout and graphics
- Options for personalization, e.g. choice of a particular design, choice for the selection of channels of information, number of records per page, sort options, display options etc.

2.) Search process:

Three major processes are involved in an information search session, viz. database selection, query formulation and result manipulation. These influence the usability of the information system.

3.) Help:

Various forms of help may be offered at different stages of an information search process, and in each case it is vital to note its

- Appropriateness for the different information users
- Usability including the language, style, context, etc.
- Stability of terminology, design and layout
- Correctness

Chowdhury (2004a) indicates that it is essential to know whether error messages are exhibited, and if so, whether it also displays the measures for corrections.

2.3.3.4 Library Interface and Human Computer Interaction

As defined by Callahan, (2005) the user interface is “a point of interaction or communication between a user and a computer system”. Different cultures design different interfaces with the appropriate language used in that environment, which means they will have to use different standards for dates, time, and numbers (Callahan, 2005). The design and efficacy of a user interface impacts the information retrieval system, since it links the users to information resources. Moreover, depending on how useful the user interface is, users can carry out many tasks e.g. the users can sort, save or even print the search results, modify the search query, etc. (Chowdhury, 2004a) Therefore, the design of the user interface should portray the user’s needs, so that the users can create their own information seeking strategies (Chen, Magoulas, and Dimakopoulos, 2005).

Information seeking and retrieval involves an interactive exchange between a user and an IR system. Information seeking can be a way for problem resolution. Many researchers (such as Xie and Cool 2000; Battleson, Booth, and Weintrop 2001; McGillis and Toms2001; and Xie, 2003) have discussed the importance of ease of use as well as user control of IR systems. Therefore, they called to design easy systems that can allow flexible behaviour between user and the system. It is also clear that the construction of an informal information seeking milieu can reduce the difficulty of using certain information systems.

According to Chen, Magoulas, and Dimakopoulos (2005)

Studies of IS have stated that the user interface is a factor that affects user’s task performance significantly, especially the speed and accuracy for locating particular information. Therefore, it is critical to pay attention to issues of user interface design and ensure that interface is friendly enough to help users get the desired results’.

In today's digital or hybrid libraries as they are more common in the academic environment, users can get access to information through a variety of information channels such as OPACs, e-journals and databases services, subject gateways etc., and each of these channels have different interfaces and usability features. Developing a web based library service to integrate the variety of information channels to facilitate access to heterogeneous information resources is a big challenge for today's libraries (Gharieb, 2006 and 2007).

A study of the IS&R characteristics of students in today's academic hybrid libraries will help us understand how usable the services are and more specifically what the major barriers are for getting access to the required electronic information. Several such studies have taken place in the context of users, and more specifically academic users, in the western world which have been reviewed by several researchers such as Marchionini & Komlodi (1998), Waldman (2003), Kerins, Madden and Fulton (2004), Törmä and Vakkari (2004), Foster (2005), Steinerová and Šušol (2005), FINDER, Dent and Lym (2006) etc. However, such research studies based on the academic library services and users in non-English speaking especially Arabic speaking countries are few and far between.

Some recent Saudi academic studies, (such as AL-Jebri, 1999/2000; AL- Sereihy, 2002; AL- Zaharani, 2004; Hafiz, 2004), discuss some basic concepts of usability, and in most studies the concentration has been mostly towards the hardware/software issues, and the qualification of the staff. Overall, these studies mention the following barriers:

- Limited financial resources
- Limitation in the number of qualified personnel in Internet and ICT
- The scarcity of expert technical librarians
- The insufficient number of computers in the library.

Overall, these studies highlighted that the major barriers are related to the library staff, technical expertise, and the network equipments. However, some of these studies e.g. AL- Zaharani (2004), AL-Qublaan (2001), AL- Sereihy (2002) and Gharieb (2006 and 2007) have mentioned other barriers, such as, the lack of support for the Arabic search engine, and the preference of Arabic publishers in publishing Arabic materials.

They also illustrate the lack of English language skills the library staff suffer from, and the continually changing Arabic publishers' websites, which makes it difficult for users to cope with, and the lack of sufficient standard or benchmark for evaluation of the library interfaces.

A Saudi study by Deiab (2003) defined the role of university libraries as providing sufficient access to reliable information and resources (printed or electronic forms) for studying and research purposes, however, Marghalany and Abdul-Fatah (2003) argued that the current situation and structure of information technology and information services in Saudi universities have raised several points that suggest the establishment of a new position at the top level of the university structure under the title of "The University Vice Dean for Information Technology". These points are:

- The current services lack a central department responsible for administrating, controlling, organizing and coordinating procedures and efforts for the acquisition of information technology, which has led to the failure and non-effectiveness of the mechanical and technological systems used within the Saudi universities;
- It lacks coordination amongst the computer centres, departments, and library affairs deanships with regard to the development of technical specifications for information technology;
- There is a lack of organized qualitative and quantitative training courses provided by the departments, library affairs deanship and colleges, which result in deficient utilization of the systems available at the university campuses.

2.3.3.5 Evolving Trends in Information Access and Barriers due to the Emergence of Digital Libraries

Digital libraries are bringing a major shift in the creation, distribution, management and use of information. A significant change in the scenario is that instead of the user going to the library for information, digital libraries bring the information to users in

real-time at work or at home. A user can get access to a library almost from anywhere if there is a personal computer and a network connection. Thus, digital libraries break the barriers of time, space and often language, thereby improving the use of information (Tennant 1999 and Chowdhury and Chowdhury, 2003). They facilitate access to information by providing various complicated search and retrieval services, through electronic database search services and web search engines. They provide users with the latest information with the help of the web and digital publishing (Arms, 2000).

A significant contribution of digital libraries is their ability to facilitate improved teamwork among users (Chowdhury and Chowdhury, 2003). It has been reported in Borgman (2003) that such collaboration will have a significant impact on the academic information life cycle. In fact, many companies, institutions and research groups are using the resources of the Internet and digital libraries to share information among members by file sharing and co-operative document preparation and use.

According to Borgman (2003), digital libraries have the ability to support the cycle of information seeking, using and creating, the social life of documents and electronic publishing. However, while digital libraries may increase access to information for authorised members, both online and offline, unaffiliated students and scholars may have less access to information resources than in the printed world.

To sum up, the uniqueness of digital libraries, in themselves, pose barriers to information use, as non-availability of technology may leave users with no ability to access information. In the light of the above, the concept of digital divide and information literacy assume significance.

2.4 Digital Divide: an Important Consequence of the Evolving Information Societies

According to Gunkel, (2003), “Digital Divide” is the gap between those with regular, effective access to digital technologies and those without. In other words, those who are able to use technology to their own benefit and those who are not. Digital divide is

usually seen as social and economic problems and relates to the level of social inclusion and equality of opportunity. This term was popularised by Larry Irving, a former United States Assistant Secretary of Commerce and Technology adviser to the Clinton Administration through a series of reports in the mid 1990s (Lynch, 2002; Hargittai, 2002; Gunkel, 2003). It may be important to note that the differences in digital divide not only arise due to the differences that exist among communities in their ability to access digital information but also the ability of the users to use such information. Hence access to Internet is only a contributory factor among other equally significant factors like computer literacy etc. This view is shared by Davison and Cotten (2003) who comment that while ease of Internet access is a fundamental aspect, effective access depends on quality of connection, quality of digital content that is available and that which is provided, auxiliary services, and type of devices available for access. Therefore, any digital media that differentiates the use among society can become the subject of a digital divide.

The term digital divide refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities... Access to basic telecommunications infrastructures is fundamental to any consideration of the issue, as it develops and is more widely available than access to and use of the Internet (OECD, 2001).

Even if appropriate level of access is achieved, users require education that includes information literacy and technological skills to make effective use of the information. The second aspect of user knowledge enables effective participation, due to the users' ability to distinguish relevant information from the wealth of information available (Selwyn, 2004).

While Birdsall (2000) defines the digital divide as separating the users who have access to the Internet from those users who do not, Wilhelm (2001) defines it as: "The gap between those who have access to and can effectively use information technologies and those who cannot." Furthermore, Lee et al. (2002) argue that accessing and using ICT among the population in an unequal base had multiple

disadvantages for some, because accessing ICT means being able to participate in the economic, social, and political and cultural aspects of a society or particular unit. This means that the digital divide not only differentiates between those who have access to the physical hardware of the ICT and those who do not, but it is associated with the broad social environment in which these technologies operate, the users' skills, and the availability of resources to access it.

Furthermore, an extensive literature review focused on the advantages of computers and its consequence; for example, Ainley et al. (2000) declare that the use of computers has a positive effect on the learning process. Accordingly, there are several factors that may have, to a great extent, an influence on the socio-economic factors involved in the digital divide, such as level of the individual or family income, level of education (i.e., the individual or the parents), geographical location, age, gender, occupation and family type, which are considered in this study.

Moreover, Chowdhury and Chowdhury (2003) assert that libraries do not receive sufficient attention from the governments in various countries, and that most of these countries focus their attention on the basic needs of their nations, such as food, water, health, and electricity, etc. This means that the majority of the libraries in these countries are affected by the shortages of financial resources to meet their needs of appropriate information technology, qualified manpower, and to improve the information literacy of their population. In addition, a comparative study by Yusif (2006) illustrates the barriers to information technology infrastructure status between the Arabic and intercontinental world, with information illiteracy among the Arabs countries reaching 95%. This means that there is a need to increase the awareness of and the use and access to electronic information resources in order to reduce this illiteracy.

2.4.1 Local vs. Global Digital Divide

Digital divide is often discussed in an international context given the widely varying disparities in the social and economic conditions in different countries. This key

dimension is termed as “global digital divide”. According to Lu (2001, p1), ‘global digital divide’ is a term used to describe “*great disparities in opportunity to access the Internet and the information and educational/business opportunities tied to this access ... between developed and developing countries*”. Unlike the traditional notion of the “digital divide” between social classes, the “global digital divide” is essentially a geographical division. This effectively implies a situation that countries which have no access to Internet and relevant technologies and the effective ability to use information available globally will suffer severe economic downfall. Other issues that create this divide are gender issues, disability issues, role of foreign language (e.g. content available in English for non-native English speakers), cultural inequality with regard to the content available on the Web, the role of educators in reducing the digital divide in the classroom etc. (Hargittai, 2002; Gunkel, 2003; McLaren and Zappalá, 2002; Selwyn, 2004).

While the developed nations with the resources to invest in and developed ICT infrastructure is reaping enormous benefits from the information age, developing nations are trailing along at a much slower pace. This global divide is often characterized as the north-south divide (i.e. divide between the “northern” wealthier nations and “southern” poorer ones) (Chowdhury and Chowdhury, 2003).

Given that global information can be used for a variety of applications like international trade, online digital libraries, online education, telemedicine, e-government etc. which can solve vital problems within the developing world, the Internet has been hailed as a “great equalizer” (Brynjolfsson and smith 2000), a revolutionary technological tool that enables efficient transfer of information on a global scale. It may be pertinent to mention that though the developed nations have in abundance many of the resources that developing nations could use to resolve their problems, geographical, political and cultural barriers exist that make it difficult or impossible for these solutions to be transferred easily and effectively (Lynch,2002; Cullen,2003).

Therefore, the major obstacles for the digital divide are related to the cost of setting up appropriate infrastructure to enable availability of access to information along with the ability to impart appropriate education for users to use these resources effectively

(Hargittai, 2002). Recent thinking has further reiterated the point that digital divide is not merely a matter of who has direct access to technology, but who is actually helped by technology.

There is a wide variety of arguments about the underlying reasons as to why it is important to bridge the digital divide. The major arguments are (Servon, 2002):

- To provide better education
- To enable economic equality
- To promote social mobility
- To enable social equality
- To promote the concept of true democracy
- To enable economic growth and development.

Appreciation of the problems of digital divide and developing appropriate solutions to address these will provide the much-needed encouragement in resolving this major problem. According to Steinerová and Šušol (2005), while users have accepted the new electronic information environment; they require improved information literacy support. Libraries in the electronic information environment therefore need to combine their traditions and experience in information provision and knowledge organisation with the new possibilities for creative knowledge sharing, use and production.

2.4.2 Digital Divide – Real Cause of Concern for Development within the Middle East

In order to understand the situation within the Middle East region on the aforesaid subject, a review of major literature within the region on the relevant topics of interest was carried out. A distinct theme that emerged from the literature is that the views of the authors in the Middle East complement the various studies done in the Western world highlighting the gravity of the problem of information poverty and digital divide within the region.

According to Al-Jebri (2004), there has been a growing awareness about the importance of information and the impacts of non-availability of information. He has used the term “information poverty” to denote the lack of information availability. His study has highlighted the recent progress made within Saudi Arabia. His study quotes that fixed phone lines have exceeded the 7 million mark that has been a contributing factor for the significant progress in the availability of ICT infrastructure within the region. He states that though a huge volume of information is available both through government and private sources, the biggest barriers are the methods, means and legislations required to facilitate accesses to the required information. This implies that even though information is available the user will be unable to access it and therefore will suffer from information poverty.

2.4.3 Digital Divide – Middle Eastern Perspective

According to Ali and Hijazi (2005), whose major research centres around digital divide and its implications in the Middle East, digital divide refers to the gap between the developed and developing countries with regard to access to information and knowledge sources, and the ability of application of such knowledge sources. They state that varying definitions of digital divide is restricted to the level of detail at which one associates the tasks within the knowledge acquisition cycle. A total knowledge acquisition cycle involves the following tasks (Ali and Hijazi, 2005):

- Access to knowledge sources.
- Knowledge comprehension and use of existing knowledge.
- Knowledge generation.

Therefore, digital divide in the narrowest sense is limited to "access to knowledge sources". In the widest sense, the definition includes all tasks within the knowledge acquisition cycle. A mid-level definition focuses on the gap that exists due to the first two tasks within the knowledge acquisition cycle. Ali and Hijazi (2005) believe that digital divide occurs due to the accumulation of various layers of inequality gaps that occur due to the following:

- Poverty gaps which can be explained through inequality arising due to disparities in income level, non-availability of food, shelter, healthcare, education and knowledge
- Organizational and legislative gaps
- Scientific and technological gaps explained by the pace of adoption of technology, monopolisation of technology, availability of integrated scientific knowledge
- Infrastructure gaps arising due to lack of appropriate policies and inadequate telecom networks and lack of skilled technical manpower.

Further, Ali and Hijazi (2005) consider that one of the contributing factors to digital divide arises because of political compulsions in different countries, e.g. they quote of USA's reluctance to pass on ICANN (i.e. Internet code) to a neutral organisation due to internal political compulsions to retain the supremacy of USA within the global telecommunications market.

2.4.4 Regional and Cultural Differences – A Major Contributor for the Growing Digital Divide within the Middle East

Differences in cultural and social fabric within different societies are a major contributor to digital divide. The varying levels of literacy also aggravate the problem of digital divide. Ali and Hijazi (2005) stated that though there has been a recent development within some of the Arab nations to improve the infrastructure, the level of penetration specifically in the remote rural areas is still low. The problem is also compounded as users face high access charges to use the Internet.

Ali and Hijazi (2005) state that the policy makers have been unable to bridge the digital divide primarily because of varying stances taken by various key stakeholders to resolve the aforesaid issue. Educators consider the digital divide as an educational issue and the inequality is associated with not having appropriate access to educational opportunities. The proposed solution is to enable learners to develop self learning skills for life through use of modern techniques where Internet is an integral

part of the learning process. Communication specialists consider that the cause of the digital divide is the non-availability of telecom networks and associated access methods, inadequacy for exchange of various data types and their proposed solution to resolve this issue is to provide cheaper alternatives to establish telecom networks widely Ali and Hijazi (2005). Sociologists view that digital divide exists due to social inequalities such as individual income, age, sex, educational level, residence location (i.e. urban/rural) Ali and Hijazi (2005).

Various empirical studies (Al-Oboud, 2003; Bo Azzah, 2000; Musllam, 1999; Jaeryees and Al- Senani, 1999; Mubarak, 2005) have taken place in the recent past within the Arab world that highlight the causes of the digital divide within the region, and they support the study of Ali and Hijazi (2005). It may be pertinent to mention that strict regulations within some countries in the Arab world determine the level of content availability and even access to sites within the Web, which in effect has an impact on the digital divide.

As highlighted earlier, while availability of technology is a key aspect of digital divide, equally important is the ability of users to exploit the resources. There has also been several empirical studies done by various scholars; such as Albakhaity (2001); Al-Saleh (2004), which have demonstrated the growing interest among students to use the Internet while highlighting barriers in the form of student capabilities that prevent the use of available resources.

2.4.5 Users' Competence – a Critical Success Factor for Bridging the Digital Divide

While the adoption of technology has been to varying degrees across universities in different countries, the development of technology has necessitated acquisition of different levels of skills among library users. Information access to ICT is useless without the required skills, knowledge and support to use it effectively (Selwyn, 2004). According to Douglas and Murdoch (1999), this has also resulted in convergence of information literacy and computer literacy skills wherein the user

requires the same skill sets i.e. navigating a graphical environment, Internet applications, word processing, spreadsheets, database searches, and presentation software, file management etc.

2.4.5.1 Information Literacy

Different forms of literacy have been discussed in the literature, such as computer literacy, electronic information literacy, library literacy, media literacy, and digital information literacy; for more information on these terms see Bawden (2001).

“Information literacy skill” refers to finding the information one needs, including an understanding of how information resources libraries are organized, familiarity with the resources they provide and knowledge of commonly used research techniques. This also includes the skills required to critically evaluate information content and employ it effectively, as well as an understanding of the technological infrastructure on which information transmission is based, including its social, political, and cultural context and impact (Chowdhury and Chowdhury, 2001). Bawden (2001) suggested that ‘Information literacy is the ability to access, evaluate and use information from a variety of sources’. Other definitions of information literacy, such as those provided by Eskola, (2005), ALA (2007), and ACRL (2007) also reflect similar views. Kurbanoglu, Akkoyunlu and Umay (2006) stated that

Information literacy incorporates the abilities to recognize when information is needed and then to initiate search strategies designed to locate the needed information.

Yet another dimension of information literacy has been identified by Herring (2004) who proposes that information literacy is a broader term, encompassing not only skills but also attitudes to, and motivation for, learning.

Information literacy is associated to ICT skills. These skills can help a user to be able to use computers, software applications, and other technologies to accomplish different academic, work related and individual goals (Chowdhury and Chowdhury

2001; Association of College & Research Libraries (ACRL), 2007). Savolainen, (2002) proposed that information literate individuals ought to obtain new skills: these comprise the efficient and effective location and utilization of information for problem solving and decision making. Therefore, users should be skillful to use of the ICT tools to access information in changing information milieu.

Students have to obtain and practice the important skills to utilise the electronic information resources at university, so that when they leave they are fully equipped to use electronic information (Ray and Day, 1998). The review of the ACRL (2007) for information literacy and its impact on higher education assumes that the important keys for developing lifelong students rely on individual's intellectual abilities of analysis and critical thinking, and helping his or her abilities to build up a framework for learning how to learn, through providing the foundation for continued development in the careers.

2.4.5.2 Information Literacy and Human Information Behaviour

Human information behaviour includes both information processing by humans and interaction with information sources and technological systems (Steinerová and Šušol, 2005). Therefore each user has to possess the required skills to perform different tasks in IS&R process. Hargittai and Hinnant, (2006) state some variables that could be considered as indicators of information literacy skills, such as:

1. time spent on a particular task
2. results gained from this task
3. phases taken to achieve a particular aim
4. resources used to find information
5. value of the information found
6. Evaluating the found information

However, according to Kurbanoglu, Akkoyunlu and Umay (2006), studying certain skills is not adequate; a user should increase confidence in the skills that he/she is learning. Thus high self efficacy is as vital as possessing information literacy skills.

Bandura (1997) suggested that self-efficacy is individual's capabilities to organize and implement the course of action required to achieve an object. It also determines how long individuals can persist and how flexible they will be when facing difficulties and how much effort they can expend on a task. Users with high self-efficacy perception will continue with the task until it is completed. In contrast, users with low self-efficacy perception are less likely to persevere doing their tasks (Bandura, 1997). It is clear that information literacy is a key factor contributing to usability, digital divide and can be regarded as a major barrier.

2.5 Understanding Information Behaviour within the Broader Context of Information Seeking and Access

Given the complex information environment users need to operate in, it is important to understand the role of information behaviour of users to appreciate the barriers to information access. In this section, we present a concise analysis of the research done in this area over the last few decades. Information behaviour has been represented by various researchers as models.

Models may be described as a framework for thinking about a problem and may evolve into a statement of relationships among theoretical propositions. Most models within the information behaviour research are in the nature of the former. While most models attempt to describe information seeking activity, the causes and consequences of that activity and relationship among various stages of information seeking, rarely do they specify relationships among various theoretical propositions (Wilson, 1999).

According to Wilson (1999), it is important to understand the linkages between information behaviour, information seeking and searching models so as to appreciate users information need and the process of how they satisfy the need.

- Information Behaviour (IB) models are concerned with the generalised behaviour surrounding the actual initiation of information seeking on one hand and is concerned with the broader perspective of information search rather than simply using computer based information retrieval systems on the other. It is therefore being thought of as a general field of investigation.

- Information Seeking Behaviour models are a subset of IB models. It is concerned with how people use a variety of methods to discover and gain access to information resources.
- Information Searching Behaviour is a subset of information seeking behaviour and is particularly concerned with the interactions between the user and the computer based information systems of which information retrieval systems for textual data may be seen as just one (Wilson, 1999).

To summarise, if we were to take a holistic approach the aforesaid nested model can be further expanded to consider the IB model as part of the human communication behaviour model.

2.5.1 Information Behaviour Models

Wilson (1981) proposed a model of information behaviour which tries to encapsulate what he considered as information seeking behaviour. The basis of the model is that information seeking behaviour arose due to a perceived information need and in order to satisfy the need the user makes demands on formal or informal information sources which may result in success or failure to find the relevant information. This process is a reiterative process and would stop once the user's need has been satisfied. The model shows that part of the process may involve other people and the information acquired may be used by self or disseminated to others, thereby highlighting the importance of information use and the involvement of other people with the process. The limitation of the model is that it does not provide suggestion of causative factors in information behaviour and consequently does not directly suggest any hypotheses to be tested (Sonnenwald, Iivonen, 1999; Niedźwiedzka, 2003; Ingwersen and Järvelin 2005).

2.5.2 Information Seeking Behaviour Models

The early studies conducted between 1960 to 1985 were either focussed on a systems perspective or a social perspective resulting in each of them presenting a distorted

picture of the Information Seeking Behaviour (ISB) (Pettigrew, Fidel and Bruce 2001; Ingwersen and Järvelin 2005). The existence of conceptual and methodical problems present in these studies have been highlighted by various researchers like Brittain (1975), Dervin and Nilan (1986), Hewins (1990), to name a few. The system perspective viewed the user solely within the context of the information systems, relegating the role of the user vis-à-vis the systems, thereby lacking realism. The traditional view of information seeking assumed that information as objective and users as input-output processors of information. It focused on information seeking behaviour as trans-situational and tried to predict user behaviour using static and across time space by focusing on externally observable dimensions of behaviour and events. Though the social perspective acknowledged the role of users it was unable to provide support for systems development (Dervin and Nilan, 1986).

The alternative paradigm assumes information as something constructed by human beings through a dynamic process. It focuses on how individuals make sense of situations and as to how information need could arise. The three broad approaches within the alternative paradigm could be summarised as follows (Dervin and Nilan, 1986):

- The user-values approach (Taylor, 1984) – The focus is on the perceptions of utility and value to users. It highlights how problems of cognitive factors of users may have a bearing on the users information needs.
- The sense making approach (Dervin, 1983) – The focus is based on the premise of Situation-Gap-Use analysis. When a user is encountered with a situation i.e. when there are cognitive gaps, they build bridges to fill these gaps by selectively identifying the information that best resolves the situation gap.
- The Anomalous State of Knowledge - ASK (Belkin, Seeger and Wersig, 1983) – the approach is based on the premise that a user with the problem normally refers to some information system where the user is considered to be in an ASK and are unsure of the gaps, uncertainties and incoherencies and therefore are unable to specify what is needs to resolve the anomalies. Therefore, the human-machine interaction becomes extremely critical.

Though the aforesaid approaches are different, they focus on different ways to obtaining, describing and resolving information needs of the user highlighting that understanding barriers to information access is integral to resolve user needs. Elizabeth Hewins (1990) in her review of the work done in ISB between 1986 and 1990, acknowledged the growing shift in focus i.e. from either a systems perspective or social perspective, to emphasising the role of users' need in the process of ISB. These new studies attempted to understand individual differences for purposes of systems design as well as to understand common cognition and behaviour among users. However in spite of this shift, these studies lacked good conceptual frameworks.

Dervin and Nilan (1986) proposed a new approach to ISB, where information seeking could be viewed in the context of situation-sensitive sense making approach. This "Sense making Approach" focused on the subjective need of information seekers in a given situation/context and moved away from the historical perspective of information seekers as passive receivers. This implied that individuals were elevated above the systems and the individuals were assumed to be free to construct their own interpretations based on the systems and context, thereby making the ISB as context dependent. This model therefore supports the theory of "information need" proposed by Wilson (1981) which forms the very basis of ISB.

The term "sense-making" as proposed by Dervin refers to "a set of metatheoretic assumptions and propositions about the nature of information, the nature of human use of information, and the nature of human communication" (Dervin, 1999). This study has theoretical foundations in communication studies, cognitive science, sociology, and information studies (Kari, 1998). It has universal applicability and can provide a basis for analyzing virtually any kind of context. Sense-making theory is based on a communication metaphor where information is not transmitted, but is constructed by individuals as they make sense of their movements through "time-space" (Dervin, 1999; Ingwersen and Järvelin, 2005).

As Dervin (1999) puts it *sense making is about moving through time-space, constructing sense of situations, seeing gaps ahead and constructing notions of the kinds of ideas needed to bridge these gaps, reaching for particular kinds of bricks*

(e.g., information sources), with which to build these cognitive bridges, and putting these bridges to work in constructing the next moment in the future (Dervin, 1999).

Information sharing is a continuous process in which humans construct and reconstruct their pictures of reality (Dervin, 1983) a view shared by Matsubayashi (1995). The key feature of this theory is that it allows for the observations of actors to be compared, rather than limiting the research to the boundaries of a particular observer. From an information seeking standpoint, “sense-making is essentially ...a human anchored in history, a structure, and a time-space, moving across gaps, constructing bridges using different verbings for doing so, and arriving at outcomes and consequences” (Dervin, 1999).

According to Savolainen, (1993), sense-making behaviour is in response to and is dictated by fundamental and pervasive discontinuities or gaps in reality. The sense-making gap is the information need that prevents a person from making the next move. This implies that the user must construct a new or altered sense in order to bridge the gap and continue in time-space (Savolainen, 1995). The uses concept refers to “the outcome or outcomes of sense-making aimed at addressing gaps” (Kari, 1998). It refers to the ways in which the bridges created to close the gaps are put to work (Savolainen, 1993). Uses can be either facilitating or blocking and in summary can be either enablers or detractors of information access. The concepts of time, space, movement, gap, power, constraint, and force are central to the theory of sense making (Savolainen, 1995).

The approach gives rise to several important propositions, which are relevant from the current research context, which are encapsulated below.

- Information is not mere restricted within the cognitive realm but exists within any experience observed by individuals during their sense-making process.
- Sense-making suggests that the information obtained by a user during the sense making process can lead to both positive and negative outcomes.
- Since information bridges gaps during the moments of confusion, the interpretation that emerges can be realist, foundational, constructivist, or subjectivist conceptualizations.

- Since time-space conceptualizations are central to this approach, the level of sense making will vary depending on the level of external resistance.
- Sense-making redefines “the concept of barrier from that which stands between a person and what a system thinks ought to be that person’s goal to what stands between a person and her life-facing” (Dervin, 1999). Sense-making theory in summary does not allow for “a priori assumptions about whether the information is useful or otherwise” (Dervin, 1999).

According to Savolainen (1993), the sense-making theory has shifted the focus from users being considered as a function of information systems to focusing on the perceptions of the users. However, he considers that the approach needs further development to efficiently describe the concepts of needs, barriers, helps, and hurts. The metaphorical conceptualization lacks sufficient definition and requires inclusion of cultural, societal, and organizational factors of the sense-making process.

Kari (1998) criticised the sense making theory on the grounds that it has never been explicitly and systematically expounded and brought down to the empirical level and there has been little discussion on the impact of empirical results on the theory. Further, according to Kari (1998), it lacks the formal dimension and most substantive sense-making theories have been “little more than obscure lists of loosely interrelated operational concepts and their categories”.

However, Kari (1998) suggested that the process character within the theory as a major strength, but felt that the implicit assumption of using the “bridge” as a major drawback of the theory. He disagreed with the presumption that all concepts of the model are equal. According to him, while “gap,” “bridge,” and “help” are the various stages, “situation” is the context within the sense-making process and therefore logically all sense-making occurs within the “situation.” Interestingly what is of great importance and relevant in the context of the current research is the inclusion of the concept of “barrier” within the model.

Kari’s embraced the term “information action” to represent a more formal theory of sense making. His situational information seeking model encompasses the three major steps in the information seeking process: needs, seeking, and use (Vakkari, 1997).

Mokros et al. (1995), in their study on the practice and personhood in professional interaction highlighted that individual differences are apparent from the outset of the interaction and users broadly use two distinct strategies i.e. seeking a broader context and clarifying the query. In fact, users would choose a strategy in favour of the other and this in turn would influence the interaction. This study provides another dimension on how individuals influence the situation by influencing the interaction.

Kuhlthau's process model developed in 1991 (Kuhlthau, 1991) was an important benchmark as it identified various stages in the process of ISB. The model identifies six successive stages each of which is linked to a specific task/ activity i.e. 1) initiation (recognise); 2) selection (identify); 3) exploration (investigate); 4) formulation (formulate); 5) collection (gather); and 6) presentation (complete) (Beaulieu, 2000). The interesting fact about the model was that it brought to fore that users' feelings, thoughts, actions and type of tasks performed will be dependent on the stages of the information seeking process the individuals find themselves in. The affective as well cognitive behaviour of the user were explained by the model and it also showed that ISB was a dynamic concept and it changed based on the stage of the information seeking process individuals were involved. This model is based on Kelly's "personal construct theory" which provides explanation as to how the affective behaviour of individuals impact their ISB during the process of assimilation of information and as to how they assign meanings to various constructs of information(Wilson,1999). Though the model is a general process model applicable over a range of empirical domains it does not explicitly model the work complexity. Vakkari (2001) extended the scope of the model to study information retrieval where additional explanatory variables in the form of types of information sought, search tactics etc were used.

David Ellis following his earlier work in 1989, has along with Haugan proposed in 1997 (Ellis and Haugan, 1997) that ISB has eight distinct features i.e. starting, chaining, browsing, differentiating, monitoring, extracting, verifying and ending. Though these features inform ISB, they do not explain the interrelations between these activities temporally (Wilson, 1999). Ellis defines his model as a behavioural one and acknowledges that the relationship between these activities or the order in which they occur may vary. Though this model is a generalised one explaining ISB, it

fails to address and explain ISB in terms of work tasks, user knowledge about the task etc because they are not explicitly linked to external causative factors (Ingwersen and Järvelin 2005).

Wilson (1999) explored as to how the two models of Kuhlthau and Ellis could be brought together. Though both these models could be roughly mapped on to each other he noticed that the models were opposed to each other. According to Wilson (1999), while Kuhlthau's model assumes stages of information seeking based on the behavioural analysis of individuals, the Ellis model suggests that the sequence / order of the behavioural characteristics may vary. According to Wilson, 1999; Wilson, et al.2002), this anomaly could be explained by the differences in the empirical studies carried out i.e. single vs. multi-sorted process.

Byström, and Järvelin's Model (1995) can be viewed as significant model as it integrates IS&R processes. It explicitly links and explains causal linkages between task complexity, information need and sources. The impacts of variables like personal, situational and organisational variables have been incorporated into the model. Though this model enables development of testable hypotheses based on systematic categorisation of central concepts, it does not consider other equally important aspects of work tasks i.e. size, urgency, reasons of difficulty and dependencies between different tasks, which are extremely integral to the IS&R process.

Saracevic (1996) reviewed literature of different models that capture the users' interaction with different information retrieval systems. According to him there are three distinct models which are highlighted below;

1. Traditional model – which defines information retrieval as a two prong system between the user and the system.
2. Ingwersen's cognitive model (1996) which defines the individual cognitive space present within the system and concentrates on how cognition impacts and interacts with various elements of information retrieval i.e. information objects, interfaces, social & organisational environment and the information system itself.

3. Belkin's episode model (1995) which defines the user interaction with the information retrieval system as a series of different interactions present within an episode of information seeking (Saracevic, 1996).

Wilson (1981) has identified work task as a central component of information behaviour. This has subsequently been investigated by Byström and Järvelin (1995) and by Vakkari (1999). Though work task relates to a problem or problematic situation, it involves a higher level of abstraction. Even behind the process-oriented views of information behaviour (Kuhlthau, 1993; Ellis 1989; Wersig & Windal, 1985) though work task is not explicitly mentioned, it forms the central theme behind information seeking behaviour.

Search task can be defined as sub-task of the work task. This is concerned with how the searcher would develop search strategies to solve the given work task. Though work task and search task have been studied separately in the past, various studies have been conducted in the last two decades which attempt to integrate the above two (Belkin & Vickery, 1985; Jarvelin, 1986; Saraveic et al., 1988; Ingwersen, 1992; Marchionni, 1995; Vakkari, 1999; Spink, et al. 2002, Jarvelin & Wilson, 2003).

More recent work of Pharo (2004) tries to encapsulate and integrate the two processes through a conceptual framework called search situation and transition model. The model seeks to display five distinct categories that have significant interplay during the information seeking and retrieval process. He also makes a distinction between two elements during the search process which he terms as search transitions and search situations. Search transitions refer to interaction by the searcher with the information surrogates so as to enable locating the resources. This is similar to information seeking strategy proposed by Belkin (1993). All relevance judgement done by searcher is based on the surrogates and rejections take place silently. Situations refer to the periods within the search session where the searcher examines the resource in order to find information that may be of help to execute the task. The work also highlights the importance of how work tasks influence relevance judgements and relevance level during the search process.

Recent studies by Foster (2004, 2005) modelled information seeking as a nonlinear model. The behavioural pattern of the information seeker is like an artist's palette where the various activities remain throughout the information seeking process. However, there is no fixed start or finish points; the information seeking process may be repeated or lead to any other until such time either the context or query will determine whether the information seeking process will end. The interaction takes place over time in a non-linear way. The study shows that the information need is a dynamic holistic process that keeps changing. The model suggests that there are three core processes (i.e. opening, orientation & consolidation) and three levels of contextual interaction (i.e. external context, internal context & cognitive approach), each composed of different activities and attributes. These interact with time in a non-linear manner.

Barriers to information access exist within the external as well in the internal context. Major external influences are social and organisational, time, the project, navigation issues and access to sources. Internal context variables include feelings and thought, coherence, knowledge and understanding. Cognitive approach describes the aspects of the mode of thinking observed in the users i.e. willingness to identify and use the information that might be considered relevant. In summary, the information seekers experience the opportunity and need for information also change over time. The relationship between the core processes and developing context freely interact with each other and is iterative over time. Given that the information seekers is holding a palette of information behaviour opportunities the interactivity that takes place can be described as non-linear, dynamic, holistic, and flowing. The above model reiterates the fact that even if one were to presume that the information seeking behaviour as a non-linear model barriers do exist during the information seeking process and highlights the importance of the current research (Foster, 2004, 2005).

Though all the above models attempt to explain the information behaviour and IS&R process through a holistic cognitive view, they fail to explicitly specify the variables which may act as a barrier in the information seeking process. However, Wilson's behaviour model is a macro-model which explicitly mentions intervening variables and therefore has been chosen the appropriate model for the purpose of this study (Ingwersen and Järvelin 2005).

2.6 Wilson's Information Behaviour Model -An Overview

Wilson originally proposed the model of information behaviour in 1981. This model is based on the literature review done from a variety of fields other than information technology like decision making, innovation, psychology, health communication and consumer research. Subsequently Wilson incorporated the work of Ellis (1989) into the model. Wilson (1997) further refined his model to incorporate the activating mechanism between the context and the decision to seek information. This is similar to the "bridging of the gap" proposed by Dervin (1983). He also elaborated the concept of intervening variables which in his view could promote or act as barrier to the ISB. The model was essentially made up of two constructs, information seeking and information processing and use, represented in a circular, iterative system (Johnstone, Tate and Bonner 2004).

The root of the information seeking behaviour is the concept of information need. The need is a subjective experience that occurs only in the mind of the person in need and therefore cannot be observed by another person. The experience of need can only be discovered by deduction from behaviour or through the reports of the person in need. As Morgan and King (1971), (cited in Wilson 1997), propose need arises due to the following three reasons:

Physiological needs, unlearned motives and social motives, which is summarised by Wilson as cognitive, affective or physiological.

The need is actually triggered by a motive. When the motive is activated a belief-value matrix is activated which associates different values relating to various believed levels of success. Motive can be linked to the gratification theory (Fiske, 1990) which suggests that users have complex needs and they try to seek information actively to gratify their needs. Gratification falls into various affective needs like diversion, personal relationships and personal identity. The needs also have a cognitive component, which can be expressed as the need to find order, and meaning in the environment i.e. needs to know, curiosity and desire to be informed. The types of information needs can be the need for new information, elucidate information held or confirm information held.

According to the model, therefore information seeking is activated in a context and there are various modes including passive attention. The information need forms the trigger for the ISB. The information need which is a subjective concept is present only in the mind of the user. However, though information need is a cognitive representation of a future desired state, the types of information need broadly stem from the need to acquire new information, need to elucidate information held and need to confirm information held. The modes of questioning to elicit information can take the form of orientation/discovery, reorientation, construction or extension (Wilson, 1997)

Another way of defining the elusive information need is through focusing on the proximate causes of information seeking behaviour. This can be related to the stress and coping theory which has its origins in psychology. According to Folkman (1984) coping has two major functions that are regulation of emotions and emotion focused coping and management of the problem that is causing distress (i.e. problem focussed). Wilson (1997) referred to Van Zurren and Wolfs (1991) who suggests that information seeking is highly correlated with problem focused coping.

Coping may take many forms. According to Krohne (1993) they are attention or coping with threat or cognitive avoidance or turning away from the threat. While Krohne used the term 'vigilance' for defining attention (Cited in Wilson 1997), Miller and Mangan (1983) use the polar dimensions by the terms sensitisation and repression. Based on the cognitive styles people will use different coping strategies to deal with the situation.

Wilson uses the stage process version to represent the similarities between Kulthau & Ellis models within the overall process of information seeking. In line with his view that an information need may not activate the information seeking behaviour he used the concept called "Activating Mechanism" to promote the idea. He borrowed ideas from the social sciences to explain this phenomenon. The three main activating mechanisms are explained below (Wilson, 1997 and 1999).

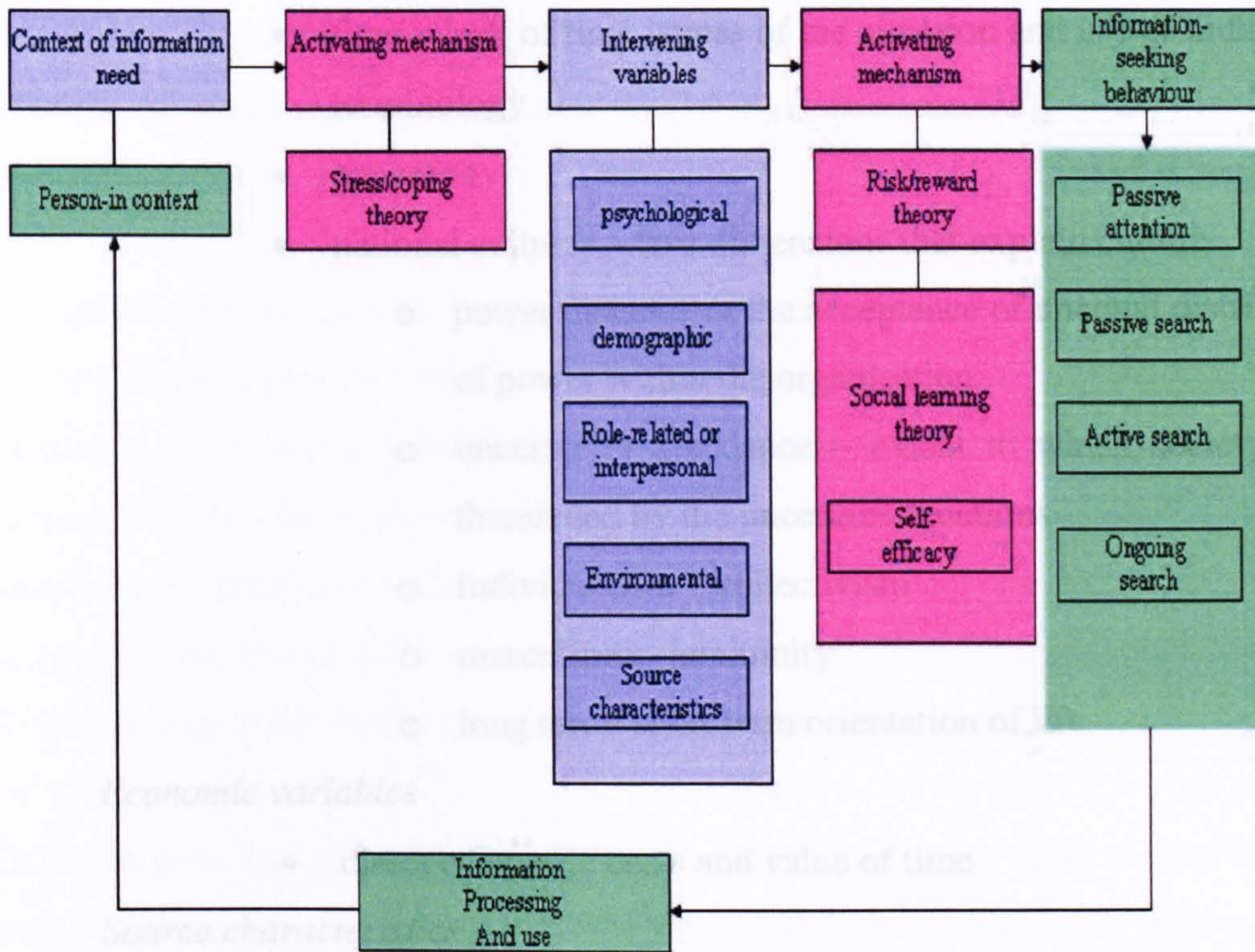
1. *Stress and coping theory* based on a general theory of psychology promotes the idea that individuals develop stress when they perceive their environment

to endanger their well being. In order to cope with stress, individuals would seek different coping mechanisms based on their levels of intolerance to uncertainty and anxiety.

2. *Risk-Reward theory* based on consumer research draws attention to the role of rewards vis-à-vis the search efforts in the information seeking process.
3. *Social Learning theory* is based on the ideas derived from stimulus response theory which has as its central theme “self efficacy” or “personal mastery”. According to this, individuals would pursue coping only if they are convinced about their self-efficacy in handling the situation.

This therefore leads to the premise that whatever the situation in which a person perceives the need for information, engaging in information seeking is not a necessary consequence. There are a number of potential impediments between the recognition of the need and the activation of the search of information. The various barriers are termed as intervening variables. These intervening variables may prevent the emergence of the coping strategy or may intervene between the acquisition of information and its use. Wilson introduced this concept to suggest that certain factors may act as enablers or detractors during the information seeking process.

Figure 2.1 Wilson's 1996 Model of Information Behaviour



Adopted from Wilson (1999)

According to Wilson (1999), the various intervening variables are:

Personal characteristics

Emotional variables arising due to

- cognitive dissonance – i.e. conflicting cognitions make people uncomfortable forcing them to resolve the same
- selective exposure – i.e. people consciously or unconsciously avoiding the messages that are in conflict with the dispositions
- physiological, cognitive and emotional characteristics

Educational variables

- educational level and knowledge base

Demographic variables

- age, sex and other factors

Social/ Inter personal variables

- variables that intervene due to the fact that human interaction is required to obtain the information sought

Environmental variables

- time – lack of time, stress of the situation and use of unfamiliar terminology
- geography
- national cultures – five dimensions that explain culture
 - power distance or the acceptance of unequal distribution of power within the organisation
 - uncertainty avoidance – extent to which society feels threatened by the uncertain situations
 - individualism – collectivism
 - masculinity- femininity
 - long term/ short term orientation of life

Economic variables

- direct economic costs and value of time

Source characteristics

- access – ease of access
- credibility
- channel of communication

Further, the model suggests that information seeking and acquisition can happen through the following ways (Wilson 1997):

- passive attention – information acquisition may take place without intentional seeking
- passive search – when one type of search results in the acquisition of information that happens to be relevant to the concerned user
- active search – where users seeks out information actively
- ongoing search – where active search has been done to establish the framework and where continuing search is carried out to expand / update the knowledge base

The rationale for using this model for the purpose of this research is that this model not only combines views from various literature but has specifically identified

intervening variables which will promote or act as barriers during the information seeking process. Though this model continues to be a macro behaviour model, the inclusion of other theoretical models makes it a richer source of hypotheses and further research (Wilson, 1997).

Though the Wilson model is fairly static and is a general behaviour model it provides a good framework for understanding the various processes present during information seeking. Given that this research seeks to address barriers to information access in an electronic environment, the model serves as a good starting point. Though there have been various criticisms levied against the use of the model, there has been a wide acceptance that the model provides a broad framework (Ingwersen and Järvelin 2005; Niedzwiedzka, 2003, Pettigrew, Fidel and Bruce, 2001).

The main criticism of the model has been that the context of the information need has been isolated from the intervening variables. There is an argument purported that since all these variables themselves form the context of information behaviour, context should not be separated from the intervening variables (Niedzwiedzka, 2003).

However, we take the view about context purported by Ingwersen and Järvelin where they state that “if context is the determining factor for individual cognition then there would be no advance or change in that context but only predetermined aggregation of knowledge” (Ingwersen and Järvelin 2005). It suggests that though an individual can be influenced by the context he cannot be directed by the environment/ domain. The principle of complementary social and cognitive influence captures the essence of individual cognition where cognition occurs as a two way process i.e. bottom-up or top-down approach where the individual may be influenced by the environment and may also influence a change in the external environment.

Hence in the context of the study, the aforesaid debate about context is not significant. What is more critical, is to understand given these different categories of intervening variables how does individual cognition affect the information seeking process and what is the role of interplay between these variables during the IS&R process. Further, studies by Heinstorm (2003) support the view that inner traits of individuals interact

with contextual variables so as to have an impact on information behaviour giving rise to the notion purported by Ingwersen and Järvelin (2005).

Further the concept of intervening variables is universally applicable even if we were to presume information seeking as a linear or as a non-linear process. Given that the model is a very generalised model, we do acknowledge that the model has its own limitations. However, the model is useful to the extent of providing a broad framework for testing hypotheses and as a good starting point to explore the research questions in the current empirical study.

Based on the aforesaid literature review it is clear that a lot of research efforts are directed towards understanding the role of individuals within the IS&R process. Given that humans are directed by rationalistic as well as affective, cognitive and emotional processes, it is extremely difficult to decipher the entire information behaviour. As elucidated earlier the need for what prevents an information need to result in an information seeking behaviour forms the core basis of this study.

The current research objective is directed towards understanding the barriers to information access in an electronic environment in culturally distinct as well as similar academic environments.

Chapter 3: Research Design and Methodology

3.1 Introduction

This Chapter discusses the process followed in the gathering, analysis and interpretation of the data. It starts with the design of the research and refers to the study sample. It describes the research tools used embracing both quantitative and qualitative methods. It discusses the development and piloting of the instruments used - questionnaire, focus group, and interview - that represent the research milieu in which the study was implemented.

3.2 Research Philosophy, Strategy and Approach

3.2.1 Research Philosophy

Based on points made by Hammersley (1996), the aim of this study is to adopt a research philosophy founded on realism as opposed to positivism and interpretivism. A realism philosophy combines the extreme ends of interpretivism and positivism by accepting the existence of a reality that is shaped by large-scale social forces independent of human thoughts and beliefs, while recognising the importance of understanding people's socially constructed meaning and subjective reality (Wang, 1999). Furthermore, Benton (1998) believes that most social science philosophers prefer to use the term positivism to naturalism, because epistemological naturalism believes that the social life of humans is known in the same way as the natural world is. Subsequently, methodological naturalism applies natural science methodology in social science research.

This approach requires using a structured methodology to make a replicable outcome possible that is consistent with the findings of the literature review. For example, Wilson's model (1997) of information behaviour has been used as a broad basis for this study. The various intervening variables have been micro-segmented and have been studied from two culturally distinct academic environments, i.e., University of

Strathclyde in Glasgow, UK compared with King Abdul-Aziz University (KAAU) in Jeddah, Saudi Arabia in the first phase. Findings from KAAU were then compared with both King Saud University (KSU) and Imam Mohammed Ben Saud Islamic University (IMBSIU) in the second phase. These universities are considered typical universities in the respective countries. The various intervening variables of Wilson's model have been used as the micro-segments and with the aim of answering a number of questions as mentioned in Chapter 1, section 1.4(P.5).

Wilson (2006) suggested that the full assortment of human and personal needs is the root of the motivation of information-seeking behaviour that arises because of individual roles in social life. Moreover, when determining factors related to needs and information-seeking behaviour, the environment in which the work-role is performed, the socio-cultural environment and the physical environment should be considered because they will have an impact in particular ways.

Bawden (2006) pointed out that the relative simplicity of Wilson's model seems to be the strength for consensus understanding, the representation of the relationship between human information behaviour, information seeking and information retrieval. He assumed that this model forms the basis for the education and training for these subjects.

Furthermore, Bawden (2006), citing Case (2002), Mckeckine (2003) and Savolainen (2005), asserted that the inclusion of information providers and informal information systems is an intrinsic part of any study of information seeking, and is essential for the study of "everyday life" information seeking.

3.2.2 Research Hypotheses

There were six major research questions to be addressed in this research, (Chapter 1, section 1.4). These research questions relate to:

- ICT infrastructure, of the country as well as of a specific universities and its impact on IS&R

- Barriers to information access caused by personal characteristics of individual and group of users
- Barriers to information access caused by poor Internet skills of users
- Barriers to information access caused by demographic, social/interpersonal and environmental factors
- Barriers to information access caused by a source related characteristics.

In order to address these research questions seven hypotheses were generated. These hypotheses were primarily based on the intervening variables proposed in the Wilson's model (1999), which have subsequently been discussed and modified by other researchers such as Niedzwiedzka (2003) and other models of HIB as discussed in Chapter 2. They relate to the barriers to information access caused by:

- ICT infrastructure
- Personal characteristics of users
- Internet competence of users
- Demographic features of users
- Social/ interpersonal characteristics of users
- Features of environment where student are located
- Usability characteristics of information sources and services.

Each of these hypotheses and corresponding sub-hypotheses are discussed below.

Main hypothesis 1: Differences among universities in terms of ICT infrastructure and access to electronic information services may have an effect on the use of electronic information resources.

H 1-1: Differences in ICT infrastructure, national and institutional policies, and provision and access to electronic information services among university libraries, i.e., University of Strathclyde, UK and King Abdul-Aziz University, Saudi Arabia, may have an impact on the use of electronic information resources and the type of resources being accessed.

H 1-2: Differences in ICT infrastructure, institutional policies and provision and access to electronic information services that exist among different

universities in Saudi Arabia may have an impact on the use of electronic information resources and the type of resources being accessed.

H 1-3: Internet Access and availability may impact the usage, preference and type of electronic information resources accessed.

Main hypothesis 2: Personal characteristics may impact the usage, preference and the type of electronic information resources accessed.

H 2-1: The user confidence in adopting technology may have an impact on the usage, preference and type of electronic information resources accessed.

H 2-2: The user's confidence in using the Internet to obtain information may have an impact on the usage, preference and type of electronic information resources accessed.

H 2-3: The user's computer experience may have an impact on the type and preference of electronic information resources accessed.

H 2-4: The user's language may have an impact on the ease of searching, the ability to obtain effective results and the time taken during an IS&R process.

H 2-5: The user's subject background may have an impact on the preferences towards use of certain types of electronic information resources accessed.

H 2-6: The user's current subject of study may have an impact on the preference of the type of electronic information resources accessed.

H 2-7: Use of the Internet as part of daily routines may have an impact on the usage of electronic information resources accessed.

Main hypothesis 3: The user's Internet competence may have an impact on the IS&R process.

H 3-1: The user's Internet and computer competence may have an impact on the extent of information obtained during an IS&R process.

H 3-2: The user's Internet competence may have an impact on the efficacy of the time taken to obtain results during an IS&R process.

H 3-3: The user's Internet competence may have an impact on the ease of access of electronic resources during an IS&R process.

H 3-4: The user's Internet competence may have an impact on the familiarity with using electronic resources during an IS&R process.

H 3-5: User education and training in information literacy skills may have an impact on the ease of access of electronic resources during an IS&R process.

H 3-6: User education and training in information literacy skills may have an impact on the extent of information obtained during an IS&R process.

H 3-7: User education and training in information literacy skills may have an impact on the efficacy of the time taken to obtain results during an IS&R process.

Main hypothesis 4: Demographic variables may have an impact on the usage, type and preference of electronic information accessed.

H 4-1: The user's gender may have an impact on the usage, type and preference of electronic information resources accessed.

H 4-2: The user's age may have an impact on the usage, type and preference of electronic information resources accessed.

H 4-3: The user's marital and social status may have impact on the type and preference of electronic information resources accessed.

H 4-4: The user's marital and social status may have an impact on having a computer and Internet usage per week.

H 4-5: The user's own and/or family income may have an impact on the ease of access of electronic information resources.

Main hypothesis 5: Social/interpersonal variables may have an impact on access to electronic information.

H 5-1: The role of the user may have an impact on the usage, type and preference of electronic information resources.

H 5-2: Parental education of a user may have an impact on having a computer and Internet usage.

H 5-3: Parental education of a user may have an impact on the user's confidence in adopting technology.

H 5-4: Parental work of a user may have an impact on the user's confidence in adopting technology.

H 5-5: Parental work of a user may have an impact on the ease of access of electronic information on the Internet.

Main hypothesis 6: The environmental variables may have an impact on access to electronic information.

H 6-1: The location of the user (city, suburban, rural areas) may have an impact on the ease of access to electronic information resources.

H 6-2: The economic condition of the local university in using technology may have an impact on the usage of electronic information resources.

H 6-3: The user's perception of the ambiance of the search environment has an impact on user's satisfaction during the IS&R process.

H 6-4: The user's household type has an impact on having a computer and Internet usage.

Main hypothesis 7: The IS&R, usability features and user interfaces may have an impact on access to electronic information resources.

H 7-1: The design of the library web interface may have an effect on the user's perception.

H 7-2: The user's satisfaction with the search result of a known topic is dependent on the efficacy of the IS&R process.

H 7-3: The user's satisfaction with the search result of an unknown topic is dependent on the efficacy of the IS&R process.

H 7-4: The level of difficulty of a known topic search may have an impact on the number of times needed to rephrase the search terms before obtaining the desired result and the user's satisfaction with the results.

H 7-5: The level of difficulty of an unknown topic search may have an impact on the number of times needed to rephrase the search terms before obtaining the desired result and the user's satisfaction with the results.

H 7-6: The user's familiarity with electronic information resources may have an impact on their perspective of the importance of electronic information resources.

H 7-7: The search process and help facilities may facilitate the IS&R process.

3.2.3 Research Strategy

Methodology is prior to method and more fundamental, it provides the philosophical groundwork for methods (Wilson, 2002). Wang (1999) defined the term methodology with respect to empirical studies of human behaviour and social sciences as "a theory of methods that guides the description, explanation, and justification of methods in

empirical studies”, while method was classified as “the actual design and specific scientific techniques used in an empirical study.” Further, Dervin, (1999) assumed that the term methodology is used as a substitute for methods or to refer to the theoretical analysis of methods. However, Hemon and Schwartz (1994), as cited by Wang (1999), called for further studies on methodologies and research designs in Library and Information Science (LIS) because of “its limited influence on LIS research practice and tendency of published research that focus on the findings and its implications rather than on the methods used and issues of reliability and validity”.

This study has adopted multiple research techniques (qualitative and quantitative). Quantitative approach has been used to collect data through survey questionnaires, which would enable statistically significant results to be produced, using the Statistical Package for Social Sciences (SPSS), in order to define and generalize the findings for samples of a given population (Waldman, 2003). Miles and Huberman summarise the characteristics of qualitative data as data that is “expressed in words”, based on “observation, interviews or documents” that are collected in “close proximity to a local setting over a sustained period of time” (Miles and Huberman, 1994). Qualitative approach was used to collect data on specific issues through interviews and focus group.

This study was planned to be conducted in five interrelated phases Figure 3.1 provides a schematic representation of this research. Each phase of the research produced some output that provided the modification for, and input to the subsequent phases of this research.

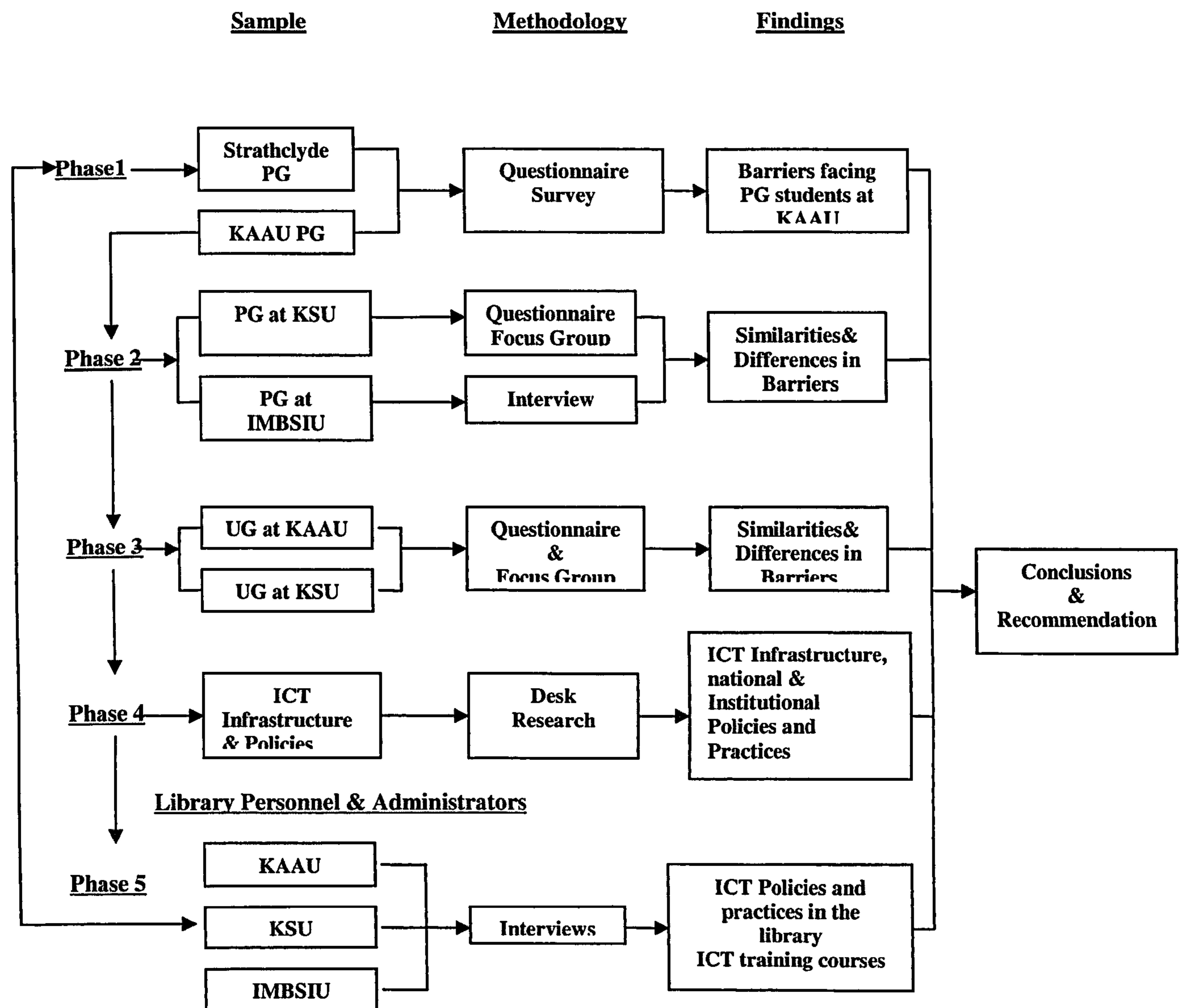
3.2.4 Research Design

3.2.4.1 Quantitative and Qualitative Methods

There are two techniques exploited for collecting data in social sciences, these are divided into two broad paradigms: quantitative and qualitative, and each has its strengths and limitations (Wang, 1999). Quantitative methodology harmonizes with a study dealing with statistics and large random samples. This approach provides,

through statistics, and diagrams how the data are related, and thus approves or disapproves the research hypotheses; and qualitative approach provides an opportunity to evaluate the individuals' views involved in the research environment such as library staff and library users. Qualitative analysis proceeds by particular themes from evidence and organizing data to provide a consistent picture (Eisenhardt, 1989; McQueen and Knussen, 2006).

Figure 3.1 The Research Structure



According to Hammersley (1996), the use of both quantitative and qualitative methods would refer to internally coherent and comprehensive research paradigms that are founded on incommensurable philosophical or political assumptions. In addition, both methods appear to be complementary and must be used in an appropriate way depending on the context, purposes and the focus of the research, which would bring to the researcher's attention information about the wider context that being investigated (Wang, 1999; Wilson, 2006).

In addition, the intention behind the use of quantitative and qualitative methodological approaches is to reach options available, enrich the study with differences in philosophical view, and gain more views from the variations in substantive theoretical ideas and in practical goals. Furthermore, the combination of qualitative and quantitative techniques would promise to cancel out the respective weaknesses of each method practised alone (Wilson, 2006). These methods together can extend and validate results further (Sonnenwald and Iivonen, 1999).

The methodology used for this study comprises the collection of both quantitative and qualitative data. Questionnaires, focus groups and interviews (in-depth semi-structured) were the selected methods (Powell, 1999); Wang, 1999; Wilson, 2006). Both quantitative and qualitative methods are used to provide holistic view and the robust data needed to triangulate and validate data collected in information seeking behaviour (Bryman 1988; Gorman and Clayton, 1997; Wang, Hawk, and Tenopir, 2000; Banwell, Coulson 2004; Martzoukou, 2005). In IS&R studies, combined methods can provide more accuracy and reliability (Wang, 1999; Martzoukou, 2005; Kuhlthau, 2005). The aim of using multiple methods is to overcome the possible deficiencies and limitations and to increase the hypothetical understanding of the considered event (Martzouko, 2005).

A holistic study of information seeking behaviour may identify the multidimensional nature of information seeking and can attempt to discover the dynamic phenomenon that takes place in IS&R process (Kuhlthau, 1993). According to Wilson (1997 and 2006) the information users in such a wide view would not only be lead to seek information for cognitive needs, but as living and working social environments that form their motivations for seeking information to satisfy largely effective needs. It

revealed that cognitive, contextual and social factors drive information seeking behaviour (Hjorland, 2000).

Since, the aim of this study was to investigate the barriers to accessing e-information resources in the selected Saudi universities (KAAU, KSU, and IMBSIU), it focused on confirming the findings revealed by the statistical analysis of the quantitative (survey questionnaire) with the qualitative data from in-depth semi-structured interviews and focus group discussions (appendix A , B and C).

3.2.4.2 Validity

Validity is the feature of methods or devices that scale the dimensions that they want to measure (Busha and Harter, 1980). The two main validity methods used in this study were the content and construct methods. The use of content validity depends on the way we classify the concept it is designed to test. It is the most commonly used method in the social sciences (Ephraim, 1994; Hammersley, 1996; Gorman and Clayton, 1997; Wang, 1999; Powell, 1999; Walden, 2006; Reeves et al., 2003).

In this study, the role of the professors in Saudi Arabia was mainly to make sure that the translation from English to Arabic was done correctly in the questionnaire and interview, and their role was not to provide critical evaluations of the instruments. Moreover, the pilot study in both UK and Saudi Arabia validated the instruments; they were also vetted by the department Ethics committee and the team of supervisor. Moreover, chosen postgraduate and undergraduate students also pre-tested the questionnaire, and interview and evaluated the instruments used in this study. The validity of these instruments was supported by ideas from other researchers' questionnaires adopted from successful recent doctoral studies and tested in published research studies (Gorman and Clayton, 1997; Reeves et al., 2003).

3.3 The Study Sample

According to Reeves, Apedoe and Hee Woo (2003) “a representative sample shares all important characteristics, such as age, gender, skill level, etc. of the large population that are of interest in studying.” Furthermore, the use of sampling requires establishing eligibility criteria to determine the targeted individuals that are eligible to be included in the sample population. This entails using an appropriate sampling technique, which includes several methods, such as (Busha and Harter, 1980; Moore, 2000):

- Random sample (i.e., every individual has an equal chance to be selected);
- Cluster sampling (i.e., a naturally occurring unit, e.g., school, university, a province, city, etc.);
- Convenience sampling (i.e., using an already available group of individuals, e.g., postgraduate and undergraduate students, professors, library staff, etc.);
- Snowball sampling (i.e., when finding participants who meet the study criteria is difficult, selecting one or two participants who meet the study criteria, who in turn would be able to identify other individuals, and so on.)

The initial sample of users for this study comprised male and female postgraduate students who used electronic information services for their work as well as for non-work-related jobs (e.g., for living). Further, given that postgraduate students possess more maturity than undergraduate students do, the impact of their cognitive behaviour on information seeking would throw light on critical factors that act as barriers to information access (Wilson, 2006).

Convenience sampling was used to choose from four different postgraduate programmes, i.e., Information Management (IM), Information and Library Studies (ILS), Computer and Internet Technologies (CIT), and Master of Business and Administration (MBA) at the University of Strathclyde, Glasgow. Furthermore, all these 4 programmes comprising 139 postgraduate students were targeted for this research. These programmes represent some of the popular courses in the university; in addition, students on these courses not only have access to the general university websites, but their own department websites also provide a great deal of information related to their learning and living. The questionnaires were e-mailed and distributed

by hand to 139 postgraduate students. A total of 60 responses were obtained out of which 6 responses were rejected, because they were incomplete, so 54 valid responses were obtained, thus giving a response rate of 39%.

In the case of King Abdul-Aziz University in Saudi Arabia, out of 187 target respondents, 146 responses were obtained, out of which 10 replies were rejected because they were incomplete. Thus, 136 postgraduate students of both genders responded to the questionnaire, giving a response rate of 72.72%. The postgraduate students included the three main postgraduate courses, viz., Library and Information Science (LIS), Computer Science (CS) and Business Administration (BA). Moreover, at KAAU out of 340 target respondents, 239 undergraduate students of both genders responded to the questionnaire, giving a response rate of 70.29%, from the same departments mentioned above.

In contrast, at King Saud University (KSU), out of 102 target respondents, 82 postgraduate students of both genders responded, but 7 responses were rejected because they were incomplete, so 75 valid responses were obtained, reflecting a 73.52% response rate. The faculties of the postgraduate student participants included Computer Science (CS) and Business Administration (BA). Furthermore, at KSU, out of 362 targeted undergraduate students, 235 students responded, giving a response rate of 64.9%. There were respondents from both the genders from the BA, and CS departments, but for the LIS department all the respondents were male.

The postgraduate students at KAAU and KSU of both genders who participated in the study survey questionnaire were asked to answer all the questions. A shorter version of the questionnaire was distributed for the undergraduate students because they are restricted to a daily time table of lectures, unlike postgraduate students who have more search experience with the library websites and electronic information resources. The undergraduate students were selected for this part of the study to investigate the situation in Saudi Arabia; more specifically to discover the ICT facilities available to this stage of higher education vis-à-vis their ICT skills and to explore the information resources they use and prefer.

However, the questions concerning usability features were excluded from the questionnaire distributed among the undergraduate students. The study recruited students from a variety of subjects such as LIS, BA and CS at KAAU and KSU. However, the female students' division of LIS does not exist in KSU. All the participants were in their third year of university, so that when questioned they would have had enhanced awareness on which to base their answers because they have settled in and understand the university environment (Kitzinger, 1994; Bryman, 2004). Furthermore, all the respondents were asked if they had previously visited the library for either instruction or to use its resources; this was done to ensure that all of the participants of both genders had some basic level of library skills. Table 3.1 below illustrates the details of the undergraduate and postgraduate students of both genders (numbers, percentages, and response rates). In addition, the interview held at IMBSIU was conducted with 8 postgraduate students from the LIS department.

3.4 Reasons for Selecting these Universities

According to Kirk and Miller (1987), the use of a case study in studying the relationship between library services and a variety of social problems appears to be the right method. This study was designed to investigate the barriers to information access faced by students within the University of Strathclyde in the British environment on the one hand, and students within the Saudi university environment on the other hand. In the first stage of this study that took place the year 2005, the survey was conducted at the SU and at KAAU, in Saudi Arabia.

In the first phase the department chosen was Computer and Information sciences at the University of Strathclyde. The questionnaire was implemented on three programs: 1.Msc Computer and Internet Technology (CIT); 2. Msc Information and Library Studies (ILS) and 3.Msc Information Management (IM). Additionally, MBA (Master of Business Administration) was chosen at the Management Department in the Business School at SU because it was accessible to distribute the questionnaire and collect it.

However, due to the difference in the university structure at KAAU, many departments from different colleges became involved in order to gain a similar sample to the one collected at SU.

The choice of two Saudi Universities viz. KAAU and KSU was made for the reason that they are among the earliest and the most respected universities established in Saudi Arabia and both are also well known in the Gulf region. Nonetheless, since the main comparisons made are between the SU and KAAU, there was a need to include in the study another university from a different part of Saudi Arabia with similar disciplines to enrich and improve the gathering of the study data, the validity of this study and its reliability.

In the second phase, the decision was made to select similar departments from KSU to compare the findings from KAAU. There are two master comparable programs available at KSU, viz. Business Administration and Computer Science. However, the unavailability of postgraduate study in the LIS department at King Saud University during the year 2006 has forced the researcher to overcome the consequential shortage of data by including the LIS department of Imam Mohammad Bin Saud Islamic University. The researcher intended to include another department, but the Computer Science and Business Administration postgraduate programs were not available (discussed in Chapter 4, section 4.4.3).

The selection of the universities, faculties and departments for this study was made based on the researcher's familiarity with these disciplines and their convenience with regard to the ease of access to the study population (i.e., students, library staff, and academic staff). Furthermore, the selection of the departments at SU was made in two broad areas: Computer and Information sciences and Master of Business Administration (MBA). Consequently, similar departments and/or sectors were selected in both KAAU and KSU, with the addition of involving the LIS department at IMBSIU for the previously stated reason.

Table 3.1 Undergraduate and Postgraduate students: Response Rates

Name of the University/ department	PG/UG	Population		Total	Response rates		Total	Response Rate	Instrument		
		F	M		F %	M %					
KAAU-CS	PG	32	22	54	26	81.25	14	63.63	40	74.07	Questionnaire
KAAU-MBA	PG	40	50	90	31	77.5	32	64	63	70	
KAAU-LIS	PG	35	8	43	26	74.28	7	87.5	33	76.74	
Total		107	80	187	83	77.57	53	66.25	136	72.72	
KAAU-CS	UG	66	60	126	41	62.12	44	73.33	85	67.46	Questionnaire
KAAU-BA	UG	65	67	132	54	83.07	24	35.82	78	59.09	
KAAU-LIS	UG	67	15	82	61	91.04	15	100	76	92.68	
Total		198	142	340	156	78.78	84	59.15	239	70.29	
KSU-CS	PG	17	45	62	15	88.23	32	71.11	47	75.8	Questionnaire
KSU-MBA	PG	16	24	40	13	81.25	15	62.5	28	70	
Total		33	69	102	28	84.84	47	68.11	75	73.52	
KSU-CS	UG	120	60	180	77	64.16	44	24.44	121	67.22	Questionnaire
KSU-BA	UG	47	45	92	29	61.7	30	66.66	59	64.13	
KSU-LIS	UG	0	90	90	0	0	55	61.11	55	61.11	
Total		167	195	362	106	63.47	129	66.15	235	64.9	
IMBSIU-LIS	PG	2	7	9	2	100	6	85.71	8	88.9	Interview
SU-MBA	PG	9	30	39	5	55.55	14	46.66	19	48.71	Questionnaire
SU-ILS&IM	PG	51	29	80	18	35.29	6	20.68	24	32	
SU-CIT	PG	6	14	20	5	83.33	6	42.85	11	44	
Total		66	73	139	28	42.42	26	35.61	54	38.84	

The availability of access to these universities and the nature of the research questions, made an exploratory case study with the most practical research strategy. Although the work started with a generic data collection exercise and is therefore primarily inductive, Wilson's model (1996) was used as a broad basis for this study, and its intervening variables are used as a framework for analysis and adding a deductive element.

3.5 Data Collection Instruments

The data collection instruments for multiple research approaches adopted in this study comprised a survey questionnaire, and focus groups, and interviews with some of the library and management personnel (appendices A, B, C).

3.5.1 Data Collection Procedures

The following are the gathering techniques used in this study:

1. The questionnaire was used at SU for postgraduate students, KAAU and KSU for postgraduate and undergraduate students of both genders because it was convenient to collect the required data. The questionnaire was not implemented with the IMBSIU undergraduate students in the LIS and CS departments, due to the long administrative procedure to be followed to gain an approval from IMBSIU decision makers. CS postgraduate course was not available at IMBSIU at the time of conducting this research. BA was not available department in this university for undergraduate or postgraduate students (for more information see: Chapter 4 section 4.4.3).
2. The focus group interviews were implemented at KAAU and KSU for postgraduate and undergraduate students of both genders to allow students to speak freely, to explore the subject in depth and to discuss and exchange their views in order to enrich the data and contribute descriptive results, assess and justify their questionnaire responses.

3. The interview technique was used for the postgraduate students at IMBSIU because of the limitation in the number of the students registered in the master program.
4. The interview method was used for the administrative staff and librarians, to obtain information about the library's ICT infrastructure, the quality and availability of access to electronic resources.

At Strathclyde University, the study questionnaire was distributed among 139 students (of LIS, IM, CIS and MBA). The questionnaire was distributed via e-mail; printed questionnaire was also distributed to same students. Altogether 54 responses were received. The number of valid questionnaires returned at KAAU was 136 (72.74%) from postgraduates and 239 (70.29%) from undergraduate students. Table 3.1 reports the questionnaire response rate of by both university and gender.

In Saudi Arabia, the mail system is not reliable. To achieve a high response rate, it was decided to deliver the printed version of the questionnaires personally to the study population. Before the researcher distributed the questionnaire, she obtained a formal letter from the Head of the Department of Library and Information Science at KAAU (see Appendix F). This letter explained the purposes of the research and encouraged the heads of the selected departments in the universities to support the researcher by implementing the survey and the focus group discussions. The questionnaires were distributed in February 2005. Students were asked to return the questionnaires to their department office; some were collected from their classes by hand. The distribution phase lasted until the end of March. During this time, the researcher made frequent visits to the academic departments in order both to collect the finished questionnaires and to redistribute questionnaires to those who reported losing their copies. The procedure of gathering the completed questionnaires ended in April 2005.

After a year, in March 2006, the questionnaires were distributed in KSU (Business Administration and Computer Science Departments) and collected by hand. The rationale behind doing so was to first compare the findings of KAAU students with the KSU students to see whether students in these two groups had similarities or differences in their ICT facilities, their preferences for electronic information resources and the barriers to accessing electronic information resources. The

distribution and collection phase lasted until the end of May 2006. The collected questionnaires were then coded and entered into SPSS using a personal computer to compare the findings from KAAU and KSU.

3.5.2 The Questionnaire

A questionnaire is a data collection instrument used in the survey method. A survey questionnaire is a good instrument to gather information about users' attitudes, beliefs, previous or current behaviours, and level of satisfaction.

Questionnaires have been used for the initial phase of the study because:

- It would provide anonymity to respondents and given the breadth of issues explored, the respondents could complete them at their own pace;
- A broad understanding of the issues through a wider audience would emerge;
- Given that questions are standardised across respondents, it would provide a comparable basis for analysis (Busha and Harter, 1980; Wang 1999; Troll, 2002; Chowdhury, 2004b).

In addition, it was considered that any critical issues arising from the survey questionnaire would be explored through subsequent use of focus groups and interviews. This would in effect allow triangulation (i.e., collecting information from several sources about the same event or behaviour) and the validation of the results obtained, which in turn would improve the quality of the research. Moreover, the triangulation of data collecting methods would involve correlating the quantitative method with the qualitative method to draw out the unique strengths of each. It would also provide both macro- and micro-level perspectives in a single project (Gorman and Clayton, 1997).

The questionnaire used for this study comprised multiple questions and was open ended to accommodate various user responses. The questionnaire was broadly classified into four broad sections covering various aspects, such as the respondent's personal details, ICT infrastructure including Internet availability, and issues pertaining to usability of electronic resources. These questions ranged from general questions about user profile to more specific questions relating to barriers to information access. Each of the specific questions was based on the different

intervening variables specified in Wilson's information behaviour model (1997). The questions asked ranged from general user profile questions to more specific issues related to barriers to information access; therefore, the data collected in this study were analysed using both quantitative and qualitative methods.

A deductive research approach was followed as various propositions were tested using the data collected. Data were analysed using SPSS (Statistical Package for Social Sciences) version 12 for Windows to obtain both inferential and descriptive statistics. The foremost focus of the study has been the identification of relationships in the data and the testing of hypotheses to understand the impact of various variables during information seeking. Descriptive statistics were used mainly to determine the profile of the respondents in the study. Based on the nature of the variables analysed, some hypotheses were tested using Spearman's rank correlation coefficient r_s , (i.e., ordinal variables) and others through the Chi-square test χ^2 (i.e., nominal variables). The t-test was used to determine whether the sample means of the two groups were different.

Though many studies in the area of information seeking have used longitudinal approaches (Kuhlthau, 1991; Ellis, 1989; etc.), this research is based on the study of the barriers to information access at a specific point in time. The rationale for using this approach is that the perceived barriers may change either due to the removal of existing barriers or through changes in users' perceptions, which may not be linked temporally. This does not imply that the influence of the temporal element has been discounted, but rather a stance taken that it is very difficult to isolate the time dimension from the overall interplay of other factors (Hammersley, 1996).

Since the quality of data is dependent on the validity and reliability of the data set collected, adequate precautionary measures have been adopted during questionnaire design, data collection and analysis. The data was collected through voluntary participation. Thus, individual bias in the selection of respondents was avoided (Ephraim, 1994; Waldman, 2003). Returned incomplete questionnaires were discarded, Table 3.1 shows that questionnaires that were complete and thus were used for this research. However, one may argue that a self selecting sample may result in some form of biasness but this could not be avoided. However, this method of

selection was considered more suitable for this research than going for other alternatives like random sampling. In addition, this study was based on the intervening variables of Wilson's 1997 model of information-seeking behaviour, which was used as the conceptual framework, founded on the literature, to reveal how individuals naturally seek out information in the selected university libraries.

3.5.3 Pre-Testing of the Questionnaire

It is important to conduct a pilot study to ensure that the questionnaire is understandable and clear to the target population. The questionnaire must be tested to make sure that it is reliable and valid (Pedhazur, and Schmelkin, 1991). The pilot study helps the researcher in constructing the final version of the questionnaire to understand how clear it is for the potential participants. The pilot test is vital because it allows the researchers to discover whether the questions are understandable and sequential. In this research the pilot study was carried out to examine the appropriateness of the wording and clarity of the questionnaire's content (Bourgue and Fielder, 1995).

At Strathclyde University, the student questionnaire was piloted with 6 postgraduate students (3 female students and 3 male students) from the two chosen disciplines i.e. Library and Information Studies and Management studies. This process was important to measure the adequacy of the questionnaire and to simplify any ambiguity in the questions. It was also useful to identify the time required to answer the questionnaire.

In Saudi Arabia, the questionnaire was translated into Arabic because this is the language used by the population on which it focuses. It is presented to three professors at KAAU for validation of the translation and suggestions for improvement. Some minor changes in the language and presentation, suggested by the professors, were made before conducting the pilot study. After that, the pilot study for the questionnaire was conducted with five postgraduate and five undergraduate students in each department at each chosen university, thus altogether 30 PG students and 30 UG students at KAAU, and 20 PG students and 25 UG students at KSU, took part in the pilot study, and a total of fifty one filled-in questionnaires (48.57%) were

returned. The testing of the questions revealed that further elaboration was required for a few questions to assist the participants' understanding. The pilot test also indicated that around 15 to 20 minutes was needed to complete the questionnaire. The pilot study added value to final draft of the questionnaire (presented in appendix A) and it ensured that participants would not face difficulties in responding to the questionnaire.

3.6 Focus Group Technique

Gwyneth (2002) suggests that focus group is very valuable for exploring how users can respond to a new service or function. The assessment will come directly from the participants' observations and discussions. This method can help a researcher to stimulate new suggestions and concepts, to recognize the possible for obstacles. Walden (2006) comments that focus group can provide the opportunity to investigate answers, clarify responses and ask follow-up questions. A series of focus group meetings are conducted to gather reliable data from students. It is also useful to have multiple groups with similar participants to notice the forms and methods across groups. The interaction from the meeting creates huge of rich data. Before the focus group started, the researcher pre-tested the list of questions by using students in the selected departments to test the proposed questions.

The technique of interviewing individuals or groups provides the respondents in an evaluation or research study with great opportunities to speak freely in their own voice, in contrast to the questionnaire, which merely couples the responses to the categories of questions that others have defined for them (Reeves et al., 2003). Furthermore, this method involves a similar preparation of a protocol of questions and the same types of interviews as previously described in the above paragraphs about interviews.

According to Wall (2001), the driving reasons for a particular research study should inform the decision concerning which methodological approach is appropriate. There were several reasons for this study to use the focus group method, such as to generate

student feedback, which was done by exposing the participating students to a familiar methodology. It is also a convenient and efficient method for utilizing a particular group of students who belong to a particular unit. In this study, the main purpose of the focus group was to discover in-depth information, to determine the statistical findings and to expand on the students' views (Morgan, 1997; Wall, 2001; Lincoln, 2002; Talja and Maula, 2003; Walden, 2006). However, the focus group discussion technique is to provide the students' thoughts to enhance the research findings and to allow students to verbalise their thoughts. It is used to complement the findings of the questionnaire survey.

The in-depth semi-structured focus group discussion technique was applied in this study for two Saudi universities: KAAU and KSU. This technique was used because it seems to be an appropriate methodological technique to enrich the researcher's knowledge of the barriers to electronic information resources concerning the Saudi Arabian ICT infrastructure, its role in general, and in particular, its impact on the postgraduate and undergraduate students at Saudi Arabian universities, i.e., the quality of the ICT infrastructure, types of Internet connection and access (broadband/dial-up), government regulations and policies on access, and in addition, the apparent range of the digital divide. It also offers the opportunity to illustrate proposed solutions to overcome noticeable problems concerning access to electronic information resources.

This method also shed light on the differences in personal characteristics and the role these differences might play as enablers and/or detractors of access to electronic information resources, i.e., the influence of the individual's choice and/or preferences on the use of e-resources, and the influence of the individual's background on preferences concerning e-resources. In addition, this method allows a general understanding to be gained of user behaviours and information-seeking behaviour, the ways and purposes of using the Internet, and the impact of the English language on the user's ability to access information.

Furthermore, the objective of the focus group was to probe into the role of Internet competency in information access, including the participants' views of what Internet competence is; the impact of Internet competence on the efficacy of the search process; the level of the user's satisfaction with the search results in relation to

Internet competence; and the role of demographic factors in information access. It also focuses on the effects of social/interpersonal variables with respect to information access (e.g., the impact of the user's preferences, the level of education of the user's parents, and the impact of cultural aspects), and the influence of environmental variables on information access and usability aspects such as design, layout, and help facilities.

However, due to the cultural lifestyle in the Arabian Peninsula, as described in Chapter 4, the Saudi universities have to be divided into two separate sections or campuses (female student campus and male student campus), and some university campuses are located in different parts of the city. Consequently, separate focus groups were held for each campus, one for female students and another for male students. Moreover, since Saudi regulations do not allow female individuals to enter or access the male campus, the focus group discussions for male students had to be arranged and scheduled over the telephone, which took a great amount of time. The focus group discussions involving male students were held by Closed-Circuit Television (CCTV). However, the differences in the methods adopted for conducting the focus group studies were quite common in accordance with the cultural and academic practices in Saudi universities and therefore no differences in the outcome were expected because of this. The focus group discussion was accomplished with all the faculties or departments at KAAU and KSU mentioned in the above sections discussing the questionnaire.

The findings for all the categories in this qualitative data-gathering technique were analysed with the data gathered using the quantitative method (i.e., questionnaire), as presented in Chapters Six and Seven, to illustrate the evolving relationship between the statistical findings and the participants' statements.

3.6.1 Focus Group Analysis Procedures

At KAAU, the focus groups consisted of postgraduate and undergraduate students from three different subjects (Business Administration, Computer Science, and

Library and Information Science) and from both campuses (female campus and male campus). It is important to mention that both campuses at KAAU are located at the same site.

However, at KSU, the campuses for each discipline are in different locations within the city of Riyadh. Therefore, it was not possible to arrange a meeting with students from diverse departments and group them at one campus. In order to involve male students from each university campus in the focus group meeting, an arrangement was made through the administrative department to hold it via CCTV because the male campuses are inaccessible to females.

The focus group size ranged from 7 to 9 members to gain sufficient and reliable views. Furthermore, the location of all faculties of both campuses (female and male student campuses) at KAAU offered the researcher the chance to organize a synthesis or mixture in the focus groups of postgraduate and undergraduate students from different disciplines and backgrounds who did not know each other. They were mixed into groups to increase challenges in the discussion between the students with their distinct knowledge and experience. It also offered the opportunity to enhance the gathered data and confirm it from several sources, which in turn would strengthen the triangulation method. In addition, the intention of using this method was to offer a chance for those shy and/or introvert members to express their views without being left out (Covey, 2002; Moore, 2000).

The time spent by each group ranged from one hour to an hour and a half. Apparently, this would not limit the students in their views too much, and would ensure that they would not get bored of the discussion after a while (Gorman and Clayton, 1997; Wang, 1999; Covey, 2002).

However, it is important to mention that this mixed method was inapplicable at KSU, because the male and female student campuses for each discipline or college are located in different parts of Riyadh. For that reason, it was not possible to arrange similar mixed group discussions. In addition, the postgraduate and undergraduate students were not mixed in each group discussion, because it is believed that each group of a particular degree level has its own specific characteristic features and beliefs, especially when it comes to declaring something about their opinions or

arguments. However, the information revealed from both postgraduate and undergraduate students of both genders was not separated during the analysis of these qualitative data.

For the KAAU mixed group, making the arrangements and scheduling the meetings led to a shortage of time; thus, the group meetings were organized at suitable times (for all the students in every group) with the various departments, which saved the time and effort associated with having to do more than one session for each group. This was an advantage because at KAAU, twelve focus groups were held, which meant more information valuable for this study would be forthcoming. Similarly, nine focus group discussions were held at KSU. Table 3.3 illustrates the numbers of groups at each university and discipline.

Table 3.2 Numbers of Focus Group Sessions

Disciplines	KAAU Students				KSU Students			
	PG		UG		PG		UG	
	F	M	F	M	F	M	F	M
CS	9	7	8	7	8	7	9	7
LIS	9	7	9	8	--	--	--	7
BA	8	7	9	7	8	7	9	7
Total	26	21	26	22	16	14	18	21

F: Female; M: Male; PG: Postgraduate; UG: Undergraduate

The procedures followed when conducting the focus group discussions included welcoming the students with a short introduction to provide some guidelines and explain the purpose of the discussion, followed by a definition of key terms. When the target questions about the topic were asked, a strategy was formed to listen to and note any unexpected findings, and use prop questions to classify the main themes from the contributor's statements, as well as to ensure that all participants had a chance to express their points of views (Covey, 2002). In order to collect the optimal information from the focus group data, the author used a transcript-based analysis method, which was facilitated by the use of digital and tape recording all the way through for all the sessions. Written notes for the focus group discussion were taken to highlight the key words and topics brought up in order to provide accurate information (Gorman and Clayton, 1997; Wang, 1999; Moore, 2000; Covey, 2002).

Finally, the following steps were used when analysing the focus group data:

- Classifying the data into predetermined categories;
- Expanding the categories based on the data;
- Interpreting the data through an intensive investigative method;
- Recognizing the main ideas;
- Identifying those units of information that become the basis for defining categories.

In terms of usability, each university website for both KAAU and KSU was explored based on the Chowdhury's usability criteria (Chowdhury, 2004a) to investigate and evaluate the barriers postgraduate students encounter when they use the websites to access electronic information resources. These findings of the usability part are elaborated in Chapter 5 section 5.5 main hypothesis 7; Chapter 6 section 6.4 main hypothesis 7; and Chapter 9 section 9.7. The methods employed to gather accurate information about the usability of the library websites were the survey questionnaire and the focus group. These methods were used to ascertain how students think the library website should be used and to discover the barriers to access to and use of available electronic information resources (Reeves et al., 2003; Chowdhury, 2004a).

3.7 Interview Method and IMBSIU

Barsky and Bar-Ilan (2005) suggest that an interview is frequently perceived as a tool for providing more information from the user. The interview method was chosen because it is a qualitative research technique similar to the focus group technique except that interviews are conducted normally with one user at a time (Miles and Huberman, 1994; Gorman and Clayton. 1997; Patton, 2002; Reeves et al., 2003). In addition, using multiple methods of data collection would enable triangulation of the study results (Reeves et al., 2003).

According to Patton (2002), there are three types of interview used in evaluation or research: informal conversational interview, the standard open-ended interview, and interview guide approach. The first interview type (informal conversational interview)

employs the most flexible and open-ended strategy. It depends on the natural flow of interaction between the participant and the interviewer, but it is a less substantive evaluation method. The second interview type (standard open-ended) is built on a standard set of questions (protocol) which has been created in advance to evoke in-depth responses from participants. This type of interview is quite useful for limiting the variation between interview experiences. Finally, the third type of interview is referred to as the semi-structured interview, which is a combination of the other two types. It serves as a checklist of the study or research topics that should be covered during the interviews without specific arrangement of the questions that need to be asked. However, the interview protocol is usually refined through several trial interviews or subsequent revisions of the questions. Gorman and Clayton (1997) highlight the importance of determining who should be interviewed, what type of questions should be asked, the time and place of conducting interviews, and controlling the ever-present danger of biasness.

Accordingly, the interviews in IMBSIU focused on the information revealed by eight postgraduate students from the Library and Information Science department. It is important to mention that this department was the only discipline selected from this university, because Computer Science and Business Administration are not available at IMBSIU.

The in-depth semi-structured interview was the method employed for this part of the study because it seemed to be the appropriate method to obtain in-depth information, which would help the researcher in discovering and comparing the findings with those gathered from the focus group discussion at KAAU. The interviews lasted on average about one hour. The interviews with postgraduate female students were conducted face-to-face and recorded as well, while the interviews with postgraduate male students were conducted and recorded through the telephone method (with the agreement of both the male and female students, respectively). Female students are not allowed to enter the male student campus due to the general cultural practice of Saudi society: female members are not permitted to personally speak to male members, with the exception of formal government meetings associated with especial security and privacy arrangements. The data were coded into predefined analytic

categories according to the questionnaire structure to produce verified and enriched information with LIS students.

Wang (1999) affirmed that interviewing users facilitates the interaction between the interviewer and the interviewee, and is considered to be an alternative to self-administered questionnaires to improve data quality. It allows the in-depth semi-structured interview to include predefined guidelines and pose open-ended questions that offer the users/interviewees the opportunity to address issues not considered before. Furthermore, the interviews started with a short introduction about the objectives of the research, how data was obtained and an affirmation that none of the interviewees' identities would be revealed in this study. In addition to recording, notes were taken during the interviews and transcribed on the same day to avoid missing any information obtained from the participants.

Finally, this approach has both advantages and disadvantages. The main advantage consists of linking data to an existing theoretical framework (Saunders, Lewis and Thornhill, 2003) which, according to Yin (1994), enables the evaluation of the extent to which the adopted theory or model is capable of explaining what was going on in the particular context (in this case, IMBSIU) and improves the generalizability of findings. The disadvantages, according to Kuzel (1992), include the possibility of introducing a premature closure on the issues to be investigated and the possibility of departing excessively from the views of participants of the actual social setting. Keeping this in mind, the category structure was kept loose, allowing alterations to occur according to patterns of the process of allocating text units to categories.

3.7.1 Interview Analysis Procedures

A total of eight students in the department of LIS at IMBSIU were engaged in the in-depth semi-structured interview, consistent with Miles and Huberman's (1994, p.27) argument that,

“Qualitative researchers usually work with small samples of people, nested in their context and studied in-depth – unlike quantitative researchers, who aim for larger numbers of context-stripped cases and seek statistical significance.”

This in-depth semi-structured interview was in accordance with the structure of the questionnaire survey and categories of the focus group because:

- there were only eight postgraduate students in the LIS department, which gave the researcher the opportunity to manage the time and focus on the issues related to the ICT infrastructure and its role in general;
- investigating the barriers to electronic information resources with respect to Internet connection and access in Saudi Arabia;
- to validate the quality and types of ICT infrastructure and the Internet connection speed in university, home or workplace;
- to identify issues related to government regulations and policies on access, the influence of society on accessing and using e-resources; and
- to signify the range of the digital divide among the Saudi university community.

This method was also used to offer the flexibility to ask probing questions and to follow up the correspondents' lines of thought. It also provided the interviewee with an opportunity to use various media to express their ideas, and allowed them to refer to some of their colleagues or librarians whenever needed (i.e., snowball effect) (Strauss and Corbin, 1998). Moreover, the rationale for using this approach was that the respondents would be able to recall related examples and offer the researcher the chance to write notes about the participants' information-seeking behaviour patterns (Kitzinger, 1994; Morgan, 1997; Bryman, 2004). All the qualitative data gained from the interviews are described and analysed in depth in Chapter 8.

3.8 Library Personnel Interviews

The libraries of the Saudi universities were assumed to be of the hybrid library type. Oppenheim and Smithson (1999) defined the hybrid library as “a halfway step

towards the fully digital library”, whereas Wake and Lisgarten, 2002), defined it as a library that comprises various information resources in both digital and printed form that could be accessed physically and remotely. In addition, Rusbridge (1998) indicated that the hybrid library employs a range of technologies from diverse sources (i.e., printed and electronic forms) and utilizes them for its systems and services in both the printed and electronic context.

Deiab (2003) comments that the university library’ role is to provide sufficient access to reliable information and resources (printed or electronic forms) for academic-study and research-purposes, which fall into two categories of activities:

- The managerial vocations, which include planning and developing the library contents and services, and implementing adopted strategies, policies and procedures;
- Technical vocations, such as providing and building up the library collection and resources, and the usage of technology to systematize it.

Deiab concluded that the success of university library management depends primarily on qualified and trained staff; therefore, it requires an improved administrative system to ensure and follow up the quality of services provided.

One of the aims of this study was to investigate the barriers of access to electronic information resources in those selected Saudi universities (KAAU, KSU, and IMBSIU). For that reason, this research involved a selection of administrative staff and librarians from the libraries of the three selected universities. A semi-structured interview was used to obtain information about the library issues in general, and particularly the library’s ICT infrastructure, the quality and availability of access to electronic information resources, information service characteristics and the acquisition policies and strategy. Furthermore, it was intended to investigate the computer facilities provided to the users (e.g., academic staff, PG and UG students), the accessibility of the Internet connection, the length of time offered to the various users, and the capability of accessing and using available electronic databases.

It is important to mention that the information and data in this part were obtained from the following members of staff at the three universities: at KAAU, two male vice deans and one female vice dean at the female campus, and three librarians; at KSU, one male library vice dean, and one female and two male librarians; and at IMBSIU, one library vice dean, and two male and two female library staff members, see Chapter 10.

3.9 Summary

This chapter has described the research design and the methodology within which the present study was conducted. It has discussed the research philosophy, research questions, variables, hypotheses and the reasons of selecting specific Saudi universities. Data collection tools, techniques and procedures were discussed. The following chapters present the descriptive, statistical, and qualitative findings for the questionnaire survey, focus group interviews, and interviews of library personnel selected for this study.

Chapter 4: ICT Infrastructure and Information Services in Saudi Universities

4.1 Introduction

This chapter provides a comparison of the ICT infrastructure and information services facilities in the UK, particularly at the University of Strathclyde, with those at the selected Saudi Arabian universities. The Chapter begins with an introduction to the society and culture in Saudi Arabia, followed by a brief description of the Saudi Arabian higher education system, and a brief profile of selected Saudi universities. In particular, this Chapter aims to highlight the current practices and usage of ICT facilities and the differences that exist between the various universities in Saudi Arabia in terms of the ICT infrastructures, national and institutional policies and the provision of electronic information services to the students. These are compared with those of the University of Strathclyde, a typical university in the western world.

4.2 A Brief Overview of the Kingdom of Saudi Arabia

4.2.1 The Background of Saudi Arabia

Saudi Arabia is the largest country in the Middle East. It was founded by King Abdul-Aziz Bin Abdurrahman in 1902, and is divided into 13 regions. Geographically, it is a peninsula in south-western Asia bordered by the Red Sea on the west, and the Arabian Gulf, the United Arab Emirates and Qatar on the east. In the south, its neighbouring countries are Yemen and the Sultanate of Oman; and in the north it is bordered by Kuwait, Iraq and Jordan. The capital city Riyadh is located in the centre of the country. In Saudi Arabia, two important holy cities (Mecca and Medina) are vital sites of pilgrimage for Muslims. Jeddah is an important industrial city because it lies on the Red Sea; it is also the gate to the holy cities. Therefore, Saudi Arabia attracts many Muslims from around the world. It is also an important member of the United Nations (UN), and it is part of the Gulf Cooperation Council (GCC).

Figure 4.1 Saudi Arabia's provinces and a map of the surrounding Middle East region



Adopted from: <http://www.infoplease.com/atlas/country/saudiarabia.html>

It was estimated in 2006 that the total population of Saudi Arabia was 27,019,731, out of which about 23% (around 5.4 million people) were foreign nationals.

4.2.2 The Saudi Arabian Culture

Culture is comprised of shared beliefs, customs and behaviours in a certain place, religion or between groups of people (Smith, 2000). It forms the foundations of a society or social groups. Cultural practices and beliefs of a nation have a significant impact on several aspects of like including information access and use influencing education, communication and indeed almost all walks of life.

Hofstede (1997) has identified six layers of culture that differentiate people from one another. These layers are:

- A national level, where individuals belong to a particular country;
- A membership level, where people are marked according to their geographical area;
- A gender level that differentiates individuals depending on their masculinity or femininity;
- An age group level, where individuals are divided into multi-stage groups depending on their ages;
- A social class level that depends on the individual's occupation or education within a social group; and
- An organisation or company level that classifies people by the type of work they usually perform in an organisation.

The national culture contains the essential values that are shared by the citizens of a country. These may have a strong impact on people living in different regions under a main government, language or religion.

In Saudi Arabia, the national culture is built upon Islamic religion. The word 'Islam' means 'submission' and this involves full and complete obedience and surrender to, and acceptance of, Allah's commands and revelations in order to bring peace. It is believed that 100% of the Saudi population are Muslims. Moreover, it was found that 23% foreign nationals were of mixed religions such as Islam, Christianity, Hindus etc. They believe that God created the whole universe and sent Mohammed as the last prophet. The Quran is the word of Allah (God). Therefore, Muslims use this as a guide for issues in life; for example, it informs the basic social, economic and political systems, as well as an authoritative source for moral issues. The Islamic religion makes the Saudi Arabian people a relatively homogeneous group.

Islam does not only care about religious matters; it is also concerned with human knowledge. Islamic faith does not restrict creativity, but actually supports inventions and benefits to society. However, there is still a separation of men and women in most things, especially in education, work and other areas of public life. Even though

almost everyone shares the culture and values of the religion, there are still debates on certain areas because of differences in people's points of view, and their interpretations of the ideal way of living according to God's rules and the Prophet's principles. Internet is a good example: before it was introduced to Saudi Arabia in 1998 (ISU, 2006), there were arguments about whether it might destroy the Arabian culture of the nation. Although Islam does not restrict its followers from seeking knowledge, people still worry about whether introducing new technology might endanger their traditions. Still, Islam provides Muslims with guidance on how to explore and integrate new challenges and experiences. Therefore, if these technologies are used in a proper manner, culture would not be damaged, but the advances would actually lead to a more knowledgeable society, providing a better understanding of the modern world. Consequently, the higher education system has launched several initiatives to change society's view of the Internet in order to achieve their goals and manage future developments.

Islam forbids any mixing of the genders; therefore, men and women are segregated at all levels of society, including education, formal and informal meetings or gatherings, and in workplaces. The Saudi government is leading its nation according to the rules, principles and practices of Islam in the Quran and the teachings of the Prophet Mohammed, which state clearly that the sexes should be segregated. Hence, they follow this as an obligatory principle in order to protect the nation from the influence of the devil, which Islam believes is the enemy of Islam.

4.3 The Saudi Arabian Higher Education System

Higher education, according to Barnett (1990), is concerned with promoting students' understanding by endorsing and encouraging their critical and intellectual faculties. This encourages and supports research and academic freedom, as well as the development and enhancement of a student's personal character, autonomy, competence and intellectual integrity.

In the early 1970s, Saudi Arabia paid special attention to the higher education system in the country. Consequently, in 1975, the Ministry of Higher Education launched a sophisticated plan that allows the education system to train the people needed to manage the country's economy (Ministry of Planning, 1975).

In Saudi Arabia, all citizens have the right to choose from a variety of higher education institutions or colleges, as long as they hold a secondary school certificate. Furthermore, every higher education student is granted a free education and monthly financial support, as well as free accommodation for non-resident students at the university campus. Higher education also involves:

- Colleges and universities that provide four-year undergraduate courses and postgraduate programmes;
- Teaching colleges;
- Training colleges that offer vocational and technical degrees;
- Junior colleges for two years.

Higher education in Saudi Arabia is centralized under the Higher Education System Council (HESC), which was honoured by royal decree in 1994. Its core aims are to plan and develop higher education policies, govern higher education affairs, direct all actions of institutions and control them. It also grants funding to all its governing bodies which run and manage these institutions, except the military education institutions. There are fifteen council members in the HESC and all decisions require the agreement of at least two-thirds of them.

In Saudi Arabia, each university has its own mission and objectives, financial plans and functions that are associated with Saudi government principles. They act as a foundation for distributing knowledge: teaching, training and educating students, encouraging research performance, and advancing the Kingdom in all areas. There is an independent council in every university in the nation. This is controlled directly by the HESC's decisions. The council's main tasks are to administer all managerial, financial and academic affairs to accomplish the university's policies and objectives.

Due to the influence of culture and religion noted above, there are policies in place to prevent the mixing of men and women in any circumstance at any level, resulting in complete separation of the genders in all Saudi universities. Furthermore, the female colleges are under the management of the colleges' highest council, despite the fact that this council is composed solely of male members from the male campus. Accordingly, this means that only men are responsible for making all the educational policy decisions, because women do not have the opportunity of representing themselves in the upper levels of managerial hierarchy in the Colleges' or Universities' Supreme Council. They do, however, get to participate and collaborate in lower levels of the universities' management.

4.3.1 Saudi Universities' Study System

The higher education system in Saudi Arabia consists of three patterns: full-time, part-time and distance learning (*Intisab*). Each university puts one or more of these systems in practice in order to fulfil the needs of the students in its region, and the society as a whole. Each structure is described in the following paragraphs.

Full-time study is the most common option chosen by universities in Saudi Arabia. There are two different systems of full-time study. There is an annual system used by some universities/colleges, such as those offering medicine, that requires five to seven years to achieve a bachelors degree. The student in this system follows a planned annual schedule/timetable provided by the university/college, and cannot determine their own timetable. The other system involves eight or more semesters' work to fulfil the university/college requirements to graduate. Furthermore, summer semesters are an additional option, giving students the opportunity to finish some of their courses more quickly. However, summer semesters are not provided by all universities/colleges, because not all can afford to provide the facilities and staff that particular courses will require. The primary language used for teaching-learning in theoretical topics is Arabic. However, English is also used in scientific fields, at varying degrees.

Secondly, there is a provision for part-time study, but this is only offered to postgraduate students. This system appears to support postgraduate students who cannot attend full-time study.

Lastly, there is the system of distance learning (*Intisab*). The idea behind the creation of this system was to help women to have the chance to complete their education. It does not require daily attendance, but only presence for the annual exams. This system has recently been opened to the male section of the population as well. However, this course does have its problems, including (Ministry of Higher Education, 2000):

- Unavailability of requisite staff to monitor students' progress;
- Limited to a small number of theoretical subjects that the students can choose from.

There are eight fully-operating universities in the Kingdom of Saudi Arabia, viz.

Five Multi-Disciplinary Universities:

- King Saud University (KSU), established in 1957, located in Riyadh in the centre of K.S.A.
- King Abdul-Aziz University (KAU), established in 1964, which is in the western region, located in Jeddah.
- King Faisal University (KFU) is located in Dammam and Hafoof in the eastern region, and was launched in 1975.
- Umm Al-Qura University (UQU) was founded in 1981 in Mecca, in the western province.
- King Khalid University (KKU) was built as an educational institution in 1981/1982, associated with branches of KSU and Imam Mohammed Bin Saud Islamic University (IMBSIU); it was then made a full university in 1998.

Two are Islamic Universities:

- The Islamic University (IU) in AL-Madina AL-Munawra was established in 1961 as a branch college of KAU.

- Imam Mohammed Bin Saud Islamic University (IMBSIU) was built in 1953 and was promoted to university status in 1974. It is located in Riyadh.

There is only one technological university, the King Fahad University of Petroleum and Minerals (KFUPM), which was established in 1963 in Dhahran in the eastern region. This started as a college for petroleum and minerals sciences, taught in English to male students.

4.4 The Selected Saudi Universities for this study

Three out of the eight Saudi universities have been chosen for the purpose of this study: King Abdul-Aziz University (KAU), King Saud University (KSU) and Imam Mohammed Bin Saud Islamic University (IMBSIU).

4.4.1 King Abdul-Aziz University (KAU)

KAU was established in 1963 (Al-Qublaan, 2001) by a group of people who were concerned about the needs of both male and female students for higher education in Jeddah. However, the institution's administrators could not manage the rapid increase of students, academic staff and the financial burden. Therefore, in 1972, the university was placed under the management and control of the government by royal decree. Its key objectives are: to provide postgraduate studies; to support schoolteachers with additional training; and to access available knowledge and science using experimental scientific research (Sinbual, at el., 1996).

Its nine colleges are: 1.Economics and Administration; 2.Arts and Humanities; 3.Sciences; 4.Engineering; 5. Medical Studies; 6.Geological Science; 7.Marine Science; 8.Meteorology and Weather Forecasting; and 9.Medicine. KAU also administers the Community College in Tabuk, which is located in the north-west region of Saudi Arabia.

KAAU awards degrees at different levels: bachelors and masters degrees, diplomas and doctorates. In the academic year 2004/5, the total number of undergraduate full-time students of both genders from different courses who graduated was 6058 (Ministry of Higher Education, 2006). The total number of undergraduate male students was 4637, while the number of undergraduate distance learning students (Intisab) of both genders was 852. The total number of registered students for a full-time postgraduate degree at KAAU in the same academic year was 1640 students of both genders. Table 4.1 represents the number of master's degree in the different disciplines of KAAU.

Table 4.1 KAAU Postgraduate (MS) students 2004/5 (Ministry of Higher Education, 2006)

College	Gender (MS)	
	Female	Male
Arts & Humanities	108	74
Economic & Administration	187	129
Sciences	271	125
Engineering	*	240
Geological Science	*	18
Weather Forecasting	*	67
Medicine	15	4
Marine	*	26
Environment's designs	*	15
Dentistry	0	1
Home Economics	70	*
Total	651	699

* Not applicable or available

4.4.1 The Higher Education Academic Centre for Women at KAAU

KAAU separates the female students on their own academic campus with female staff, and provides them with their own central library; however, this is under the control and supervision of the central library from the male campus. Furthermore,

traditional distance learning studies (Intisab) for non-resident female students are offered through the female campus. On this campus, the lecturers are female; however, male teachers are able to teach some of the subjects through CCTV.

While female students are allowed to register in various subjects, such as Arts and Humanities, Economics and Administration, Science, Medicine and Medical Studies, Dental Medicine and Home Economics, they are not allowed to study Engineering, Marine science, Meteorology and Weather Forecasting or Geological Science.

4.4.1.2 The KAAU Library and Electronic Services

According to the KAAU library guide (2001), the KAAU central library was established in 1965. Its aim is to provide the academic staff and students with all the necessary educational materials and electronic resources. Since 1986, it has adopted the DOBIS/LIBIS systems for its databases. Online search services (in the IS literature online search service generally mean online database search services provided by vendors like Dialog, ProQuest, etc.), are provided through a direct connection with the King Abdul-Aziz City for Sciences and Technology (KACST) database, which is a freely accessible service for both the academic community and the public. This facilitates the flow of information to end-users through its LAN system either on campus or at remote sites.

The library computer centre was established in 1975 to help attain the academic educational objectives and to pursue technology development. KAAU recently installed a partial campus network with three “ETHERNET LAN” interfaces centralized at the computer centre building. The fibre optic network operates at speeds up to 16 MB and is connected to the majority of the colleges and university departments. In addition to the main system, the computer centre has created sub-systems to provide a multiplicity of educational and administrative functions (Komosany, 2006).

The KAAU computer centre's mission involves setting up an information technology strategy, automating all administrative work, constructing and maintaining the central databases and providing technical support (Komosany, 2006).

4.4.2 King Saud University (KSU)

KSU is the first and oldest Saudi university. It was established by the royal decree in 1957 and is located in the capital city of Riyadh. Its main goals are to create an appropriate educational environment providing superior educational services and to improve educational programmes so that it can build better relationships with international Islamic and Arabic institutions and promote their interaction with Saudi society.

KSU maintains fourteen colleges and one institute that offer education in various disciplines, viz. Education, Administration Science, Computer and Information Sciences, Arts, Pharmacy, Veterinary Medicine, Design and Architecture, Engineering, Agriculture, Medicine, Dental Medicine, the Arabic Language Institute, the College of European Languages and Translation and the College of Graduate Studies. There are two more colleges located at Al-Gaseem, which cover Agriculture and Economics and Administration (King Saud University, 2006b).

Furthermore, the university awards a masters degree in a number of specialties, and in certain fields, it also offers doctorates. In the 2004 academic year, the total number of freshmen was 11,993 students, while the number of students who were awarded an undergraduate degree was 6510.

Additionally, the number of students of both sexes in postgraduate programmes has gradually reached 3884. The table below illustrates the numbers of postgraduate students registered in 2005/6 (Ministry of Higher Education, 2006).

4.4.2.1 The Higher Education Academic Centre for Females at KSU

Female education started at KSU in the academic year 1961/62. At that time, they were only permitted to join the Arts and Administration colleges in Riyadh. The female campus was constructed in 1976. The female students' sections are scattered in different areas around Riyadh. Some of the faculties that have been instituted for them are Administration, Medicine, Pharmacy, Dental Medicine, Education, Arts, Agriculture and Sciences (King Saud University, 2006a).

Similar to the circumstances at KAAU, not all the subjects can be chosen by KSU female students. All the lecturers and teaching staff, library staff and administration and management staff in the females' campus are women. However, if a male lecturer is required, he is usually permitted to give his lecture through CCTV.

Table 4.2 KSU Postgraduate (MS) students 2005/6 (Ministry of Higher Education, 2006)

College	Gender (MS)	
	Female	Male
Arts	84	66
Education	103	118
Administrative Sciences	75	90
Architecture & Planning	*	35
Engineering	*	50
Food and Agriculture	10	55
Pharmacy	18	19
Dentistry	*	*
Medicine	1	*
Sciences	70	88
Applied Medical Sciences	8	*
Computer and Information Sciences	17	45
Total	386	584

* Not applicable or available

This is because of the religious restriction against mixing men and women in education or at the workplace. An exception would be made for unavoidable

situations in some areas, such as practical lectures in medicine, or doctors, nurses and pharmacists working in hospitals, where it is difficult to segregate genders due to the nature of the work.

In the education system and policies, there is always segregation between male and female in schools, higher education institutions, universities or colleges; therefore, there is no formal or informal face-to-face meeting or discussions between members of different genders. However, recently it seems that there has been some allowance for female members to attend formal and informal government meetings and conferences.

4.4.2.2 King Saud University Library and Electronic Services

The first library for KSU was established in 1957 at the Art College, while the central library was established in 1964. In 2004, the central library and six of its branches were relocated to a massive new building called 'Prince Salman Central Library', which is situated within the men's campus (AL-Qublaan, 2001).

The KSU central library, from its beginning, has adopted the DOBIS-LIBIS library management system. It also provides CD-ROM LAN services for its users (academic staff and students of both genders at both campuses) through its connection to several terminals. In addition, the library provides direct connection to KACTS for online search services, as well as Internet access (AL-Qublaan, 2001).

The KSU General Directorate of Computer and Information Systems (GDCIS) associated with the IT department is responsible for providing, installing, operating, utilising, controlling and maintaining the computer resources of the university in order to support academics and postgraduate students, as well as serving administrative functions. The GDCIS is responsible for the strategic plans and objectives, develops an IT plan (i.e., supplying/maintaining hardware/software) and designs and

implements the university databases and information resources, etc (KSU Library, 2001).

The female campus is connected to the main central computer at the male campus through a fibre optic network, and has a limited number of computers with Internet access. The maintenance of these computers and connections is carried out entirely by the main computer centre at the males' campus.

4.4.3 Imam Mohammed Bin Saud Islamic University (IMBSIU)

In 1953, this university was formed as a result of the merger of the Islamic Law College and the Arabic Language College in Riyadh; however, it was formally established by the royal decree in 1974. Its main concerns are to upgrade the knowledge and understanding of Islam, and to improve the activities of the Islamic follower. Islamic research, translation, publishing studies and Islamic law studies are available, and certificates are awarded to students of both genders declaring them to be Islamic Arabic Scholars (Ebrahim, E., 1985, and AL-Qublaan, 2001).

In 2004/5, the total number of undergraduate students in IMBSIU was 7297. The total number of graduating students in the same year was 2465 (1723 male and 742 female), who qualified from different undergraduate courses (Ministry of Higher Education, 2006).

IMBSIU has seven colleges in Riyadh, they are 1. Islamic Law (*Sharia*), 2. Arabic Language (was originally formed to educate non-Arabic speakers in the Arabic language), 3. The Fundamentals of Religion, 4. Social Science, 5. Islamic Call (*Dawah*) and Mass Communication, 6. Computer and Information Science, and 7. Languages and Translations (Library Deanship, 2006a).

4.4.3.1 The Higher Education Academic Centre for Female Students at IMBSIU

In 1965, the female section was established for external students to make it possible for women to gain higher or further education in Islamic belief, Islamic preaching, the teaching of the Prophet Mohammed and the Holy Quran and science (IMBSIU, 1999).

In 1984, the university's policy towards female students radically changed from distance learning to full-time education. In addition to the Islamic topics stated above, the university also provides courses in Arabic Language and Library and Information Science (LIS) (IMBSIU, 1999). The only department chosen for this research was the Library and Information Science department, because it was the only one related to this study, and also because the postgraduate LIS courses are not offered at KSU. The same education policy for employing male lecturers for female students is applied here, as previously stated (in section 4.4.2.1), through the use of CCTV.

4.4.3.2 IMBSIU Library Services

The central library of IMBSIU was established in 1974. It aims to provide the appropriate and required materials for its educational mission and principles. Furthermore, the library developed its systems in order to automate its library-cataloguing services in 1980 (Moid, 1998). It also provides the academic staff and students at all levels with database and online search services via KACST. The library holds a variety of materials, including volumes of printed materials (estimated over 393692 printed resources, and 2401 periodicals) (Library Deanship, 2006b). In addition, a number of other libraries inside and outside Riyadh are linked to the IMBSIU central library, such as the central public library in Riyadh, the library of the Islamic Law college, the library of the Arabic Linguistic college, the Female Education Centre library and many more (Library Deanship, 2006b).

The IMBSIU computer centre, this provides the online Arabic systems which are integrated to support several tasks, such as the payroll and personnel system records, the library system, the student registration system and many more. Furthermore, the computer centre has witnessed massive restructuring of its appliances and devices in order to meet the needs of its academic staff and students, as well as future expansion (Library Deanship, 2006c).

The computer centre provides an Internet hub, which assists the teaching staff in accessing the university network. Yet the number of personal computers provided for teaching, searching in the central library and the labs provided by college seems to be insufficient (Library personnel, 2006).

4.5 The Noticeable Development for Women in Higher Education

It is clear that the number of female students in higher education has expanded, from 150,000 students in 1996 to 334817 out of 570000 students in 2005; this is the equivalent of 58,73 % of all students (Ministry of Higher Education, 2006).

At KSA, there is a rare model of support in higher education for students of both genders, through the policy of free education for everyone at any stage, no matter what the discipline is. The government also offers students of both genders financial remuneration in the form of a monthly payment to ensure that they are financially sufficient so that they can focus completely on their studies. Students of both genders who are poor and can not continue without financial support are supported by extra funds either from their institution or from a student's affairs committee (Ministry of Higher Education Publications, 1998).

4.6 ICT Infrastructure and the Internet at KSA

At KSA the development of the ICT infrastructure and Internet followed three consecutive stages that explain the Saudi government policies:

- ◆ First Stage: Networking technical development (1994-1996)
- ◆ Second Stage: National Study of potential Internet effects (1997-1998)
- ◆ Third Stage: National Internet services (1999 - to date)

4.6.1 First Stage: The Saudi Networking Technical Development (1994-1996)

The 1985 witnessed the establishment of Gulf Net as a result of the collaboration between King Abdul-Aziz City for Science and Technology (KACST) and IBM. Gulf Net was the first wide area network (WAN) in the region. Its main goal was to provide information to support the academic and research institutions.

Then, in 1987 there was a connection and universal extension between GULF Net and US-based BITNET, and in December 1989, the Saudi Telecom Company constructed a national communication network X.25, called "ALWASEET", which was implemented by Siemens. This network consists of three communication points located in Riyadh, Dammam and Jeddah, in addition to 95 sub-units distributed around 45 locations.

However, the deficiency of the telephone system was a substantial obstacle to network use, as activity and accessing other networks was difficult from most telephone lines in KSA, which were analogue until the mid-nineties. This also limited the network communication speed via telephone lines to only 9.6 kilobytes per second; hence, connection speed was only sufficient for e-mail Internet activities (Burkhart, 1998).

Furthermore, it is important to mention that the Saudi Telecom Company (STC) is the only provider for telephone lines in Saudi; however, customers have to pay two fees,

one to STC for activation of the Asymmetric Digital Subscriber Line (ADSL) service via the telephone line; and a second payment to an Internet Service Provider (ISP) to provide the Internet service through the ADSL line. Despite the fact that STC is the only provider, customers had to wait for a long period that sometimes lasted many months to receive ADSL service. Finally, 2006 witnessed an investment to increase the size of the ADSL infrastructure of the STC, which shortened the waiting time.

The ADSL connection service in Saudi Arabia appears to be very slow and expensive, when compared to the neighbouring countries. While the current maximum Internet speed available is only 512 kbps, the broadband costs in Saudi are nearly double those of surrounding countries. However, the STC has announced that, as of January 2007, they will start providing 1024 kbps ADSL connection; currently there are no ISPs that provide ADSL 1024 kbps Internet access.

Furthermore, since October 2006, the number of Internet service providers in KSA has reached 20, which are connected through “Data service provider”-licensed companies, such as the Saudi Telecom Company (STC). While the ISPs were previously connected via KACST, which was also in charge of DNS (Domain Name System) and filtering traffic, in 2006 the responsibility for the DNS and filtering services was transferred to the Communications and Information Technology Commission.

However, it seems that a lack of experience’ staff, equipment and such are the reasons for the poor and unpopular service, the unreasonably expensive prices and incompetent, low-quality service. For example, the available ADSL speed connection, with typical monthly price, is:

- 64 kbps at a cost of SR90 (~US\$24) for ISP + SR90 (~US\$24) for STC;
- 128 kbps at a cost of SR150 (~US\$40) for ISP + SR90 (~US\$24) for STC;
- 256 kbps at a cost of SR230 (~US\$62) for ISP + SR100 (~US\$27) for STC;
- 512 kbps at a cost of SR380 (~US\$100) for ISP + SR120 (~US\$32) for STC;
- 1024 kbps at a likely cost of SR750 (~US\$200) for ISP + SR150 (~US\$40) for STC.

This information is adopted from the Organization for Economic Co- operation and Development OECD, 2005.

In the light of these facts, Saudi citizens are hoping for the quick establishment of another Internet access provider, which would allow competition in the Internet market. Especially since dialup connection is the main method of connectivity and is billed to the phone line at three Saudi Riyals per hour, which is equal to 43 UK/pence per hour (further information is available at <http://www.answers.com/topic/broadband-internet-access-worldwide>).

The expansion and improvement of the Public Switched Telephone Network (PSTN) as part of the Telecommunications Expansion Project No.6 (TEP-6), had positive effects in accelerating the development of existing telecommunications. PSTN further expanded its capacity to approximately a million and a half lines for digitising transmission and telecommunication. These changes were intended to be finished by 2001. However, this study cannot obtain information about this project from the STC, But there is an indication through the recent statement of the Saudi Telecom president about the achieved project; he mentioned that the Internet development services have noticeably improved from the starting number of one million Internet users in 2001 to five million Internet users by the end of 2006. He also pointed out that the Digital Subscriber Line costumers rate had raised from 14,000 costumers in 2001, to 217,000 customers in 2006. He also informed that the rate has reached 300,000 by the beginning of 2007. Typically, the download speed of consumer DSL services is 512 kilobits per second, depending on the DSL technology, line connections and service level implemented (AL- Jaser, 2007).

In 1994, the use of fibre optic cables became common in universities and scientific research centres. Local Area Networks (LANs) began shifting towards the use of Internet protocol and the capability to establish and transmit internal files and e-mail. In the same year, an international Internet protocol federation was established between the King Faisal Specialist Hospital and Research Centre in Riyadh and the International Centre for Medical and Education data (MEDIC) in Washington D.C. As

a part of the Saudi-American University Project, MEDIC in Washington will handle coordination and management of Saudi communications via the Internet network.

When Saudi.net was established, it claimed to be the first Saudi commercial provider of the Internet service; however, King Abdul-Aziz City for Sciences and Technology (KACST) had registered itself as a national regulatory manager for the region carrying the symbol (.sa), and built its own site, <http://www.kacst.edu.sa/>. Therefore, the plan was that KACST should be the legal body responsible for issuing commercial licenses for Internet service providers across the kingdom.

In April 1995, Saudi authorities decided to use the Internet protocol in GULFNET to build an information highway, which links academic institutions, scientific research centres and public libraries in Saudi Arabia. This network formation was called Saudi Net.

The period from 1994 to 1997 witnessed increased Internet usage by academic, government, medical and research institutions. Saudi citizens and residents at that time obtained Internet connection through foreign Internet providers in Bahrain, America and Europe through satellite services, but this was very costly. Moreover, they were only able to connect and subscribe to the local "Naseej" networks that provided local and international e-mail services, local databases and chat rooms, but did not give access to the worldwide web.

The distinguishing element of this stage for the preparation and development of the Internet service was the creation of a government committee in 1994. The committee represents various parties and is in charge of studying the advantages and potential problems of public access to the Internet. It is comprised of eighteen government employees representing ten government entities, which include the Ministry of Defence, the Ministry of Foreign Affairs and KACST. Each institution or organisation that was not represented in the national committee formed internal committees to examine the many aspects of Internet-related issues.

In addition to the general evaluation processes of the National Committee, it is also interested in dealing with national security and moral and social issues, including

sexually explicit materials, suicide method instructions, false government information, weapons design and fabrication and anti-Islam debates, whether available on the Internet or through e-mails. The National Committee concluded its work in early 1997, and submitted the studies' results, research and recommendations to the Council of Ministers (Ministry of Communication and Information Technology, 2003; Arif and Shaheen, 2004).

4.6.2 Second Stage: Saudi National Study of Potential Internet Effects (1997-1998)

Despite the availability of network connections since 1994 and Royal approval of public (mass) access to the Internet in 1997, the actual implementation of Internet connection services via private local service providers to the general public did not commence until January 1999. This delay may be justified by the adoption of a secured system, which controls information flow on direct lines.

In February 1998, Saleh Abdul Rahman Al Adel, Chairman of KACST, stated, "A permanent approved security system by the Saudi government was created to protect the society from the available materials on the Internet that violate Islam and transgress our Saudi customs and culture" (KACST, <http://www.kacst.edu.sa/>).

For this reason, the committee locates immoral sites (i.e. sex provoking and the like) to block Internet users from accessing such sites. Due to the massive number of such offensive sites found on the Internet, a mechanism was established to prevent these materials from finding their way to Saudi society. Programs and equipment that block access to these sites, which could harm and ruin social values and Islamic culture, were implemented; additionally, a firewall has been designed to block Saudi sites from being infiltrated. For these reasons, the KACST did not rush into offering Internet services without assuring first that such service is free from negative aspects.

The statement of the KACST chairman, quoted above, is largely based on the Council of Ministers statement no. 163, dated 24/10/1417H (4th March, 1997). KACST

achieved approval for Internet introduction to the KSA. They will assume supervisory responsibility and oblige Internet users in KSA not to use the network for illegitimate purposes, such as sexual provocation, gambling and conduct of any activities that violate the sanctity of the kingdom's social, cultural, political, media, economic or religious values, or send/receive coded information without network management approval.

In November 1998, the Saudi government gave approval to the establishment of 40 Internet services provided by private companies inside the KSA, that carry out their work through the KACST Internet server, the only portal to the World Wide Web.

4.6.3 Third Stage: Saudi National Internet Services (1999-to date)

January 1999 witnessed the actual start of Internet service provision on a massive public scale all over Saudi Arabia. The private providers of Internet services started offering their services, seeking to obtain as many subscribers as possible, and using various methods to market their services.

Statistical information that reflects the growth of Internet users in Saudi Arabia is contradictory, which is a result of using more than one basis for gathering statistical information, such as subscriber numbers, accounts used by many users, number of actual users, etc.

A statistical study issued on 7th March 2000 indicated that the annual growth rate of subscriber numbers in the kingdom could surpass all other Arabic countries to reach 160%. The same study noted that the number of subscribers had reached 100,000, while the average number of users for a single computer was three; consequently, the total number of Internet users in KSA was estimated to have reached 300,000. Another study issued in 28 September 2000 showed that the number of Internet users in Saudi Arabia had reached 120,000 and that most of these users relied on Internet cafés (Ministry of Communication and Information Technology, 2003; Arif and Shaheen, 2004; and United Nations, ESCWA, 2005).

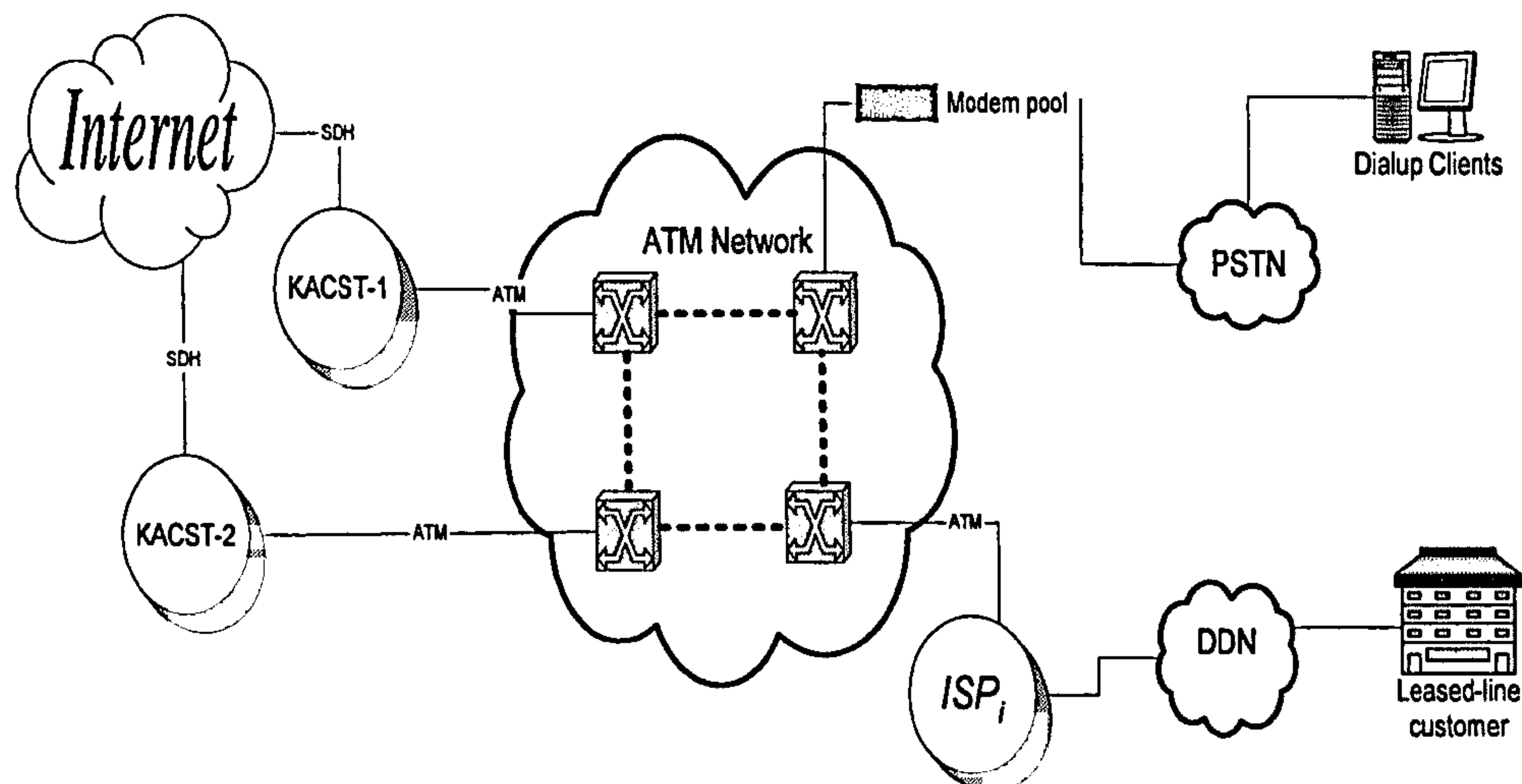
By 2003, Internet access to about 1.6 million users was supplied via 21 operational Internet Service Providers (ISPs). Moreover, the Ministry of Education started operating an education system with 41,000 PCs for 1.5 million students and more than 60,000 teachers in order to provide the opportunity to learn more about information technologies.

The last important event in this review is the national E-Transactions conference 2007, held on 14th-17th January at the Intercontinental Hotel in Riyadh. The objectives of the conference were to form and contribute to public awareness. At present, KACST is the sole provider of Internet service to academic, research and government entities. This is in collaboration with the Internet Services Unit (ISU), a subdivision of KACST, was established in 1998 which is responsible for determining Internet connection and subscription kingdom-wide, connection to the universal Internet and observing and implementing other official entities' controls and regulations, whether administrative, technical or security. This contributes a positive role, because it relies on providing and locating costly and modern technology to secure the control of negative sites and materials on the Internet, which distort religion and politics and contest the values of society. ISU, through the Internet Security Centre (ISC), has adopted Internet information filtering. ISC has also designated one of its web pages to information about this task. The ISU is also responsible for domain name registration under the ".sa" hierarchy. All Saudi universities are directly linked to the ISU link through the national ATM fibre optic network. This kind of connection makes it faster than those available via local Internet Service Providers (ISPs). All universities were supplied a bandwidth of 512 Kbps but some of them are advance their connection capacity (ISU, 1999).

Figure 4.2 illustrates a simple diagram of the Saudi Internet infrastructure and the terminals of access, which operate through three channels: the Internet services unit at KACST, Saudi Telecom, and ISPs. Furthermore, the Internet unit at KACST manages and operates the international lines through which the national Internet network is connected to the international network; it supervises the Internet gateway and blocks undesirable sites. Saudi Telecom provides, manages and maintains the telecommunication infrastructure in the country. It provides the linkage between

customers and ISPs, between ISPs and the KACST network, and between KACST and the international network.

Figure 4.2 The Internet Infrastructure in Saudi Arabia

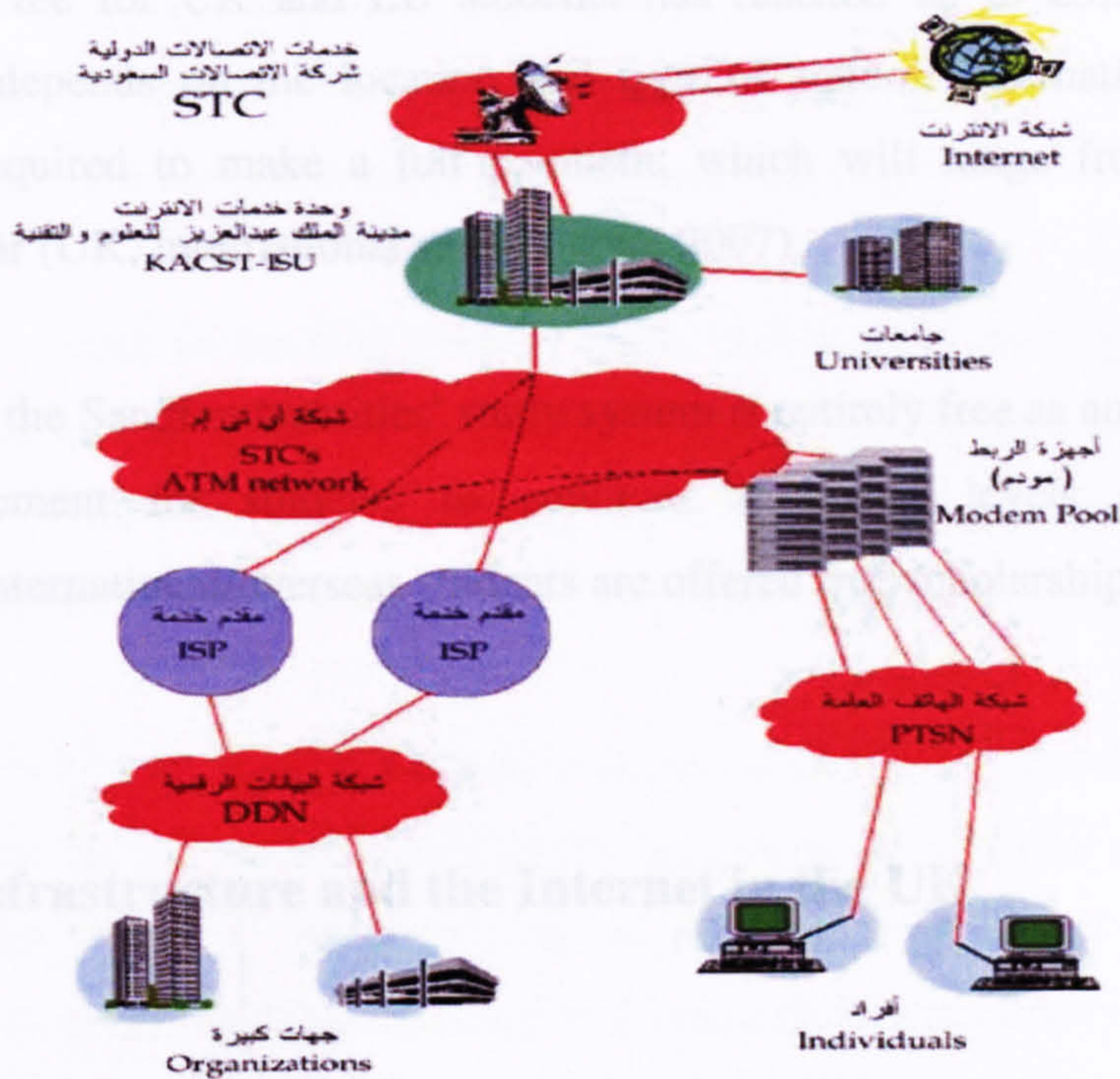


Adopted from the Report of Saudi Communication and Information Technology Ministry (2003)

Saudi universities and ISPs are linked through Saudi Telecom to the KACST as national network with different capacities. The universities or ISPs rent their own dial-up access servers from STC. Internet Service Providers have to be approved only by ISU a subdivision of KACST (ISU, 2006).

All Saudi Universities are linked to the ISU link through the national ATM fiber optic network. This Kind of connection formulates is faster than those accessible via local providers. The universities are supplied a bandwidth of 512 Kbps but some of them are upgrading the connection capacity (ISU, 2006). Figure 4.3 gives more information about the structure of Internet infrastructure levels in Saudi Arabia. It has been adopted from the AL-Zoman's study (2002) about the orientation guidelines of the Internet.

Figure 4.3 Internet infrastructure levels in Saudi Arabia



Adopted from ISU, 2006

4.7 Higher Education in the United Kingdom (UK)

There are over a hundred universities in the UK, and they offer a variety of programmes for students of both genders. About a third of young people in the UK choose to complete some sort of higher education; this ratio is over 50% for students in Scotland (UK, International student.com, 2007).

In the UK, the length of undergraduate courses is generally three to four years. Sandwich courses are becoming increasingly popular; these courses require four years, with one of the years involving practical experience in real workplaces. In Scotland, the undergraduate programmes are four years long. Masters and graduate programmes are also shorter in length than in Saudi Arabia. However, some professional subjects like medicine, law, etc. have a longer course that lasts for up to five years. In contrast to these courses in UK, the Saudi higher education system does

not involve students of these subjects gaining practical experience from real job placements.

The university fee for UK and EU students has reached up to £3,070 per year; however, this depends on the location and type of school. International/overseas students are required to make a full payment, which will range from £4,000 to £18,000 per year (UK, International student.com, 2007).

In comparison, the Saudi universities' study system is entirely free as an enhancement and encouragement for students to continue to higher levels of education. Additionally, international/overseas students are offered free scholarships.

4.7.1 ICT Infrastructure and the Internet in the UK

In the UK, the Joint Information Systems Committee (JISC, www.jisc.ac.uk) is the responsible body specialised in providing the best services for higher and further education and for the research community in the UK. It has a highly developed network, excellent services and holds beneficial content for higher education in general and for information seekers and researchers in particular. The JISC works collaboratively with the Learning and Skills Council (LSC) to provide metropolitan networks area, as well as managing the learning environments. Furthermore, they cover the entire education spectrum to provide access to information resources from different divisions of education for students and researchers. Their vision and mission is to provide developed technology that could be used for both working and studying, providing and supporting a wide and reliably accessed communication and information environment with technology for education and communication.

Moreover, the clearly stated strategy of JISC of 2004-6 (JISC, 2007) shows a desire to remain at the forefront of ICT provision in higher education through the following objectives:

- Supporting and extending JANET to all post-16 education;
- Helping ensure ICT is used effectively to improve learning and teaching;
- Developing appropriate links for schools;
- Providing international research links and knowledge transfer; and
- Supporting the development of international learning.

Nevertheless, in order to develop generic online information management and an underlying infrastructure which will enable the effective sharing and use of resources, JISC is working with e-science, e-learning, digital library communities and content provision (further information is available at: <http://www.jisc.ac.uk/whatwedo.aspx>).

Since the UK policy on universities and colleges is to incorporate the use of ICT facilities in research and teaching, this policy concentration has been transformed to persuade people that ICT needs to play an essential role in an organisation's operations, such as in teaching, learning and research. Consequently, the business practices of institutions will be supported by the use of ICT and the Internet.

With regard to management and administration, JISC plays a significant function, incorporating technology with information behaviour skills of all kinds among its users. This includes authentication, metadata, rights and records management, as well as digital preservation issues.

Finally, the important role that ICT has begun to play in both business and daily routine has been considered. For example, in July 2003 the Office of National Statistics announced that 54% of UK adults are frequent users of the Internet, and every person should have access to the Internet by 2005, according to the aim of the UK government. This plan is being enacted by the UK Online project and the efforts of the Office of the e-Envoy in England. By April 2004, 53% of UK households had Internet access at home. By the end of June 2004, there were about 4.5 million connections in UK (The Office for National statistics, 2005). By the end of 2006, half of UK people were using broadband at home (Ipsos MORI, 2007). There are many Internet connection suppliers in UK e.g. BT, Sky, Tiscali etc. They come with different options and packages, mostly with unlimited connection time, and

competitive prices. Wireless connection is also available to users if they want to set up such a network at home or work.

ICT skills are identified as the third basic skill alongside numeracy and literacy, as has been clarified by the White Paper, '21st Century Skills' (Department for children, schools, and families). This also underlines the benefit that e-communication can provide to individuals with learning difficulties. JISC is working with government departments and agencies to ensure that the work is accepted in the area of education. This will formulate appropriate links for those in other areas, especially when related to the classification of technical standards to achieve interoperable systems. In its global work, JISC can support advanced standards and solutions to ensure the widest possible application of both, and will not restrict itself to serving the requirements of UK education and research in isolation from international improvement.

4.7.2 The University of Strathclyde

The University of Strathclyde, located in Glasgow, is the third largest university in Scotland. It is also one of the UK's leading universities because of its commitment to relevant research and innovative teaching, and it has met the students' demands, welcoming hundreds of employers and students from around the world. The University of Strathclyde is known in its stated vision and mission as, 'The place of useful learning'. It was named by its founding professor, John Anderson, who launched the organisation in 1796 as a place of learning for all, no matter what their gender, position or income. The royal charter was approved for the university in 1964. The University of Strathclyde contains a wide range of colleges and faculties for all students of both genders. It houses faculties of disciplines under science; law, arts, and social sciences; engineering; education; and business school (University of Strathclyde, 2007a).

The university practices all forms of study, such as full-time, part-time and distance learning. It awards students different degrees of qualification ranging from diploma

and certificate, to undergraduate and postgraduate degrees, which meet its underlying philosophy and the primary goals and objectives of higher education, as well as enhancing the research community in the UK (University of Strathclyde, 2006).

In comparing the UK universities' history with that of the Saudis, it is apparent that UK universities are much more advanced and ancient in higher education services and are much better in the facilities they provide to their academic staff, researchers and both undergraduate and postgraduate students. They also provide more advanced facilities and services of the Internet and access to databases.

4.7.2.1 The University of Strathclyde Library

There are two main libraries for Strathclyde, one for each campus; the main one is the Andersonian library, and the other is the Jordanhill library.

First, at the Anderson library, the computer facilities and electronic library services are open to all Strathclyde staff and students. The ID card provided to postgraduate or undergraduate students at Strathclyde can also be used as a library card.

Strathclyde library provides electronic services as mentioned before; these services are accessible to a user once he/she signs the student access form or the library's acknowledgment form, and with this form a user agrees to comply with the conditions of the library and to observe the terms of the licences set by other electronic providers.. Every user must have a username and password to be able to access databases, e.g. Athens authentication.

The library's electronic journal licences are supplied by the Model NESLi2 Licence for Journals (National E-Journal Initiative), which is the model licence, used by publishers for JISC journal agreements (University of Strathclyde, 2007b). However, every licensed journal has more exclusive or additional conditions; thus, some providers also permit Virtual Private Network (VPN) remote access. A number of e-journal services provide access to their terms of use only through online connection.

The student access form or the library's acknowledgement form signed by students/users is an agreement to the licence terms and conditions set by several electronic resource providers, such as CSA, Elsevier, MIMAS and OVID. All users must follow these restrictions for the safety of University of Strathclyde data (University of Strathclyde, 2007c).

4.7.2.2 ICT Facilities and Access at the University of Strathclyde

The University of Strathclyde clearly states that staff and students who are using the university computer facilities and resources must follow the university policy. The usage of the university's property through networked links to the university's ICT facilities must be authorised. Furthermore, anybody who is permitted to use the ICT facilities within the university must follow the university policy whenever using any type of hardware, software or even when connecting his/her own equipment to the university system.

The computing facilities and resources in this policy include: central services, such as those provided through information technology services; the centre for educational systems; media services; the university libraries; departmental computers; microcomputers and peripherals; and personal computers regardless of whether they are a desktop or portable.

University students should register with the information services department to be authorised users in the agreed policy; following this, most if not all of the university's ICT facilities are then available for use after registration. Facilities are accessed by an allocated unique user ID and may require a university ID card or some other type of identification. A password is also essential to gain access to most computers; therefore, users have to create their own passwords that are secure and not easy to guess. They are also not allowed to pass these on to others and must keep them secure.

Furthermore, Strathclyde University provides a variety of computing facilities and resources that can be used by staff and students for learning, teaching, researching and direction. The use of these facilities offers the best support when the intention is to do university work; this is one of the university's strategies in guaranteeing that any use of these information technologies will ensure improvement in the university's high educational standards (University of Strathclyde, no date).

4.8 Summary

From the data collected, it was found that there are differences between the organisational structure and the ICT development in Western universities and Arabic universities. The discussions in this Chapter reveal that differences between the two environments caused by several factors are such as:

- The ICT infrastructure and Internet were introduced late in Saudi Arabia compared to the universities in UK.
- The management of the ICT infrastructure and support services were governed and controlled overall by the male campuses. This is influenced by cultural practices, and can sometimes result in females finding themselves at a disadvantage as far as using these facilities is concerned.
- The investigation of the ICT infrastructure in Saudi Arabia revealed that KACST and Saudi Telecom have a key responsibility, which is to develop and assist the progress of information technology in Saudi Arabia. Within the UK there is a general government policy such as JISC that formulates the general information support to be provided by the universities; however, there is no precise equivalent of that body in Saudi Arabian universities. Although KACST is an authorized body for the control of ICT policies and infrastructure, there is nothing comparable to the information support which is available in the UK within the framework of JISC, which governs and controls information policy and infrastructure.
- In addition, there is a difference in institutional policies in that, within Britain, universities have their own clearly laid-out policies and infrastructure, while in Saudi Arabia, the ICT structure and its support is entirely different in each

university. It is clear that Saudi universities are located in the major cities in different regions of the country, and that each region has a different ICT infrastructure and Internet support, and, in addition, this geographical distribution has an impact on the economy and facilities of the universities. Although some universities cover more disciplines and subjects and have a better ICT infrastructure, in the same university, particularly on the female campuses, they still lack equal access to ICT facilities and the Internet.

- Another important factor is the availability and cost of the type of connection. There are differences between Saudi Arabia and UK in terms of the number of Internet providers, bandwidth and the cost.
- The library systems that are used in the Saudi Arabian universities are not specifically designed for dealing with Arabic materials; they have adopted systems designed mainly for the English language.

Chapter 5: Descriptive and Statistical Data Analysis for Postgraduate Students at SU and KAAU

5.1 Introduction

One of the main goals of this research is to study whether there are any differences in the barriers to information access and use facing postgraduate students in geographically and culturally different environments. This chapter presents the findings of a quantitative study aimed at identifying the barriers to information access among postgraduate students at a typical UK university and a Saudi Arabian university where students use a variety of electronic and printed information resources for their learning and other activities.

5.2 User Profile at University of Strathclyde (SU)

Of the 54 students, 46% of students were male with 72% of them being single; 50% of the students were between 20 to 25 years old while 24% represented the age group between 26 and 30. The majority of students (59%) live outside University halls of residence either in their own accommodation or in private rental accommodation; 72% of the students' fathers are educated at least up to the University level or above while the 54% of mothers are educated at least up to the University level or above. While 43% of students' mothers are homemakers/ unemployed, only 6% of fathers are unemployed. Around 61% of the students had an income over £5000 or above and 89% of them had their own computer and access from their own while the rest accessed it either from public library or from university labs. Among the students who had Internet access at home, 61% of them had a broadband connection; 41% of the postgraduate students who live in the university halls have 24-hour broadband access anyway, and those who live outside have broadband access too.

5.3 User Profile of King Abdul-Aziz University (KAAU)

Of the 136 students of KAAU, 61% were female with 56.6% of them being single; 31.6% of the students were between 20 to 25 years old, 47.8% were in the age group of 26 and 30. There is one obvious difference between SU students and KAAU students, in that the university students in KAAU do not live in the university's hall of residence. The majority of the students (93.4%) are settled in Jeddah; 72% of them own a house or live with their family, while 28% of the students live in rented accommodation. 61.8% of the students' mothers have only been educated for ten or less years whereas, and 33.1% of students' fathers have the same degree in education; only 14.7% of mothers have a university degree, whereas 45.6% of fathers are university educated. Furthermore, 76.5% of students' mothers are /homemakers, while only 12.5% fathers are unemployed/retired.

In general, it is noticeable that the fathers are more employed at all the different categories of jobs than the mothers did. The majority of students have a family income of 61,000 R.S or more per year, which is an equivalent to about £ 8714. 93.4% of KAAU students have a computer at home. In addition, 91.9% of these students have access to the Internet from home, out of which 77.9% have access through modem, and only 22% have broadband connection.

5.4 General ICT and Internet Literacy

Even though that 69% of the SU students have been exposed to computer skills since primary school, it appears that when they were questioned about the learning methods of using the computer facilities, 72% indicated that they learnt through self instruction, which was followed by formal courses given at the university and school at the rate of 44% (the options given were not mutually exclusive). Meanwhile, 44.9% of KAAU students have been taught about the computer at schools, 79.4% of students learnt to use a computer through self instruction, and 53.7% from a course given by the university. Given the above facts, over 89% of SU students ranked themselves at

extremely proficient and confident in using computers. Also 80% of KAAU students graded themselves as confident. There seems to be a slight difference among students from the two universities in terms of the methods of learning using a computer and the level of confidence to use ICT.

While 65% of US students had used Internet between four and seven years, 24% of them had used Internet in excess of seven years. Although 30.1% of KAAU students have used the Internet for one to three years, 50% have used it for four to seven years. At SU 91% of the students use the Internet on a daily basis with over 82% of them use an average at least of 8 hours per week. In contrast, 63.2% of KAAU students use the Internet everyday, with 22.1% uses the Internet for two to four hours a week. With the exception of 10%, most students indicate a high level of confidence in using the Internet.

However, there has been a surprising result from SU and KAAU students concerning the way they acquired training for information searching skills. Only 11% KAAU students indicated that they learnt through self-instruction, whereas 29.4% of KAAU students have gained their information searching skills through self-instruction. The most common method cited by students of both the universities was through a formal course given by the university department, which was about 30% for SU and 23.5% for KAAU. There was also a preference cited for learning from colleagues, library staff etc. This interesting result indicates that even though students may prefer to think they are proficient in using computers, they have a distinct preference for formal training for information skills that indicates that the policy makers need to take that issue into account while designing information systems or supporting information literacy plans.

Almost sixty-nine percent of the SU students (Table 5.1) indicated a preference for using Internet as their first choice for searching information. Preferred channels include electronic databases and electronic journals; e-books and printed journals do not seem to be the preferred sources. Overall, it may be noted that the electronic resources are overtaking the print media as the first choice for information seeking.

Table 5.1 Preferred first choice for information channel at SU and KAAU students

Search looking through	SU		KAAU	
	Frequency	%	Frequency	%
Internet	37	68.5	121	89.0
Printed books	18	33.3	62	45.6
Electronic books	5	9.3	19	14.0
Printed journals and magazines	6	11.1	42	30.9
Electronic databases	24	44.4	29	21.3
Electronic journals	28	51.9	22	16.2
Other	1	1.9	1	.7

(Note: The table states that the percentages add up to more than 100 because the students were able to tick more than one option).

On the other hand, it is noticeable (from Table 5.1) that the postgraduate students in KAAU do have a desire for printed books and journals and most of them (89%) prefer to use Internet. Preferred electronic information resources for KAAU students are e-journals, electronic databases and e-books, though they are used by a relatively small number of KAAU. This result might be caused by the following facts:

1. Electronic information resources are available only in English language.
2. Electronic information resources might only be available in limited subjects.

Another possible cause for the lack of usage of these resources may be the shortage of computer equipments and the need for labs in their college buildings or in the library.

5.1.1 T-test for Table 5.1 at SU and KAAU

	SU&KAAU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
Internet	Equal variances not assumed	-2.95	72.7	.004
Printed books	Equal variances not assumed	-1.58	101.9	.118
e-books	Equal variances assumed	-.88	188	.381
Printed journals	Equal variances not assumed	-3.37	141.2	.001
e-databases	Equal variances not assumed	3.01	82.7	.003
e-journals	Equal variances not assumed	4.72	76.6	.000

There appeared to be a variance between SU and KAAU in Table 5.1. Therefore a t-test was carried out to highlight for whom this variance was. The results show that

there were evidence within the setting observed that KAAU students made use of the Internet significantly more on average than SU students did, $t(72.7) = -2.95, P=.004$. The mean of using printed books was not significant different at both universities, $t(101.9) = -1.58, P = .381$. While, the priority of using printed journals at KAAU was significantly more than SU, $t(141.2) = -3.37, P = .001$; the e-databases use at SU was significantly more than KAAU students, $t(82.7) = 3.01, P = .003$, as well as the mean for using e-journals was significantly more at SU than KAAU, $t(76.6) = 4.72, P = .000$.

Though one would assume that students would use the Internet for performing their study/course work, it has been found that Internet is also used for other activities such as: e-mail, online shopping etc. (Table 5.2). It is clear from (Table 5.2) that the majority of KAAU students use the Internet to learn how to use the PC and the Internet. This indicates that the students need to learn the adequate ICT skills. Only a small group (25.7%) of KAAU students use the Internet to study or do course work, which is clearly the opposite for the SU students (92.6%). Therefore, the Internet in SU is used as an important information resource in the education system, while it is not as important in KAAU.

Table 5.2 Distribution of users' web search interests at SU and KAAU

Using the Internet:	SU		KAAU	
	Frequency	%	Frequency	%
To read e-mail	54	100	107	78.7
To study or do coursework	50	92.6	35	25.7
To find job and career information	45	83.3	23	16.91
To read general information	42	77.8	80	58.8
For online shopping	42	77.8	32	23.5
To chat with others	38	70.4	61	44.9
To browse web for own enjoyment	38	70.4	41	30.1
To do part of the work	29	53.7	26	19.1
To find free software to download	26	48.1	43	31.6
To learn to use PC and Internet	14	25.9	107	78.7
To obtain information through distance education classes	9	16.7	32	23.5

(Note: Table 5.2 shows that the percentage adds up to more than 100 because the students can choose more than one option).

PG students at KAAU use the Internet for coursework as well as for other purposes such as learning the Internet and ICT usage, but they do not use the Internet that much for other purposes like those at Strathclyde such as for online shopping, entertainment, etc.

Table 5.2.1 T-test for Table 5.2 at SU and KAAU

	SU&KAAU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
To read e-mail	Equal variances not assumed	6.05	135.0	.000
To study or do coursework	Equal variances not assumed	12.84	158.1	.000
To find Job and career inf.	Equal variances assumed	10.98	188	.000
To read general inf.	Equal variances not assumed	2.67	113.8	.009
For online shopping	Equal variances assumed	7.95	188	.000
To chat with others	Equal variances not assumed	3.36	104.9	.001
To browse web for enjoyment	Equal variances assumed	5.43	188	.000
To do part of the work	Equal variances not assumed	4.53	80.2	.000
To find free software to download	Equal variances not assumed	2.08	91.0	.040
To learn to use PC and Internet	Equal variances assumed	-7.81	188	.000
To obtain information by distance education classes	Equal variances not assumed	-1.09	109.5	.277

Table 5.2.1 was created to portray the variance between SU and KAAU students. According to this table, the means of the Internet use activities at both universities were significant more at SU (such as read e-mail, study or do coursework, read general information and find job) than at KAAU (while learn to use PC and Internet was significant at KAAU).

5.5 Barriers to Information Access

The study used various hypotheses based on the intervening variables specified by the Wilson's information behavior model, that is summarized below.

5.5 Main hypothesis 1

Differences among universities in terms of ICT infrastructure and access to electronic information services may have an effect on access to electronic information resources.

H 1-1 is a sub-hypothesis of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis1).

Correlation analyses did not show any significant relationship between Internet access/ availability and the usage of electronic resources among SU students, and it is the same even in the case of Internet access/ availability and the preference towards the use of certain electronic resources during information access. However, for KAAU there is a relationship between the Internet access/availability and the usage of electronic resources accessed (Table 5.3). These variables were tested using Spearman's rank correlation coefficient.

Table 5.3: Correlation between owning a computer, and Internet usage and preference for electronic resources (Q. No. 15;16 and 23; 28; 44)

Hypothesis and Factors	KAAU r_s	
	P-Value	Sig.
H1-1: owning a computer & Internet usage	.003	Y
H1-1: owning a computer & priority of inf. resources: Internet	.001	Y
H1-1: owning a computer & the preference of using e- inf. resources: e- databases	.008	Y
H1-1: the preferences of using e- inf. resources: Online reference books	.023	Y

Sig.: significance Y: Yes Q.: question

In Addition, for the Saudi Arabian students as it appears in Table 5.3, there is a relationship between owning a PC and the priority of using the Internet in general, and the preference towards the use of specific electronic information resources, particularly in terms of using online databases and online reference books.

This point indicates that perhaps the Internet has become so common in the lives of the Strathclyde students, its availability does not influence their information

behaviour, whereas Internet has not yet become that much as part of the Saudi Arabian culture and hence its availability (or non-availability) influences the students' information behaviour.

5.5 Main hypothesis 2

Personal characteristics may have an impact on the usage, preference and the type of electronic information resources accessed.

The following sub-hypotheses were derived from this hypothesis (H2) for the purpose of this research.

H 2-1, H 2-2, H 2-3 and H 2-4 are sub-hypotheses of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis2). These variables were tested using Spearman's rank correlation coefficient.

Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 5.4. User confidence in adopting technology (Table 5.4) by students at both the universities has a significant relationship with the usage of Internet resources. This has a significant implication for both administrators and policy makers as it indicates that educating users and increasing their computer literacy and instilling confidence will go a long way in improving the students' use of electronic resources. However, the results from SU indicate that users' confidence in adopting technology does not have any bearing on the type of resources or choice of resources used for information access. On the other hand, Saudi Arabian students appear to be different from their Western peers at SU; in the former user confidence in adopting technology has an impact on the type and the preference of electronic information resources (see Table 5.4).

For the SU students, user confidence in using the Internet to search and find the required information does not have any effect on the usage patterns, preference or type of electronic resources accessed. This implies that irrespective of the perceived levels of confidence among individual users about the importance of Internet as a

vehicle to obtain the required information, there is no difference among the students in terms of their usage or choice of electronic resources being accessed.

Table 5.4 Correlation between some personal characteristics and Internet usage; the type and the preference of electronic information resources (Q. No. 22; 30, 25 and 23; 28; 44; Q. No.5 with 33; 34;35)

Hypothesis and Factors	KAAU r_s		SU r_s	
	P-Value	Sig.	P-Value	Sig.
H2-1: ICT expertise and time spent per week	.000	Y	.005	Y
H2-1: ICT expertise and the priority of inf. resources: Internet	.000	Y	Null	N
H2-1: ICT expertise and the priority of inf. resources: e- databases	.008	Y	Null	N
H2-1: ICT expertise and the priority of inf. resources: e- journals	.000	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: e- databases	.001	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: OPAC	.011	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: Internet	.000	Y	Null	N
H2-2: Internet user confidence and time spent per week	.000	Y	Null	N
H2-2: Internet user confidence and priority of inf. resources: Internet	.001	Y	Null	N
H2-2: Internet user and preference of e- inf. resources: e- databases	.000	Y	Null	N
H2-2: Internet user and preference of e- information resources: OPAC	.001	Y	Null	N
2-2: ICT expertise and user confidence	.000	Y	.001	Y
H2-3: Internet user experience and priority of inf. resources: e-databases	.016	Y	Null	N
H2-3: Internet user experience and priority of inf. resources: Internet	.005	Y	Null	N
H2-3: Internet user experience and time spent on using the internet.	.000	Y	Null	N
H2-3: Internet user experience and preference of inf. resources: Internet	.001	Y	Null	N
H 2-4: Users' language and ease of searching	.027	Y	Null	N
H 2-4: Users' language and preference of information resources: e-databases	.000	Y	Null	N
H 2-4: Users' language and preference of inf. resources: Online reference books	Null	N	.004	Y

Sig.: significance N: No Y: Yes Q.: question

On the other hand, KAAU students illustrate significant differences; as shown in Table 5.4 there is a correlation between users' adoption of technology and Internet usage, and the type or preference for electronic information resources. There is a

significant correlation between the Internet and user confidence in Internet usage, and the preference for using OPAC.

For SU students there appears to be no relation between users' computer experience and the type of preferred electronic resources accessed. By comparison, KAAU users' experience of the Internet has an impact on electronic information resources in particular electronic databases and Internet in Table 5.4. The table also shows a significant correlation between users' ICT experience and the time spent on the Internet weekly at KAAU.

As shown in Table 5.4, SU users' language has no impact on ease of search in the IS&R with the exception of online reference books. This probably can be explained by the fact that most online books are multi-lingual, and language skills act as an enabler on the ability to obtain successful results during an IS&R process. On the other hand, in the KAAU, postgraduate students' language has a significant relationship with the ease of searching in the information seeking process. In addition, it is clear from Table 5.4 that the users' language has no impact on the preference for electronic information resources with the exception of online databases.

Table 5.4 shows that significant differences exist between UK and Saudi Arabian students in terms of the students' confidence in using the Internet and their ability to gain information. This again could be an important cultural issue. It may be concluded that the PG students in the Western world are more confident in the use of technology (ICT in particular) because it forms part of their daily life whereas in case of the Saudi Arabian students there is a difference in the degree of ICT confidence that influences their information behaviour. In the light of these findings, it may be concluded that instilling confidence in users for adopting technology will pave the way for users to believe in the Internet as a source for information.

The findings from the Saudi students in relation to ease of search and the preference of electronic information resources could be attributed to the users' weakness in English language, since it is not their first language and yet they are required to use English language when searching on the Internet. At this point, it may be significant to note that teaching English language at Saudi educational institutions takes place at

quite a late stage (i.e., intermediate and secondary schools) and this could be one of the major obstacles in the students' information behaviour.

Table 5.5 Correlations between users' subject background and current subject and the type and the preference of information resources (Q.No. 13, 14 and 23; 28; 44)

Hypothesis and Factors	KAAU		SU		Test type
	P-Value	Sig.	P-Value	Sig.	
H2-5: The users' subject background and priority of information resources: e-journals	.000	Y	Null	N	r_s
H2-5: The users' subject background and priority of information resources: e-databases	.000	Y	Null	N	r_s
H2-5: The users' subject background and priority of information resources: Internet	.001	Y	Null	N	r_s
H2-5: The users' subject background and time spent on using the Internet.	.000	Y	Null	N	r_s
H2-5: The users' subject background and preference of information resources: OPAC	.001	Y	Null	N	χ^2
H2-5: The users' subject background and preference of information resources: Internet	.000	Y	Null	N	χ^2
H2-5: The users' subject background and preference of information resources: e-databases	Null	N	.009	Y	χ^2
H2-6: The users' current subject and priority of information resources: e-databases	.000	Y	Null	N	r_s
H2-6: The users' current subject and priority of information resources: Internet	.001	Y	Null	N	r_s
H2-6: The users' current subject and priority of information resources: e-journals	.012	Y	Null	N	r_s
H2-6: The users' current subject and priority of information resources: e-books	.002	Y	Null	N	r_s
H2-6: The users' current subject and time spent on using the internet.	.000	Y	Null	N	r_s
H2-6: The users' current subject and preference of information resources: e-databases	.027	Y	Null	N	χ^2
H2-6: The users' current subject and preference of information resources: OPAC	.008	Y	Null	N	χ^2
H2-6: The users' current subject and preference of information resources: e-journals	.035	Y	Null	N	χ^2

Sig.: significance N: No Y: Yes

Q.: question

H 2-5 and H 2-6 are sub-hypotheses of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis2). These variables were tested using Spearman's rank correlation coefficient.

Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 5.5. For the SU students, subject background has an impact on the preference for the electronic resources. For KAAU, users from different subjects were different in their information seeking behaviour, which means that the diverse subject background of the students has an impact on the type of electronic information resources accessed as shown in Table 5.5. The first degree of KAAU students seems to have an impact on the preference of electronic information resources accessed. We can see that there is a difference between SU and KAAU students in their preference for electronic information resources. It may be due to the differences in the subject backgrounds of the students or to the various teaching methods used in the concerned universities.

Table 5.5 shows that the KAAU postgraduates' current subjects of study appear to have a significant impact on the preference for online databases, e-journals and OPAC. It may be concluded that in KAAU, students from different subject backgrounds may have different degrees of exposure and confidence in ICT, which is reflected in their information use behaviour. This in turn reiterates the need for more and uniform emphasis on the ICT training in all subjects and courses for Saudi university students.

H2-7 is a sub-hypothesis of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis2). The following sub-hypotheses were null, i.e. there were no significant relationship between the variables. Therefore, these activities are not listed in Table 5.6.

- To find job and career information with Internet usage
- To do part of your work with Internet usage
- To browse web for own enjoyment with Internet usage
- Online shopping with Internet usage.

For the SU students, there appears to be a correlation between the use of the Internet as a source for reading general information and for downloading free software (Table 5.6).

Table 5.6 Correlation of reasons for using the Internet and time spent on the Internet per week (Q. No. 31 and 28)

Reasons for Internet using and time spent per week	KAAU r_s		SU r_s	
	P-Value	Sig.	P-Value	Sig.
To read general information	Null	N	.040	Y
To read e-mail	.000	Y	Null	N
To learn to use PC& Internet	.002	Y	Null	N
To do coursework	.039	Y	Null	N
For chatting	.000	Y	Null	N
To obtain information through distance education	.000	Y	Null	N
To find free software	.000	Y	.001	Y

Sig.: significance Y: Yes, N: No Q.: question

For KAAU students, there appears to be a correlation between the use of Internet and to read email, to learn the computer and Internet use, to do coursework, to chat, and to obtain information through distance education as well as to find free software.

5.5 Main hypothesis 3

User's computer and Internet competence may have an impact on the IS&R process

Three sub-hypotheses were derived from this that is shown in Table 5.7. Results of the correlation study based on several factors derived from the sub-hypotheses are presented in Table 5.7. While the 3-4 was null for both universities, i.e. there was no significant relationship between the variables. These were tested using Spearman's rank correlation coefficient.

Although for SU students, there appears to be a relationship between the user's Internet competence and the extent of information obtained, but there no significant relationship between these two variables for the KAAU students (and hence does not appear in the Table 5.7)

However, for SU, users' Internet competence has highly significant impact on the efficacy of time taken to obtain results (Table 5.7). This correlation may be because the SU users' are more competent they spent less time to get results. However, this is not significant for KAAU students (and thus, does not appear in the Table 5.7).

Table 5.7 Correlation Internet user competence and the efficacy of the Internet results (Q. No.30 and 33; 34; 35)

Hypothesis and Factors	KAAU r_s		SU r_s	
	P-Value	Sig.	P-Value	Sig.
H3-1: Internet user competence and extent of information obtained during on IS&R Process	Null	N	.041	Y
H3-2: Internet user competence and the efficacy of time taken to obtain result	Null	N	.002	Y
H3-3: Internet user competence and ease of access of Internet information during IS&R process	.000	Y	Null	N
H3-3: Internet user competence and ease of access of Internet information during IS&R process	Null	N	.002	Y

Sig.: significance N: No Y: Yes Q.: question

On the other hand, for KAAU, users' Internet skills were not correlated with the time spent to obtain results. This would point out that the amount of time spent on searching depends on the individual's searching skills to find out the information they need, besides, the ICT facilities and its quality.

As noted in Table 5.7, for KAAU, it was noted that the students' Internet competence may have an effect on the ease of access to electronic resources during an IS&R process.

Though Internet competence enables the process of an effective search it does not guarantee that the required results are obtained at the end of a search. This also reiterates an earlier finding in our study that when the Internet search did not yield the desired result it does not deter users from using it. Computer and Internet skills are essential for users in finding information on the Internet. At this point, we may need further research on search engines that the KAAU students use.

However, it may be stated that in order to improve students' information search skills on the Internet, their ICT and Internet skills have to be improved, and this could be achieved by special courses and/or incorporating information skills as part of their curriculum.

H 3-5: User education and training (information literacy skills) may have an effect on the ease of access to electronic resources during an IS&R process.

It is clear that users education and training would facilitate the process of information access during an IS&R process. There was a relationship among user education skills and the courses given by their high schools and universities, library staff instruction, and self-instruction (Table 5.8). This shows that computer training and help are significantly related to the students' IS&R process, but the way such training is provided or support is obtained varies from SU to KAAU students. Table 5.8 shows that for KAAU there is a significant correlation between a course given by elsewhere, and the assistance from colleagues, and both have an affect on the ease of information access during an IS&R process. Table 5.8 shows a significance value of a chi-square test.

Table 5.8 Correlation between methods of learning computer skills and the ease of access to the Internet (Q.No. 18 and 35)

Learning computer facilities through:	KAAU χ^2		SU χ^2	
	P-Value	Sig.	P-Value	Sig.
A course given by the high school	Null	N	.028	Y
A course given by the university department	.028	Y	.041	Y
A course given elsewhere	.012	Y	Null	N
Assistance from colleagues	.011	Y	Null	N
Individual instruction by library staff	.031	Y	.032	Y
Self - instruction	Null	N	.046	Y

Sig.: significance N: No Y: Yes Q.: question

Thus it may be stated that it is important to incorporate information seeking and /or literacy skills as part of the course. From SU students we have found out that a course given by the high school and/or the university department has an impact on their computer skills. While for KAAU they have no effect on the students' computer

skills. This may be due to the difference in the way the computer training is imparted in the UK and Saudi Arabia.

H 3-6 and H 3-7 are sub-hypotheses of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis 3). Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 5.9.

Table 5.9 Correlation between methods of learning information literacy and computer skills, and information obtained and the efficacy of time taken to obtain results from the Internet (Q.No. 18;20 and 33, 34)

Hypothesis and Factors	KAAU χ^2		SU χ^2	
	P-Value	Sig.	P-Value	Sig.
H3-6: methods of learning information skills influencing Internet information found : Assistance from colleagues	.000	Y	Null	N
H3-6:-----: A course given by the high school	.008	Y	Null	N
H3-7: methods of learning computer skills influencing the efficacy of time taken to obtain results during an IR&S process : A course given by the high school	.003	Y	Null	N
H3-7:-----: A course given by their department	.000	Y	Null	N
H3-7: -----: A course given by lib. Or the computer centre	.006	Y	Null	N
H3-7: -----: Assistance from colleagues	.000	Y	Null	N
H3-7: -----: Literature reading	.000	Y	Null	N
H3-7: methods of information skills training impacting on time taken to have results: Individual instruction by library staff	.017	Y	Null	N
H3-7: -----:A course given by their Department	.000		Null	N
H3-7: -----: A course given by lib. Or the computer centre	.002	Y	Null	N
H3-7: -----:Assistance from colleagues	.001	Y	Null	N
H3-7: -----: Reading literature	.047	Y	Null	N

Sig.: significance N: No Y: Yes Q.: question

For the Strathclyde students user information skills do not have any effect on the extent of information obtained during an IS&R process. At KAAU, the formal training programme does not have an impact on their performance in obtaining

information on the IS&R process except when a course is given by their schools. However, informal training in information skills is correlated with the information found on the Internet. Thus, the formal training on information skills does not have an effect on their performance which may be explained by the lack of availability of such training. A significant conclusion may be drawn from this finding is that the KAAU students still depend on their peers for help and support.

As far as H3-6 is concerned, there appears to be no relationship between the SU students' individual (ICT or information literacy) skill levels and their IS& R process on the Internet. However, at KAAU the methods of learning computer facilities or ICT skills have an impact on the time required to have results during IS&R process on the Internet (Table 5.9). Thus it may be stated that information skills are correlated with the instructions given by the library staff, colleagues' assistance, courses given at their departments or elsewhere and reading to learn how to use the ICT and information skills to search for KAAU students.

Results from KAAU reflect that not only do the students have the lack of provision for access to electronic information resources; they also have poor information searching skills that is essential to use these resources usefully. One of the hypotheses of this study was that the methods of teaching-learning in the area of the usage of computers in different cultures are diverse. The Saudi education system does not provide enough facilities (programs, labs, courses and workshops) for providing adequate training and skills to the students in schools or universities with regard to the understanding and usage of computer/ICT skills.

5.5 Main hypothesis 4

Demographic variables may have an effect on the usage, type and preference of electronic information accessed.

A number of sub-hypotheses were derived from this hypothesis out of which those that are significant appear in Table 5.10, while the following sub-hypotheses were

null, i.e. there were no significant relationships between the variables for both universities.

- Age with Internet usage
- Age with priority of information resources
- User's Social status with priority of inf. Resources

Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 5.10. There appears to be no relationship between these variables at SU, whereas it was significant in KAAU.

This result indicates that gender plays no significant role in access at SU. However, it is different in KAAU; there is an impact on the preference of electronic information resources, particularly, for e-books and online reference books. This might be due to the fact that English is not their first language; and accordingly they search the online reference books to find some resources to help them finish their tasks.

Table 5.10 Correlation between demographic variables and Internet usage, type and preferences of information resources (Q.No. 1; 2; 6; 12 and 23; 26; 28; 44)

Hypothesis and Factors	KAAU		SU		Test type
	P-Value	Sig.	P-Value	Sig.	
H4-1: Age with the preferences of using e-information Resources: Online reference books	.001	Y	Null	N	χ^2
H4-1: Age with the preferences of using e-information Resources: e- books	.046	Y	Null	N	χ^2
H4-2: Gender with the preferences of using e- information Resources: Internet	.009	Y	Null	N	χ^2
H4-3: User's social status with Internet usage	.012	Y	Null	N	r_s
H4-5: User's income with ease of access: from home	Null	N	.029	Y	r_s
H4-5: User's income with ease of access: from home	.021	Y	Null	N	r_s
H4-5: User's income with ease of access: Type of Internet connection at home	Null	N	.021	Y	r_s
H4-5: User's income with ease of access: Type of Internet connection at home	.012	Y	Null	N	r_s

Sig.: significance N: No Y: Yes Q.: question

With regard to the H 4-2 there appears to be no relationship between these variables for the SU students (and hence does not appear in the Table). On the other hand,

KAAU's students do not have a difference with the exception of having a correlation between users' gender and the preference of using the Internet (Table 5.10).

For H4-4, Strathclyde users' social status seems to have no impact on these variables while for the KAAU Students there is a significant correlation between their social status and Internet usage per week. With regard to the nature of family life and social circumstances in Saudi, it is noted in Table 5.10 that there is a relationship between owning a computer and the usage of the Internet. It can be seen from these results that there were differences between the two cultures with regard to the social status vis-à-vis the users' preference for, and usage of, electronic resource and the time spent on the Internet for information searching.

User's income seems to have an impact on the ease of access to electronic resources, which logically follows the fact that higher level of income leads to higher affordability and use of ICT. Table 5.10 shows that there was a relationship between the annual income and the places students use the internet, where the Internet was mostly accessed from home at KAAU and Strathclyde. There was a similar relationship between the annual income and the type of connection at home.

This is maybe due to the easy availability of ICT facilities in UK which leaves no problem for the user to have access from anywhere at any time, while in KSA the limitation in the availability of ICT facilities causes some difficulties for the users to access the Internet from anywhere except from home. Additionally, in KSA, the places for accessing ICTs segregate between the male and female users, which is a cultural issue. The transportation required to reach the places for access to ICT is not always easy, especially for the female users. Therefore, the Saudi society prefers to access the Internet from home.

5.5 Main hypothesis 5

Social/interpersonal variables may have an effect on access to electronic information.

Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 5.11. There appears to be no relationship for H5.1

for the SU students. However, in the case of KAAU, it appears that the role of the user has a significant impact on the time spent for using the Internet per week either for studying or accomplishing a work. Users' role at KAAU has a correlation with the preference for electronic resources such as online databases, OPAC and Internet. Their preferences could depend on the ease of using these resources, or it could be these resources are more available in their subjects.

There appears to be no relationship with regard to H5.2 for SU students (does not appear in the Table 5.11), and it is so for KAAU with the exception for the mother's education level, for which there appears to be a relationship in Internet usage per week. This indicates that mothers' education levels in Saudi have an impact on children's attitudes to use technology, because their children are closer to mothers than to their fathers.

Table 5.11 Correlation social/interpersonal variables and Internet usage and the preference for electronic resources (Q.No. 10; 8 and 15;27;28)

Hypothesis and Factors	KAAU χ^2		SU χ^2	
	P-Value	Sig.	P-Value	Sig.
H5.1: User's role and Internet usage	.000	Y	Null	N
H5.1: User's role and the preference of e-info. resources: E- databases	.049	Y	Null	N
H5.1: User's role and the preference of e-info. resources: OPAC	.006	Y	Null	N
H5.1: User's role and the preference of e-info. resources: Internet	.001	Y	Null	N
H5.2: User' parental education and Internet usage : Mother's education	.010	Y	Null	N
H5.2: User' parental education and adopting technology: Mother 's education	.010	Y	Null	N
H5.2: User' parental education and adopting technology: Father's education	.010	Y	Null	N

Sig.: significance N: No Y: Yes Q.: question

At SU, parents' education does not have an impact on the user confidence in adopting technology; on the other hand, parental education of KAAU students has an effect on their children's confidence for technology. This may be due to the fact that Internet and ICT is more common in educated families in the Saudi Arabian society.

H5-3 and H5-4 were null, i.e. there were no significant relationships between the variables for both universities.

5.5 Main hypothesis 6

The environmental variables may have an effect on the access to electronic information.

H 6-1 is the sub-hypothesis of the main one (see Chapter3, section 3.2.2, main hypothesis 6).

This hypothesis had been dropped from the SU and KAAU comparison, because when been tested, it did not find any correlation in SU; however, it has been tested in case of Saudi universities.

H 6-2 is a sub-hypothesis of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis6).

There appears to be no relationship between the user's satisfaction and the familiarity of the search environment (such as labs, the library, and home) in Strathclyde University. On the other hand, familiarity of the searching environment has the significant impact on the results of unknown topic at KAAU (P-value .023), while it does not have an impact on the results of known topic.

5.5 Main hypothesis 7

The IS&R, usability features and user interfaces may have an effect on the access to electronic information resources.

H 7-1: is a sub-hypothesis of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis7).

Interface features assist such processes with regard to query formulation and specification, displaying results and interactive relevance feedback (Chowdhury, 2004a). In both SU and KAAU Universities, features of the library web – such as, content (coverage, equality, depth, and relevance); design and layout; ease of use of links; searching,; help facilities; and the personalised options – have a highly

significant influence on the user perception. The only exception was related to the readability feature at KAAU which has an impact but it was not statistically significant. This may be due to the fact that the features presented in English language may create some difficulties for users in Saudi Arabia as it appears in Table 5.12.

Table 5.12 Correlation between library interface features and the users' perception (Q. No. 57 and 55)

User's perception of Interface features	KAAU		SU	
	P-Value r_s	Sig.	P-value r_s	Sig.
Content	.000	Y	.000	Y
Design and layout	.000	Y	.000	Y
Ease of use	.000	Y	.000	Y
Links	.000	Y	.000	Y
Searching	.000	Y	.000	Y
Readability	.282	Y	.007	Y
Help and support	.000	Y	.002	Y
Options for personalization	.000	Y	.003	Y

Sig.: significance Y: Yes Q.: question

Table 5.12 shows that for both the academic library interfaces the features have an impact on the usability and user perception. This indicates the importance of evaluating user's interfaces frequently to discover user's problems. This may be useful in designing services that would satisfy the potential user's need despite their linguistic, cultural and various socio-economic disparities.

This may reduce frustration and confusion for the users. Features for personalizing interfaces may be included to enable the users to better represent their cultural preferences and increase the effectiveness of their library website.

A number of other sub-hypotheses were derived from H7; these variables were tested using Spearman's rank correlation coefficient. Some of which had significantly related factors as shown in Table 5.13, while the following were null (i.e. not significant) either for one or both the universities:

- Users' satisfaction with the results of a known topic search with time taken to finish searching (for both SU and KAAU)

- Users' satisfaction with the results of a known topic search with a number of times to rephrase it (for KAAU)
- Users' satisfaction with the results of an unknown topic search with time taken to finish searching (for SU)
- Users' satisfaction with the results of an unknown topic search with a number of times to rephrase it (for both KAAU and SU)
- the level of difficulty associated with the search of an unknown topic with a number of time rephrasing it (for KAAU)
- the level of difficulty associated with the search of a known topic with a number of time rephrasing it (KAAU)
- User's familiarity with electronic resources with user's perspective in its importance (SU)

Table 5.13 shows that for SU users' satisfaction with regard to a known topic search is related to the number of searches rather than time taken for searching the information. The correlation shows that the difficulty with a known topic search increases, user satisfaction with the results decreases. For KAAU users' satisfaction with a known topic search does not have an impact on the time taken for searching and the number of times to rephrase known topic search expressions.

For the SU students, user satisfaction with regard to an unknown topic search is not related to the number of searches and time taken for searching the information. In contrast, at KAAU, it appears that there is a relationship between the user's satisfaction of a search result of an unknown topic and the time taken for searching (Table 5.13). However, for KAAU, there is no a relationship between the user's satisfaction with the search result of an unknown topic and the number of times to formulate the search.

Table 5.13 Correlation between the user satisfaction of a known and unknown topic research and its level of difficulty (Q. No. 47; 45; 46; 59 and 48; 49; 60)

Hypothesis and Factors	KAAU		SU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
H7-2:Users' satisfaction with the results of a known topic search with a number of times to rephrase it	Null	N	.011	Y
H7-3:Users' satisfaction with the results of an unknown topic search with time taken to finish searching	.000	Y	Null	N
H7-4: the level of difficulty associated with the search of a known topic with a number of time rephrasing it	Null	N	.001	Y
H7-4: the level of difficulty associated with the search of a known topic with users' satisfaction results	.000	Y	.000	Y
H7-5: the level of difficulty associated with the search of an unknown topic with a number of time rephrasing it	Null	N	.024	Y
H7-5: the level of difficulty of an unknown topic with users' satisfaction results	.021	Y	.001	Y
H7-6: User's familiarity with electronic resources with user's perspective in its importance: e-databases	.047	Y	Null	N
H7-6: User's familiarity with electronic resources with user's perspective in its importance: e- journals	.003	Y	Null	N

Sig.: significance N: No Y: Yes Q.: question

For both the universities, it is clear that the user' satisfaction with desirable results and the time spent or the number of times the search is rephrased for searching a known or unknown topic had a dissimilar relationship. This may be due to the difference in the education cultures or the individuals' differences and topic knowledge.

In KAAU, although the students spent a long time searching on an unknown topic, their satisfaction is low with the results they obtain. Students worry about the time they spend searching for a known topic or an unknown topic, which may be explained by the limited time they have on the Internet and therefore they cannot afford to spend too much time on a certain topic. It may also be that the speed of the connection is low and therefore it takes a long time to download the retrieved information resources. This could be caused by the weakness in the ICT infrastructure. These factors might hinder the user from continuing in searching.

With regard to the hypothesis 7-4, there appears to be a relationship between the two features in both universities, indicating the higher the level of simplicity, the less number of times a user would spend to rephrase it (Table 5.13). However, this demonstrates that the users have in their minds an idea of what they are looking for, and they select the essential terms to retrieve the information needed. With regard to H7-5, there appears to be a relationship between the two features, indicating that the higher level of difficulty for an unknown topic search, the lower will be the number of times a user would spend to rephrase it (Table 5.13). However, there was no relationship between the two variables at KAAU. This is probably due to the fact that the lack of the users' knowledge, lack of information searching skills, and the lack of proficiency in using the English language for rephrasing terms act as barriers to rephrasing the search term.

Even though there is no such relationship in the two resources highlighted in H7-6 at SU, for KAAU students' familiarity with electronic information resources, is correlated with online databases and e-journals. From this, it may be concluded that the most familiar electronic resources are online database and e-journals and this may be due to the fact that those are the generally available resources covering their subjects. This result again confirms that there may be limited number of electronic information resources for access by students in KAAU, and also that may require training in information resources and how they can search on it.

H 7-7: Search process and help facilities may facilitate the IS&R process

This hypothesis discusses the help facilities available through the library services and query formulation of the selected universities.

1. Help service

This hypothesis was used to determine the different types of help available to the users for the information search process. The help services in the library system are there to assist the user search, seek and access information needs.

Table 5.14 Distribution of user opinion about online help facilities at SU and KAAU libraries

Help facilities	SU		KAAU	
	Frequency	%	Frequency	%
User's opinion of online help service				
Useful services, but I prefer asking a person to help me	22	40.7	51	37.5
Useful service, and easy to use	20	37.0	16	11.8
Useful service, but difficult to use	3	5.6	40	20.4
Not useful service	7	13	29	21.3
Option not used	2	3.7	0	0
Total	54	100	136	100

Table 5.14 shows the percentages of SU and KAAU postgraduates' responses about the online help services; and it reveals that overall, postgraduates of both universities did prefer human support in help services. However, the results were not equal for the rest of the options. Generally, SU students find the human help as the best option but still find the service helpful and easy to use. KAAU students find the online help service difficult to use, and not useful, and they would rather ask for human help. In general, the responses from the KAAU students indicate that they find it a difficult or useless service, and this maybe because they are either unaware of its existence or have no training in it or the service that is available online is not suitable for the users.

Table 5.14.1 T- test for Table 5.14 at SU and KAAU students

		Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
	SU&KAAU			
		Lower	Upper	Lower
Help facilities	Equal variances assumed	3.37	188	.001

There was confirmation within the set observed that the mean of users' opinions about online help facilities of libraries were significant more at SU than at KAAU, $t(3.37) = 188, P = .001$.

Table 5.15 The distribution of user's opinion on the system error correction at SU and KAAU

The correction of the errors on the library system	SU		KAAU	
	Frequency	%	Frequency	%
Yes	8	14.8	10	7.4
Sometimes	22	40.7	44	32.4
No	24	44.5	82	60.3
Total	54	100	136	100

With regard to the availability of the help facilities for correcting the user' errors during the use of the library interfaces at the SU and KAAU library websites (Table 5.15), it was noted that the majority of the students at both the universities stated that there was no provisions for automatic rectification of the errors they made while using the library systems. Overall, this feature needs more attention from the library system designers because it has an impact on the overall information seeking process.

Table 5.16 Students' reasons for not using help service at SU and KAAU

Participants' reasons for not using help service	SU		KAAU	
	Frequency	%	Frequency	%
I do not think I need help yet	18	33.3	26	19.1
I would rather ask someone to help me	12	22.2	19	14.0
I was not sure if online help may help me with search	5	9.3	13	9.6
I know about the online help and its role, but I did not recognize that online help is used at the specific e-sources I use	4	7.4	12	8.8
I am not sure what online help is	3	5.6	50	36.8
There are no guidelines for using search term selection	2	3.7	16	11.8
Option not used	10	18.5	0	0
Total	54	100	136	100

Table 5.16 highlights the reasons why users are not using library help services at the chosen universities. It is noticeable that the attitudes towards these services are different from SU to the KAAU students. Moreover, fifty KAAU respondents (i.e. 36.8%) did not know what online help is. Overall, the two main weaknesses in the help services for KAAU are that: firstly, many do not know what the help service is, secondly it does not correct their mistakes, and therefore they prefer to ask for human help. Therefore, it may be concluded that the policy makers and designers of the

library website should assess the user perspectives on, as well as specific requirements from, such as automatic error corrections, etc., the online help services, and this is more true for the KAAU students.

2. Query Formulation

Table 5.17 shows the answers of the postgraduate students from both the universities with regard to their approaches to formulating search queries on the library system. Interestingly, the most common manner of formulating a query is via trial and error in both the cases. Nearly, a third of the respondents at the Universities rely on the assistance from the academic staff. There was a considerable difference on the information seeking behaviour at both the academic environments. Over 66% of KAAU participants sought advice from their colleagues, while 18.5% students at SU learnt how to rephrase their queries from other students. In addition, receiving instructions from the librarian is the more likely approach for the KAAU students in comparison to their peers at SU. Nevertheless, it is clear from the tables that further considerations are required to overcome the difficulties of formulation of queries on the library web interfaces.

Table 5.17 Formulating a query on the library system at SU and KAAU

Formulated query on the system through	SU		KAAU	
	Frequency	%	Frequency	%
Trial and error	43	79.6	108	79.4
Academic staff	17	31.5	46	33.8
Help facilities on the available system	11	20.4	23	16.9
Colleagues	10	20.4	90	66.2
Librarian	7	13.0	32	23.5

(The percentages add up to more than 100 because the students could choose more than one option)

As shown in Table 5.17.1 to test the variance between SU and KAAU, the mean of assistance from colleagues was significantly high at KAAU, which have influenced on the information seeking behaviour of university students.

Table 5.17.1 T-test for Table 5.17 at SU and KAAU

	SU&KAAU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
Formulated a query on the Lib. system through		Lower	Upper	Lower
Trial and error	Equal variances assumed	.03	188	.973
Academic staff	Equal variances assumed	-.31	188	.759
Help facilities on the available system	Equal variances assumed	.56	188	.577
Colleagues	Equal variances not assumed	-7.10	117.1	.000
Librarian	Equal variances not assumed	-1.80	121.5	.075

The figures in the table 5.18 show the search options used by the students from both the universities when searching for bibliographic records through OPAC or from electronic information resources. Generally, the Keyword option was selected by 74.1% of SU students, which was much higher percentage than KAAU (35%). For subject search, the figures are opposite: almost 81% of KAAU students preferred subject search as opposed to about 65% of SU students. However, very few students use search operators and other search tools, and this is common among students from both the universities.

Table 5.18 the distribution of students' use of search options at SU and KAAU

Search options	SU		KAAU	
	Frequency	%	Frequency	%
Title	40	74.1	77	56.6
Key word	40	74.1	48	35.0
Subject	35	64.8	110	80.9
Author	32	59.3	82	60.3
Title of article	20	37.0	27	19.9
Journal title	18	33.3	21	15.4
Truncation	11	20.4	10	7.4
Use of search operators	8	14.8	14	10.3
Date of publication	7	13.0	12	8.8
Use of available tool to word search term selection	5	9.3	9	6.6
Others	1	1.9	0	0

(The percentages add up to more than 100 because the students could choose more than one option).

As can be seen from the Table 5.18, the raw data appeared to be a variance between SU and KAAU in the table. Therefore a t- test was carried out to confirm for whom this variance was. The results show in Table 5.18.1 that the means of search options

used by SU students were more significant (such as title, keyword, title of article, journal title and truncation) than at KAAU, while the means of author and subject search were significant at KAAU.

Table 5.18.1 T-test for Table 5.18 at SU and KAAU

Search options	SU&KAAU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
Title	Equal variances not assumed	2.37	108.8	.020
Keyword	Equal variances not assumed	5.32	105.1	.000
Subject	Equal variances not assumed	-2.18	82.7	.032
Author	Equal variances assumed	-.13	188	.896
Title of article	Equal variances not assumed	2.30	82.9	.024
Journal title	Equal variances not assumed	2.49	78.6	.015
Truncation	Equal variances not assumed	2.18	71.2	.033
Search operators	Equal variances assumed	.88	188	.382
Date of publication	Equal variances assumed	.85	188	.394
Available tool ...	Equal variances assumed	.63	188	.532
Others	Equal variances not assumed	1.00	53.0	.322

In response to a question designed to find out the actions that the participants might take when they are dissatisfied with the search results, Table 5.19 shows that 37% of SU students and 64% of KAAU students said that they can modify their query. However, with regard to using the advanced search options, only 10% KAAU students said that they use advanced options as opposed to nearly 32% of SU students. Table 5.19 also shows that more KAAU students quit search compared to the SU students.

Table 5.19 User's actions upon receiving unsatisfactory results at SU and KAAU

User's actions on receiving unsatisfactory results	SU		KAAU	
	Frequency	%	Frequency	%
Change database	13	24.1	14	10.3
Use the advanced search option	17	31.5	14	10.3
Modify the query	20	37.0	87	64.
Quit search	4	7.4	21	15.4
Total	54	100	136	100

There was a significant relationship in the user's actions upon receiving unsatisfactory results at SU and KAAU. The chi-square test was applied resulting in a value of

22.675 and significance value of .000 indicating a significant relationship between user's actions and SU students.

5.6 User's Perspective on Barriers to some Information Resources

This part exhibits the obstacles that were facing the study participants at both the universities. It highlights the significant differences between SU and KAAU students in terms of the barriers to information access as follows.

5.6.1 Barriers with regard to Internet at SU and KAAU

Some questions were asked to illustrate Internet problems facing students at both universities during the IS&R process. The slow speed of Internet connection and frequent rate of the disconnection in course of searching and/or browsing were regarded as the two major problems by KAAU students, at 75.7% and 58.8% respectively. On the other hand, SU students were not affected by these problems. Another significant problem is that language is a barrier for KAAU students to a high percentage (55.1%), while at SU it was only 3.7%.

In addition, Internet regulation and control as a barrier saw a disparity between the universities, with KAAU students experiencing intense control on Internet access, expressed by fifty-one students (37.5%), whereas only eight students (14.8%) at SU expressed concern over rules controlling access to the Internet. Lack of awareness in using Internet skills and the difficulties in identifying required web pages had a roughly equal concern from KAAU, but for SU students, the former was selected by only three, while the latter by eleven student. Additionally, thirty students at KAAU and nine students of SU noted expensive Internet subscription.

However, the lack of time to use the Internet was a less important problem for both the groups. A small number of students at both universities had a doubt about the information they find on the Internet. Three students (4.7%) at SU noted that they are

concerned about the safety, spyware, viruses and hackers that may affect them when using the Internet.

Table 5.20 Barriers of using the Internet at US and KAAU

Internet problems	SU		KAAU	
	Frequency	%	Frequency	%
Slow connection	17	31.5	103	75.7
Getting disconnected while browsing	14	25.9	80	58.8
Expensive Internet subscription	9	16.7	30	22.1
Lack of Internet services	3	5.6	37	27.2
Difficulties in finding the required web page	11	20.4	36	26.5
Regulations controlling access to the Internet	8	14.8	51	37.5
Language barrier	2	3.7	75	55.1
Do not have enough time to use the Internet	5	9.3	10	7.4
Lower performance of computers	10	18.5	19	14.0
Do not trust the information on the Internet	7	13.0	14	10.3
Others	3	4.7	0	0

(The percentages add up to more than 100 because the students could choose more than one option.)

In general, the result shows that the two main barriers to using the Internet at KAAU are: the language barrier because English is not the first language in the education system, thus it is not used when browsing the Internet. The latter problem was the firm regulatory control on the Internet access in Saudi Arabia in order to protect the society from such information, which violate Islam and transgress other customs and culture.

It can be clearly seen that at SU students encounter fewer problems than the KAAU students do. For KAAU, there is variety of barriers that the students found, such as, the slow connection that does not interest them so the Internet search becomes less motivating for the students. In addition, the frequent disconnection distracts the users' concentration and they might loose data in course of the ongoing search sessions.

5.6.2 Barriers in relation to OPAC at SU and KAAU

The students at both universities have indicated the major barriers that they normally encounter are related to the use of OPAC. It appears that formulating the query is the main barrier for 70 (51.5%) of KAAU postgraduate students and for 27 (50%) of SU.

Table 5.21 Barriers of using OPAC at SU and KAAU

The major barriers of OPAC	SU		KAAU	
	Frequency	%	Frequency	%
Cannot formulate the query easily	27	50.0	70	51.5
Unranked search results	16	29.6	66	48.4
Cannot search by subject heading list	15	27.8	69	50.7
Difficult advanced search options	15	27.8	48	35.3
Do not know how to combine search options with Boolean operators	15	27.8	65	47.8
Cannot limit search by date, collection and a language	12	22.2	60	44.1
Others	6	11.1	4	3.1

(The percentages add up to more than 100 because the students could choose more than one option).

The second major problem which the users face, according to their responses, is the inability to search by subject heading, for example, at KAAU the responses were higher (50.7%) than for SU (27.8%). The next problem was how to combine search options with Boolean operators, and unranked search results were also a more an obstacle at KAAU than at SU. Difficult advanced search options were chosen by 15 out of the 54 students (27.8%) at SU, and 48 of 136 students at KAAU with (35.3%).

A significant number of respondents at KAAU (44.1%) and at SU (22.2%) also could not frame their search by date, library collection and language. Few students (11.1%) at SU indicated different problems such as that the library system does not delete similar words, does not bring up relevant items, and does not give full results. According to the table, six participants have indicated that titles, names, etc. do not appear in the same format in the catalogue as given in the lecture, and some of them do not use OPAC at all. On the other hand, at KAAU, four students did not know how to use OPAC.

5.6.3 Barriers related to e-databases at SU and KAAU

What kind of barriers do the users encounter, when they use the databases? This was the survey question that showed significant differences between the two universities (SU and KAAU). The subscription fee was the main obstacle to the study students (51.9%) at SU; whereas it was a much lower proportion (37.5%) at KAAU. In addition, frequent access to different databases requiring the user ID and password was the main barrier for KAAU students (65.4%) and at SU (44.4%). Another difficulty was noted to be the retrieved of non-relevant information as indicated by 23 (42.6%) SU and 50 (36.8%) KAAU students.

Table 5.22 Barriers of using e-databases at SU and KAAU

The major barriers of using databases	SU		KAAU	
	Frequency	%	Frequency	%
A subscription fee is required	28	51.9	51	37.5
Frequent access to different databases requires the user ID and password	24	44.4	89	65.4
A lot of non-relevant information is retrieved	23	42.6	50	36.8
It is not easy to select a database	22	40.7	60	40.1
Multiple databases cannot be searched using a single search query	22	40.7	32	23.5
It takes long to revert to another database	16	29.6	65	47.8
Information cannot be downloaded	11	20.4	54	39.7
Information overload	11	20.4	49	36.0
Frequent run-time error	8	14.8	65	47.8

(The percentages add up to more than 100 because the students can choose more than one option.)

Quite similar responses (about 41%) were obtained from both universities in that selection of a database was not easy. However, another barrier that they cannot search in multiple databases with a single search enquiry was much higher at SU than at KAAU. Reverting from one database to another takes a long time was considered to be a problem by more students at KAAU (48%) than at SU. It was clear from KAAU students' responses that it is not helpful for the students when they want to access information quickly in the limited time they have with low quality ICT facilities, but only a few at Strathclyde found that to be a problem.

Eleven students from SU (20.4%) highlighted two major barriers: the first is that the retrieved information cannot be downloaded and the other is the information overload; however, comparatively more students at KAAU regarded these as barriers. Nearly half (47.8%) of the students at KAAU indicated the problem of frequent run-time error, while at SU 14.8% highlighted so.

5.6.4 Barriers with regard to e-journals at SU and KAAU

Table 5.23 shows the frequencies of the students' problems in using electronic journals at both universities. The two main problems at SU, which were highlighted by almost half of the postgraduate students (48.1%), are that e-journals are hidden under several interfaces, and that the search results often produce only abstracts of the articles. In contrast, KAAU students' major barriers were the inability of the students to understand the existence of several interfaces and the available search strategies to access the required e-journals (67%), as well as the problem of limiting the e-journals content only to abstracts (54%).

However, another significant difference between them was the complexity of wording and phrasing in the search facilities and the difficulty in differentiating among them which was pointed out by 58 students (42.6%) at KAAU, in contrast, to only four (7.4%) at SU.

Fifty-one (37.6%) of KAAU students mentioned that they cannot determine the choice of the appropriate search service provider for required e-journals, while 24 students (44.4%) at Strathclyde had pointed out this problem.

Conversely, the problem of deciding on a relevant e-journal through all displayed journals was a higher barrier at Strathclyde than at KAAU. On the other hand, 20 (37%) postgraduate students at SU noted that the structure of the e-journals provider was unfamiliar, whereas at KAAU 62 students (45.6%) indicated. Additionally, just about 7% of both students' groups stated that the distinction between html and PDF was unknown.

Finally, concerning the fee, the library does not have a great deal of resources, and lack of full text access was sometimes a problem for only three students of Strathclyde. In general, most problems with e-journals were indicated by a higher percentage at KAAU than at SU.

Table 5.23 Barriers of using e-journals at SU and KAAU

The major barriers of e-journals	SU		KAAU	
	Frequency	%	Frequency	%
It is hidden under several interfaces	26	48.1	58	42.6
Produce only abstracts	26	48.1	73	53.7
Cannot determine the choice of the appropriate search service provider for required e-journals	24	44.4	51	37.6
Cannot decide a relevant journal through all displayed journals	21	38.9	48	35.3
The structure of e-journals provider is not familiar	20	37.0	62	45.6
Long time to get required information	18	33.3	52	38.2
Cannot formulate search terms easily	16	29.6	35	25.7
Cannot mark the required article	14	25.9	32	23.5
Irrelevant information	13	24.1	39	28.7
Do not understand several interfaces and search strategies to access to required e-journal	11	20.4	91	66.9
Word and phrase search facilities are complex and it is difficult to differentiate among them	4	7.4	58	42.6
Do not know the difference between html and PDF	3	5.6	9	6.6
Others	3	5.6	0	0

(The percentages add up to more than 100 because the students could choose more than one option.)

To sum up, SU students face less difficulty than KAAU students due to the availability of electronic journals in English, which has a key impact in information seeking behaviour. This means KAAU students cannot determine which journal is appropriate and relative to the subject they are searching for, when looking through all the journals displayed, because they do not understand the interfaces and search strategies to access the required e-journals because they are required to use English language.

5.7 Summary

The aim of this chapter was to answer, what are the main barriers to information access facing the students in culturally distinct university environments? It was to

present the descriptive and statistical findings obtained from the first phase. User profile at SU and KAAU, general ICT and Internet literacy, and Barriers to information access have been presented.

The PG students at both universities are similar in their methods of learning to use computers, and in their experience in Internet use. However, there are differences in the Internet access, availability, and the preference for information resources between the group of PG students at both universities, and the impact of the ICT on their information seeking behaviour. These disparities are in terms of the user confidence in adopting technology for the type and preference of electronic information resources, the user confidence in using the Internet for searching or seeking information, the relation between users' computer experience and the electronic resources they preferred to access, the users' ICT experience, and the impact of language skills.

There are some differences between the two study groups with regard to the users' subject background and their information behaviour, and their reasons for using the Internet. Furthermore, there are differences between KAAU and SU postgraduate students with regard to the Internet competence and the extent of information obtained and the efficacy of the length of time needed to obtain results from searching the Internet. It also has an effect on the ease of access to electronic resources during the IS&R process. The differences between SU and KAAU PG students appear in the methods of learning computer skills, and the individual information literacy skill levels on the IS&R process in the different cultures.

Moreover, they differ in the demographic and cultural variables concerning usage, type and preference of e-information accessed. KAAU and SU participants are similar with regard to their preferred place for accessing the Internet. The study groups differ in the social/interpersonal variables, particularly in the users' role in the Internet use, the type and preference of e-information resources, in the mother's education level, and user confidence in adopting technology. They are similar in terms of the relationship between the parental education, computer owning and Internet usage. There is also a difference between SU and KAAU respondents as shown from the user's perception of ambiance and satisfaction during the IS&R process. Students

from both the universities have a similar perception on the influence of the library web interface features. The PG students at both universities are similar with regard to their opinion on library interface's error correction system, the preference for human help or support for search process, and help facilities during the IS&R process. They differ in the usefulness and ease of use, the difficulty of use, and the reason for not using this option.

There appears to be differences between SU and KAAU PG students in terms of slow speed Internet connection and the frequent rate of disconnection, and in the language barrier. They also differ in their awareness in using Internet skills, their difficulties in identifying required web pages, Internet subscription fees, and the lack of time to use the Internet. Both the study groups demonstrate similar insufficient information search skills, awareness of OPAC features in general, although there is more so for the KAAU students. It is clear that students at both universities face similar barriers caused by the requirement of user ID and a password to access different databases each time, retrieving non-relevant information results, and hesitation in selecting a database. However, variations emerged with regard to other barriers such as the subscription fee (mainly at SU), the difficulty of searching multiple databases using single search enquiry, the delay involved in retrieving from one database to another (particularly at KAAU, due to the low quality of ICT facilities), the difficulty of downloading or the information overload.

Chapter 6: Descriptive and Statistical Data Analysis for KAAU and KSU Postgraduate students

6.1 Introduction

This chapter provides descriptive data, the findings of statistical data analysis and hypotheses testing to assess the differentials that exist among the two selected universities in Saudi Arabia, classified into four broad sections covering various aspects such as personal details, ICT infrastructure, Internet availability, and issues pertaining to usability of electronic resources. The questions range from general ones about user profiles to questions relating more specifically to barriers to information access. Each of the specific questions is based on the different intervening variables (discussed in Chapter 2 section 2.6). The variables have been sub-categorised to understand their impact on a micro-level.

6.2 User Profile of King Saud University (KSU)

From the 75 respondents, 62.7% were male, of which 53.3% were married. Most were 26-30 years old and 29.3% were aged 20-25. Though a greater number of students live in the family home (36%), 29.3% of them resided in their own house. Overall, the students were settled in Al-Riyadh. 72% of the students' mothers had ten or less years of education, while only 32% of the fathers were so. The percentage of fathers in the highly educated category was 13.3%, whereas none of the mothers was noted as highly educated. However, the highest degree the mothers achieved was a university degree, which was reached only by 21.3%. Clearly, students' fathers can achieve better jobs than the mothers since they have higher qualifications. This is proven by 29.3% from the fathers group at KSU who held professional jobs while no more than 10.7% from the mothers group did so. 78.7% in the mothers group were unemployed/house persons, though in the fathers group only 20% were unemployed/retired fathers. In KSU, most of the students (90.7%) have a family income of 61,000 RS or more which is an equivalent of about £ 8714 a year,

At KSU, 28 students (37.3%) were unemployed and studying full-time. In addition, the majority of KSU students were full-time workers and part-time students. It is noticeable that two postgraduate students at KSU were full-time students and workers, because the postgraduate programme at the business school of KSU provides its courses after regular work hours for students.

All of KSU students have a computer at home; and all have Internet from home, too. 79% of students access the Internet through modem connection, the rest (21%) connects to the Internet through broadband. This means that KSU students access the ICT mostly from home. Findings from both KAAU and KSU confirm that students from both the universities normally access the Internet from home through modem connection.

6.3 General ICT and the Internet Literacy at KSU and KAAU

Eighty percent of the KSU students have used a computer since high school. When they were asked about computer instruction, 98.7% indicated self-instruction, followed by assistance from friends at 85.3%, then online instruction/guides and manuals on the interface itself (70.6%). Meanwhile, 79.4% of KAAU students depended on self-instruction as well. At KSU most students (74.7%) considered themselves as extremely confident in using basic computer skills, while at KAAU most students (80%) ranked themselves as confident. There is a slight difference between the two universities about how they train themselves for computer skills and the level of confidence this training might provide them with. Even though 24% of KSU students have used the Internet for 8-10 years, 70.7% have only used it for 4-7 years. At KSU 88.0% of students, use the Internet daily and 8 (10.7%) students use it from 2 to 3 times a week. Some of them (18.7%) used for 9-12 hours a week, and others (20.0%) indicated 13-15 hours a week, while at KAAU 63.2% of students used the Internet daily and 22 students (16.2%) mentioned their hours of internet use between 6-8 hours a week, and the same number of students spent 9-12 hours a week. This illustrates that the user confidence and proficiency at KSU is higher than at KAAU.

When the students at KSU were asked about the way they acquired training in information skills, 26.7% responded that they obtained it through a course given by the university department, 25.3% said they gained it through assistance from colleagues and 21.3% indicated self-instruction. At KAAU, students indicated a formal course given by the university department (23.5%) with slightly more number indicating self-instruction (29.4%). Minority of the students also obtained training through other means, such as a course given elsewhere at KAAU (6.6%) and at KSU (2.6%), online instruction was at KAAU (13.2%) and (1.3%) at KSU and literature (manuals, computer/library magazines) was 19.1% at KAAU and (14.6%) at KSU.

Table 6.1 Preferred first choice for information channel at KAAU and KSU students

Search looking through	KSU		KAAU	
	Frequency	%	Frequency	%
Internet	70	93.33	121	89.0
Printed books	50	66.66	62	45.6
Electronic books	34	45.33	19	14.0
Printed journals and magazines	17	22.66	42	30.9
Electronic databases	12	16	29	21.3
Electronic journals	6	8	22	16.2
Other	0	0	1	.7

(Note: The table states that the percentages add up to more than 100 because the students were able to tick more than one option).

Most students (93.33%) pointed out that the Internet is their most preferred choice while searching for information, while 56.7% chose printed books and 45.3% chose electronic books. From these results, it can be seen that the Internet is the first option the students turn to when searching for information. On the other hand, electronic databases and electronic journals do not appear to be a first choice for students. There may be several reasons for this; for example, it may be possible that they do not know how to use them, therefore, they avoid using them unless compelled to, or there may not be an adequate number of electronic databases and other resources that the students can access, and so on. The desire for printed media at KSU has not disappeared yet; as can be seen it is the second most preferred way for searching through information.

6.1.1 T-test for Table 6.1 at KAAU and KSU

	KAAU & KSU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
Internet	Equal variances not assumed	-1.10	182.5	.272
Printed books	Equal variances not assumed	-3.03	159.5	.003
e-books	Equal variances not assumed	-4.82	114.2	.000
Printed journals	Equal variances not assumed	1.31	165.4	.193
e-databases	Equal variances assumed	.93	209	.352
e-journals	Equal variances not assumed	1.83	191.7	.069
Others	Equal variances assumed	.74	209	.459

The Table 6.1 shows the variances between KAAU and KSU, therefore a t-test was conducted to confirm for whom this variance was. The results show that there were evidence within the setting observed that KSU students exploited printed and electronic books significantly more on average than KAAU students.

Table 6.2 Distribution of users' web search interests at KSU and KAAU

	KSU		KAAU	
	Frequency	%	Frequency	%
Using the Internet:				
To read e-mail	73	97.3	107	78.7
To study or do coursework	73	97.3	35	25.7
To find job and career information	20	26.7	23	16.91
To read general information	53	70.7	80	58.8
For online shopping	34	45.3	32	23.5
To chat with others	21	28.0	61	44.9
To browse web for own enjoyment	46	61.3	41	30.1
To do part of the work	44	58.7	26	19.1
To find free software to download	51	68.0	43	31.6
To learn to use PC and Internet	54	72.0	107	78.7
To obtain information through distance education classes	7	9.3	32	23.5

(Note: Table 6.3 shows that the percentages add up to more than 100 because students can select more than one option).

From the questionnaire survey it was found that 97.3% of KSU students used the Internet for relevant study or course work, while at KAAU 25.7% used the Internet to study or do course work. Similarly, 97.3% of KSU students accessed the Internet to read their email, as opposed to 78.7% at KAAU. From these findings, it seems that the Internet is shown to be a communication tool as well as a research tool at KSU. There

seems to be a difference among students from the two universities in Internet activities with 72.0% of KSU students and 78.7% of KAAU students using the Internet to learn how to use the PC and the Internet.

The majority of KSU students (70.7%) connect to the Internet to read general information, as opposed to 58.8% of KAAU students; while 61.3% of KSU students browse the web for their own enjoyment and only 30.1% of KAAU students do so. Other uses mentioned included finding free software to download, online shopping and to do part of their work. Only 9.3% of KSU students used the web to obtain information through distance education classes, while in contrast, 23.5% of KAAU students do so. Table 6.2 shows that a majority at KSU use the Internet for other purposes apart from study or course work related tasks. Additionally, postgraduate students at KAAU use the Internet for different purposes but they do not use it as much as the postgraduate students do at KSU for reading email and general information, studying, etc.

Table 6.2.1 T-test for Table 6.2 at KAAU and KSU

Internet use activities	KAAU & KSU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
To read e-mail	Equal variances not assumed	-4.67	193.8	.000
To study or do coursework	Equal variances not assumed	-17.04	189.0	.000
To find Job and career inf.	Equal variances not assumed	-1.61	132.5	.110
To read general information	Equal variances not assumed	-1.75	162.6	.083
For online shopping	Equal variances not assumed	-3.19	133.1	.002
To chat with others	Equal variances not assumed	2.50	165.9	.014
To browse web for enjoyment	Equal variances not assumed	-4.52	144.8	.000
To do part of the work	Equal variances not assumed	-5.95	126.3	.000
To find free software to download	Equal variances assumed	-5.41	209	.000
To learn to use PC and Internet	Equal variances not assumed	1.06	140.8	.291
To obtain information by distance education classes	Equal variances not assumed	2.85	198.9	.005

According to Table 6.2.1, the test for equality of variances, labeled “Levene’s Test”, yields a significant p-value (sig.) of the Internet use activities was significantly more at KSU (such as read e-mail, study or do coursework, find job, find general information, and shopping) than at KAAU. However, the means of Internet use activities such as chat, learn to use PC and Internet and obtain information by distance education classes were significant at KAAU. There is evidence to conclude that the

mean activities of Internet use differ among universities' students.

The various hypotheses derived from the intervening variables are tested below among KAAU and KSU postgraduate students.

6.4 Barriers to Information Access

The study used various hypotheses based on the intervening variables specified by Wilson's information behavior model, which are summarized below.

6.4 Main hypothesis 1

Differences among universities in terms of ICT infrastructure and access to electronic information services may have an effect on access to electronic information resources.

H1-1: is a sub-hypothesis of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis1).

A number of sub-hypotheses were derived from this hypothesis (H1) for the purpose of this research (see Table 6.3). At KSU it appears that there is no relationship between owning a computer and Internet access/availability, while at KAAU there is a relationship between the Internet access/availability and the use of electronic resources accessed (Table 6.3). The availability of having a computer does not influence their Internet use, but they still prefer to use the Internet as an electronic information resource.

In addition, for KAAU students, as shown in Table 6.3, there is no relationship between owning a PC and the priority of using the Internet in general, while this relationship did not occur at KSU, pointing to the lack of accessibility to the Internet at home. At the same time, they can access the Internet from other places, such as

university labs, work, and parents' computers, and these have a significant impact on some electronic information resources (see Table 6.3).

Table 6.3: Correlation between owning a computer, and Internet usage and preference for electronic resources (Q. No. 15; 16, and 23; 28; 44)

Hypothesis and Factors	KAAU		KSU		Test type
	P-Value	Sig.	P-Value	Sig.	
H1-1: Owning computer and Internet usage	.003	Y	Null	N	r_s
H1-1: Owning computer and priority of inf. resources: Internet	.001	Y	Null	N	r_s
H1-1: Accessing Internet from University labs and priority of inf. resources: e-books	Null	N	.000	Y	r_s
H1-1: Accessing Internet from University labs and priority of inf. resources: Internet	Null	N	.009	Y	r_s
H1-1: Accessing Internet from work and priority of inf. resources: e- books	Null	N	.000	Y	r_s
H1-1: Accessing Internet from work and priority of inf. resources: e- journals	Null	N	.000	Y	r_s
H1-1: Access from parents' computer and priority of inf. resources: Internet	Null	N	.000	Y	r_s
H1-1: Owning a computer and the preferences of using e- inf. resources: e-databases	.008	Y	Null	N	χ^2
H1-1: Owning a computer and the preferences of using e- inf. resources: Online reference books	.023	Y	Null	N	χ^2
H1-1: Accessing Internet from University labs and the preferences of using e- inf. resources: Online reference books	Null	N	.016	Y	χ^2
H1-1: Accessing Internet from University labs and the preference of using e- inf. : Internet	Null	N	.027	Y	χ^2
H1-1: Accessing Internet from work and preference of using e-inf. resources: e-books	Null	N	.000	Y	χ^2
H1.1: Accessing Internet from work and preference of using e-inf. resources: e-databases	Null	N	.003	Y	χ^2
H1.1: Accessing Internet from work and preference of using e-inf. resources: Internet	Null	N	.005	Y	χ^2
H1.1: Accessing Internet from parents computer and preference of inf. resources: Online reference books	Null	N	.000	Y	χ^2

Sig.: significance, Y: Yes, N: No Q.: question

H1-1 could indicate that KSU students are different from KAAU students with regard to the place they connect to the Internet. This could be due to the nature of the students' parents' social attitudes, what they may believe about their children in using

the Internet under their supervision, and/or for a limited time. In addition, none of the universities' libraries seem to have an impact on the students' use of electronic information resources.

Moreover, there is a preference for using specific electronic information resources, particularly in terms of using online databases and online reference books at KAAU (Table 6.3). Again, there seems to be a difference within the same culture with regard to preference for using electronic information resources. Although the significant resources at KAAU are online databases and online reference books, different electronic resources have considerable correlation for KSU students that may depend on the availability of ICT facilities in the places they are accessed.

The preference for various places for using electronic information resources indicates that perhaps the Internet is so rare in the educational experience of KSU and KAAU students that its availability does influence their information behaviour. It is clear from the results that there is a disparity in using electronic resources, in the same subject at both universities, which leads students to different outcomes. That might be due to the different infrastructures and availability of electronic information resources in particular subjects at both universities or to the different individuals preferences.

6.4 Main hypothesis 2

Personal characteristics may influence the usage, preference and the type of electronic information resources accessed.

A number of sub-hypotheses were derived from this hypothesis (H2) for the purpose of this research (see Table 6.4). Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 6.4.

Table 6.4 Correlation between some personal characteristics and Internet usage; the type and the preference of electronic information resources (Q. No. 22; 30, 25 and 23; 28; 44; Q. No.5 with 33; 34; 35)

Hypothesis and Factors	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
H2-1: ICT expertise and time spent per week	.000	Y	.015	Y
H2-1: ICT expertise and the priority of inf. resources: Internet	.000	Y	Null	N
H2-1: ICT expertise and the priority of inf. resources: Online databases	.000	Y	.000	Y
H2-1: ICT expertise and the priority of inf. resources: e-books	.008	Y	.005	Y
H2-1: ICT expertise and the priority of inf. resources: e-journals	.008	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: e- databases	.001	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: OPAC	.011	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: Internet	.000	Y	Null	N
H2-1: ICT expertise and the preferences of using e- inf. resources: Online reference books	Null	N	.031	Y
H2-2: Internet user confidence and time spent per week	.000	Y	Null	N
H2-2: Internet user confidence and priority of information resources: Internet	.001	Y	Null	N
H2-2: Internet user confidence & priority of information resources: e- journals	Null	N	.037	Y
H2-2: Internet user confidence and preference of e-information resources: e-databases	.000	Y	Null	N
H2-2: Internet user confidence and preference of e-inf. resources: OPAC	.001	Y	Null	N
H2-2: ICT expertise and Internet user confidence	.000	Y	.029	Y
H2-3: Internet user experience and priority of inf. resources: e- databases	.016	Y	Null	N
H2-3: Internet user experience and priority of inf. resources: Internet	.005	Y	Null	N
H2-3: Internet user experience and priority of inf. resources: e- journals	Null	N	.048	Y
H2-3: Internet user experience and time spent on using the Internet	.000	Y	.011	Y
H2-3: Internet user experience and preference of inf. resources: Internet	.001	Y	Null	N
H2-3: Experience of using e-resources and the preference of using them: e- books	.030	Y	.019	Y
H2-3: Experience of using e- resources and the preference of using them: OPAC	Null	N	.007	Y
H2-3: Experience of using e- resources and the preference of using them: Online reference book	Null	N	.000	Y
H2-3: Experience of using e- resources and the preference of using them: e- databases	Null	N	.047	Y
H 2-4: Users' language and ease of searching	.027	Y	Null	N
H 2-4: Users' language and preference of information resources: Online databases	.000	Y	Null	N
H 2-4: Users' language and preference of information resources: Internet	Null	N	.011	Y
H2.4: Users' language and information results on Internet	.027	Y	Null	N
H2.4: Users' language and information results on Internet	Null	N	.009	Y
H2.4: Users' language and justifying the time spent in searching	Null	N	.034	Y

Sig.: significance, Y: Yes, N: No

H 2-1, concerning user confidence in adopting technology (Table 6.4) at both universities has a significant relationship with the usage of Internet resources. This in turn has a significant implication for both administrators and policy makers as it indicates that educating users and increasing their computer literacy and instilling confidence will go a long way in motivating the students in the use of electronic resources at the same academic environment.

Moreover, Saudi Arabian students appear to be different in a similar academic environment, where user confidence in adopting technology has an impact on the type and the preference of electronic information resources although there is variety in their priority and preference (see Table 6.4).

Results related to H2-1 might be due to the lack of electronic information resources in their subjects, or the lack of awareness of information resources provided by the library. It can also be that the education system or the teaching style did not depend on these types of resources. This requires policy makers, administrators and academic staff to plan together how the students can identify, locate, access and use what library acquisitions have made available to their users to fulfil their information needs.

As for H2-2, among KSU students, user confidence in using the Internet to search and find the required information does not have any effect on the usage patterns. This implies that irrespective of the perceived levels of confidence among individual users about the importance of the Internet as a vehicle to obtain the required information, it may not deter their usage or choice of electronic resources being accessed or may refer to the lack of ICT facilities they have. On the other hand, KAAU students illustrate significant differences. Table 6.4 shows the correlation between user-adopted technology and Internet usage.

In Table 6.4, H2-2 points out the correlation between user-adopted technology and the priority of using electronic information resources in both the universities. This reflects the difference among students of the same culture, because the lack of the availability of these resources occurs at both universities.

Another difference between the two universities is that Internet confidence of users did affect their preference of using electronic information resources at KAAU, while it did not at KSU (see Table 6.4). The results of testing user confidence in using the computer and Internet to gain information seem to illustrate the hypothesis that there is a significant difference between the two groups of Saudi Arabian university students. This again could be an important cultural issue. It may be concluded that in the case of the Saudi Arabian postgraduate students, there is a difference in the degree of ICT confidence that influences their information behaviour. It could also be the fact that there are more facilities available for the students at KAAU than those at KSU. None of the universities has a clear policy for acquisition of electronic resources and providing services (for further details see Chapter10, section 4.1).

However, given that user confidence in adopting technology at the two universities has a bearing on the user's perception; it has significant implications for the policy makers. This implies that instilling confidence in users to adopt technology will increase the students' understanding of the Internet as a rich source of information, in spite of the difficulties they face.

This assumes that the user's experience is twofold: computer experience at schools and Internet experience which could influence the use of electronic information resources at the university; another one is the users' experience with the library information resources that could have the same impact on the specific stage of the student life i.e. which year of study they are in. In the Saudi Arabian environment, computer experience at school does not influence their information behaviour at the universities, because they do not utilize it in practice.

As a result, with H2-3, in terms of the users' computer experience of electronic information resources and the type of preferred electronic resources accessed in both universities, it appears that there is no relation at KSU and KAAU between using computers in high school and the priority of using electronic information resources. In addition, there appears to be no relationship between the experience of using these resources and the priority of using them, and hence, does not appear in the Table 6.4.

In terms of the users' experience of electronic information resources and the type of preferred electronic resources accessed in both universities, it appears that for KAAU there is no relationship between the experience of using these resources and the priority of using them while for the KSU students there is a relationship between the two, particularly with e-journals and e-databases.

By comparison, KAAU users' experience of the Internet has affected the use of electronic information resources, in particular electronic databases and Internet, while in the KSU users' experience of the Internet has an impact on different types of electronic information resources, as revealed in Table 6.4. Additionally, Table 6.4 shows the significant correlation between users' ICT experience and the time spent on the Internet weekly at both the universities.

H2-3 also shows that there is a relationship between the experience of using electronic information resources that the students have used before, and the preference for using specific electronic resources (see Table 6.4).

Table 6.4 states that the similar academic environment did not foster the same attitudes for using the same electronic information resources. This may be the result of differences between individuals, education systems, and teaching styles. Another indication could be the disparity of the ICT facilities and electronic information resources available.

With reference to H2-4 in the Arabic universities, postgraduate students' language has a significant correlation with their ability to obtain information on the Internet. At KAAU, there appears to be no relationship between the user's language and information results to justify the time spent in searching. At KSU, a significant correlation between the two is shown in Table 6.4. Thus, English language skills have an impact on the time spent search on Internet.

On the contrary, KAAU postgraduate students' language has a significant relationship with the ease of searching in the information seeking process, whereas at KSU this was not so. This confirms the focus group result (discussed in Chapter 8 section 4.4) that the KSU postgraduate students do not have problem with English language.

It is clear that both universities have a difference as well as similarity. For example, the time spent on the Internet and ease of using electronic information resources has revealed an opposite relationship among the students at both universities. At KSU there is a correlation between the user language and time spent in searching that might refer to the fact that the facilities are either limited or the time they can spend on searching is limited, while at KAAU non-English speakers and ease of using resources on the Internet has a significant correlation. It may be that KAAU students have better English language skills. These general results may occur because the non-English speakers are limited in resources at KSU, or maybe it is difficult for them to understand the resources in the second language.

It is obvious from Table 6.4 that users' language has no impact on preference of search in the IS&R with the exception of online databases at KAAU and Internet at KSU. This may indicate that more electronic databases are available at KAAU, while the Internet is the preferred source of information at KSU. This in turn reiterates the lack of the electronic resources that are available at KSU.

The findings from the Saudi students in relation to these variables could be attributed to the users' weakness in the English language, since it is not their first language and yet they are compelled to use English when searching on the Internet. It is also true to say that teaching English language to students at Saudi educational institutions takes place at quite a late stage (i.e., intermediate and secondary schools) and this could be one of the major barriers in the information search process. It could also be that the lack of awareness of using diverse types of information resources in the academic context adds some kind of difficulties or suggests unfamiliarity in using them.

H 2-5: and **H 2-6:** are sub-hypotheses of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis2).

Results of the correlation study, built from several factors from the above sub-hypotheses, are presented in Table 6.5.

With reference to H2-5, in terms of Saudi Arabian universities, users were different in their information seeking behaviour, which means that the diverse subject background

of students has an impact on the type of electronic information resources accessed, as shown in Table 6.5. The most obvious finding to emerge from this table is that the same academic environment has a difference in using the electronic information resources. This should lead the policy makers into giving more attention to planning and organizing short courses, and workshops from the library side. It is also important to academic staff to encourage students to use these types of information when they are available.

Table 6.5 Correlations between users' subject background and current subject and the type and the preference of information resources (Q.No. 13, 14 and 23; 28; 44)

Hypothesis and Factors	KAAU		KSU		Test type
	P-Value	Sig.	P-value	Sig.	
H2.5: The users' subject background and priority of inf. resources: e- journals	.000	Y	.004	Y	r_s
H2.5: The users' subject background and priority of inf. resources: e-databases	.000	Y	Null	N	r_s
H2.5: The users' subject background and priority of inf. resources: Internet	.001	Y	Null	N	r_s
H2.5: The users' subject background and priority of inf. resources: e-books	Null	N	.000	Y	r_s
H2.5: The users' subject background and time spent on using the Internet	.000	Y	.018	Y	r_s
H2.5: The users' subject background and preference of inf. resources: OPAC	.001	Y	.000	Y	χ^2
H2.5: The users' subject background and preference of inf. resources: Internet	.000	Y	.000	Y	χ^2
H2.5: The users' subject background and preference of inf. resources: e- books	Null	N	.000	Y	χ^2
H2.5: The users' subject background and preference of inf. resources: e-databases	Null	N	.004	Y	χ^2
H2.6: The users' current subject and priority of inf. resources: e-databases	.000	Y	Null	N	r_s
H2.6: The users' current subject and priority of inf. resources: Internet	.001	Y	.015	Y	r_s
H2.6: The users' current subject and priority of inf. resources: e-journals	KAAU		.012	Y	r_s
H2.6: The users' current subject and priority of inf. resources: e-books	.002	Y	.000	Y	r_s
H2.6: The users' current subject and time spent on using the Internet	.000	Y	Null	N	r_s
H2.6: The users' current subject and preference of inf. resources: e- databases	.027	Y	.008	Y	χ^2
H2.6: The users' current subject and preference of inf. resources: OPAC	.008	Y	.000	Y	χ^2
H2.6: The users' current subject and preference of inf. resources: e-journals	.035	Y	Null	N	χ^2
H2.6: The users' current subject and preference of inf. resources: e-books	Null	N	.000	Y	χ^2
H2.6: The users' current subject and preference of inf. resources: Internet	Null	N	.000	Y	χ^2
H2.6: The users' current subject and preference of inf. resources: Online reference books	Null	N	.000	Y	χ^2

Sig.: significance, Y: Yes, N: No Q.: question

Moreover, for both the universities there is a noticeable correlation when the first degree of students and the time spent on the Internet are analyzed. In other words, the first degree of both universities' students seems to have an impact on the preference of electronic information resources accessed as shown in Table 6.5.

For H2-5, this may possibly be the consequence of using the only available resources frequently for the KAAU and KSU students. The difference between the two might refer to the differences in the subject backgrounds of the students, or the individuals' preferences. It can also be due to the various teaching methods used by the concerned universities, or the availability of these resources in each university library.

It may thus be stated that in KAAU and KSU, students from different subject backgrounds may have different degrees of exposure and confidence in ICT, which is reflected in their information use behaviour. This in turn reiterates the need for more and relatively equal emphasis on the ICT training in all subjects and courses for Saudi university students.

For H2-6, the result indicates that KSU students' current subject of study did not have an impact on the time spent using the Internet per week. This could be because the academic staff of these subjects did not influence the students to use the Internet more often to gain information or to accomplish their tasks from resources accessed or that there is a lack in the availability of information resources. Conversely, KAAU students illustrate that the current subjects of the present user study have an impact on the time spent using the Internet per week.

The current findings add substantially to understanding of the ICT infrastructure in both Saudi universities and from the results above, it can be seen that at KAAU students are more aware of Internet usage than KSU students because they have access to more resources, or the teaching system could be more advanced at KAAU in motivating their students to use the Internet more often. However, although they are from the same culture, there is still a difference between them, particularly, in the sense of the availability of ICT and the way they access the Internet and its usage. The analysis, however, shows that the current subject of users at both universities has an impact on the priority to use electronic information resources (see Table 6.5). The

KAAU students' current subjects of study appear to have a significant impact on the preference of using e- databases, e- journals and OPAC.

The outcome of Table 6.5 at KAAU confirms the most commonly accessed information resources within the current courses while at KSU there is a difference in the resources, which has an impact on the current subjects. As can be seen from Table 6.5, there is a difference between KAAU and KSU students in the preference of which electronic information is used in their library. Another important point is that there is no correlation between the current subject and the Internet but still the facilities are better at KAAU as the research desk proved.

H 2-7: is a sub-hypothesis of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis2).

Some elements of this hypothesis appear significant at KAAU as shown in Table 6.6, while other elements are correlated at KSU. At KAAU, the purposes of using the Internet are more significant than at KSU. It appears that they use the websites as available resources to ease their searches. Table 6.6 reflects a relationship between the use of the Internet and email, learning the computer and Internet skills, education, chatting, distance education and downloading free software. It seems that the Internet may assist in overcoming the disadvantages of the academic library or educational system; and possibly this are why they used the Internet for education, communication and entertainment. It is obvious that the Internet has less importance for KSU students than for KAAU students for ease in completing routine jobs.

It may be interesting to note that at KAAU, the Internet is an essential resource of general information gathering, but at KSU it did not seem to be so. Thus, there appears to be a variation in the same culture and similar environment but in different provinces in Saudi Arabia and it may be again the lack of ICT facilities at the university, or the limitation of the time and access to using these facilities due to the family's control regulations about using the Internet because it is a new information resource. Another reason can be the nature of their daily routine, which does not consider the Internet as a key resource.

Table 6.6 Correlation of reasons for using the Internet and time spent on the Internet per week (Q. No. 31 and 28)

	KAAU r_s		KSU r_s	
	P-Value	Sig.	P-value	Sig.
Purposes for using the Internet and time spent per week				
To read e-mail	.000	Y	Null	N
To learn to use PC & Internet	.002	Y	.025	Y
To do coursework	.039	Y	Null	N
For Chatting	.000	Y	Null	N
To obtain information through distance education	.000	Y	Null	N
To find free software	.000	Y	Null	N
To do part of the work	Null	N	.038	Y
Online shopping	Null	N	.030	Y

Sig.: significance, Y: Yes, N: No Q.: question

From the results, it can be seen that at KAAU, the availability of the Internet allows the students to access the Internet more often as well the lifestyle of KAAU students may allow them to use the Internet openly with less restrictions and less stringent regulations. For example, at KAAU, it is highly significant with students to go on the Internet and find free software, but none at KSU considered searching free software online. Another reason could be the lack of skills and awareness in Internet usage, which have an influence on the students' knowledge of how and why they use the Internet, besides the fact that they have to use English for searching but it is not their first language.

6.4 Main hypothesis 3

User's Internet competence may have an impact on the IS&R process.

H3-1, H 3-2, H 3-3, and H 3-4 are sub-hypotheses of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis3). Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 6.7.

Table 6.7 shows that KAAU and KSU users' Internet competence is significantly correlated with the information they found on the Internet. At KSU, user Internet competence has a highly significant impact on the efficacy of time taken to obtain

results. This correlation may refer to more than the third of the students in each discipline at KSU who find the Internet results they gain from the time spent on searching cannot be justified. At KAAU, users' Internet skills were not correlated with the time spent to obtain results. This would indicate that justifying of the time spent depends on the individual's searching ability to find the information they need, or there is a lack in the information that they would like to access on the Internet. As noted in Table 6.7, for KAAU, H3-3 noted that the students' Internet competence may have an effect on the ease of access to electronic resources during an IS&R process. There appears to be no similar relationships at KSU.

Table 6.7 Correlation Internet user competence and the efficacy of the Internet results (Q. No.30 and 33; 34; 35)

Hypotheses and Factors	KAAU		KSU	
	P-Value	Sig.	P-Value	Sig.
H3-1: Internet user competence and extent of information obtained during on IS&R process	.020	Y	.004	Y
H3-2: Internet user competence and the efficacy of time taken to obtain result	Null	N	.000	Y
H3-3: Internet user competence and ease of access of Internet information during IS&R process	.000	Y	Null	N
H3-4: Internet competence and familiarity of using electronic resources	Null	N	.002	Y

Sig.: significance, Y: Yes, N: No

Q.: question

Although Internet competence enables the process of an effective search, it does not guarantee the end results obtained during any IS&R process. Students at KAAU seem to be more educated than KSU students in Internet skills. This could be attributed to the more advanced ICT infrastructure at KAAU than at KSU. This may mean that there is a need for more training in different types of electronic information resources.

It is assumed that Internet competence of a user has an impact on the familiarity with electronic information resources that are available at the library websites. Although there was no relationship between the Internet competence of KAAU students and the expertise and awareness of using electronic information resources; that are available at the library website, KSU postgraduate students' Internet competence has a significant relationship with the familiarity of the resources accessed through the

library website. This may be because the library website at KSU includes clearer links to its electronic resources than at KAAU. This may result from the poor design of the library website resulting in that the resources are not displayed properly at the KAAU library website, as divulged in group discussions (presented in Chapter 9, 9.7.2). Moreover, the literature review concluded that at KSU the library website is more interactive than the KAAU library website. In general, this disparity in both academic universities could also be because:

- They do not know about the available resources that are related to their subjects.
- The lack of the electronic information resources in their subjects.
- They may be familiar with printed resources more than the electronic ones.
- The education system or the requirement of their courses does not view electronic resources as important as the printed ones.

H 3-5: is a sub-hypothesis of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 3).

Table 6.8 presents the results of the correlation study found on a number of factors taken from the above H3-5.

Users' education and training has an impact on the process of information access during an IS&R process. There was a relationship among user education skills and the courses given by schools and elsewhere, self-instruction and reading about computing and technology (printed or online) materials at KAAU; while for the KSU students there is a correlation with individual instruction. That computer training and help are significantly related to the students' IS&R process, but the way such training is provided or support is obtained, varies from KSU to KAAU students (see Table 6.8).

Another part of information literacy is information searching skills. The findings from both the universities confirmed that there was no relationship between the formal training in information searching skills and the ease of using electronic resources on the Internet. KSU students depend on the library staff to assist them in using the Internet. However, it may be that they have the abilities but they do not have the skills that will be considered as essential skills. At present, there is no structure for ICT

skills training in the Saudi education system. It is clear that most of the training courses are given by unofficial external sources. This proves that these universities do not provide the students with the sufficient information skills they require. They do not have an ICT service centre to help their students in ICT usage. The policy makers certainly have to come up with the appropriate courses, so that they would be able to teach and train students frequently in ICT skills.

Table 6.8 Correlation between methods of learning computer and information skills and the ease of access to the Internet (Q.No. 18; 20 and 35)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-Value χ^2	Sig.
H3-5: Methods of learning computer skills influencing ease of using Internet information: A course given by the high school	.012	Y	Null	N
H3-5:: A course given elsewhere	.020	Y	Null	N
H3-5:.....: Self -instruction	.029	Y	.020	Y
H3-5:.....: Reading literature about computing	.003	Y	Null	N
H3-5:.....: Online literature review	.007	Y	Null	N
H3-5: Methods of information skills influencing ease of using Internet information: Individual instruction by library staff	Null	N	.020	Y

Sig.: significance, Y: Yes, N: No

Q.: question

H 3-6: and H 3-7: are sub-hypotheses of the main hypothesis (see Chapter3, section 3.2.2, and main hypothesis 3). Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 6.9.

User education in computer and information skills at KSU did have an effect on the extent of information obtained during an IS&R process with a course given by their school and individual instruction. However, at KAAU, the formal training programme did not have an impact on their performance in obtaining information in course of the IS&R process. At the same time, informal training in information searching skills (see Table 6.9) is correlated with the information found on the Internet. Therefore, the formal training on information searching skills does not have an effect on their performance, possibly due to the lack thereof.

One of the other findings of this study is that the KAAU participants are still depending on their peers and reading computing knowledge to help their needs. The weaknesses of the ICT programme have influenced their performance on the Internet. In addition, the availability of the Internet does not assure that it is the ideal use for the population. Therefore, the people need continuous training in the ICT facilities to be able to use them properly. At KAAU, the methods of learning computer facilities or ICT skills have an impact on the efficacy of time spent to have results during IS&R process on the Internet (see Table 6.9). Information skills are considerably correlated with colleagues' assistance.

Table 6.9 Correlation between methods of learning information literacy and computer skills, and information obtained and the efficacy of time taken to obtain results from the Internet (Q. No. 18;20 and 33, 34)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-value χ^2	Sig.
H3-6 Methods of learning computer skills influencing Internet information found : A course given elsewhere	.031	Y	Null	N
H3-6:.....: A course given by the high school	.002	Y	.024	Y
H3-6:.....: Self-instruction	.042	Y	Null	N
H3-6: Methods of information searching skills influencing Internet information found : Assistance from colleagues	.000	Y	Null	N
H3-6:.....: Individual instruction by library staff	.002	Y	.024	Y
H3-6:.....: A course given elsewhere	.049	Y	Null	N
H3-6:.....: Self- instruction	.043	Y	Null	N
H3-7: Methods of learning computer skills influencing the efficacy of time taken to obtain results during an IR&S process : A course given by the high school	.000	Y	Null	N
H3-7:: A course given by their department	.001	Y	Null	N
H3-7:: A course given elsewhere	.009	Y	Null	N
H3-7:: Assistance from colleagues	.000	Y	Null	N
H3-7:: literature reading	.001	Y	Null	N
H3-7: Methods of information skills training influencing the efficacy of time taken to have results: Assistance from colleagues	.001	Y	Null	N
H3-7:: Individual instruction by library staff	Null	N	.001	Y

Sig.: significance, Y: Yes, N: No

Q.: question

On the other hand, at KSU, there appears to be no relationship between the students' individual information literacy skills levels and their IS&R process on the Internet except for library staff instruction.

6.4 Main hypothesis 4

Demographic variables may have an effect on usage, type and preference of electronic information accessed.

H 4-1:, **H 4-2:**, **H 4-3:**, **H4-4:**, and **H 4-5:** are sub-hypotheses of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 4).

Table 6.10 presents the results of the correlation study found on a number of factors taken from the above sub- hypotheses H4-1 to H4-4.

A number of sub-hypotheses were taken from the main one, out of which those that are significant appear in Table 6.10, while the following sub-hypotheses were null, i.e. there were no significant relationship between the variables.

- Gender with Internet usage
- Gender with priority of information resources
- User's marital status with priority of information resources
- User's social status with Internet usage at KSU.

There appears to be no relationship in terms of the Internet usage and the priority of the type of electronic information resources at both universities. A significant correlation exists between the gender and the preference for electronic information resources at both universities with the variety of resources (Table 6.10).

At KSU most students choose OPAC and online databases possibly because they are the only two resources that are available to them, while at KAAU students preferred online reference books and e-books, which could be due to the availability of this information, which means they can access the library website to access these resources easily.

For both the universities there appears to be a different correlation between users' ages and the preference for using the electronic resources (Table 6.10). It can be seen from the descriptive tables in appendix H that the majority of students at both universities were aged between 20-30 years old. Further research needs to be done to

find out the characteristics of specific age groups and their correlation with the preferences for specific electronic information resources. Internet appears to be a preferable resource to KSU students even with the differences in the users' ages, and it is a significant correlation for KAAU. In addition, there was a significant impact of using OPAC as the information resource available among students of different ages at KSU.

Table 6.10 Correlation between demographic variables and Internet usage, type and preferences of information resources (Q. No. 1; 2; 6; 12 and 23; 26; 28; 44)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-Value χ^2	Sig.
H4-1: Gender with the preferences of using e-inf. resources: Online reference books	.001	Y	Null	N
H4-1: Gender with the preferences of using e-inf. resources: e-books	.046	Y	Null	N
H4-1: Gender with the preferences of using e-inf. resources: e-databases	Null	N	.008	Y
H4-1: Gender with the preferences of using e-inf. resources: OPAC	Null	N	.012	Y
H4-2: Age with the preferences of using e-inf. Resources: Internet	.072	Y	.001	Y
H4-2: Age with the preferences of using e-inf. resources: e-journals	Null	N	.000	Y
H4-2: Age with the preferences of using e-inf. resources: OPAC	Null	N	.006	Y
H4-2: Age with the preferences of using e-inf. resources: Online reference books	Null	N	.041	Y
H4-2: Age with the preferences of using e-inf. resources: e-books	.012	Y	Null	N
H4-3: User's social status with preference of using inf. resources: e-databases	.048	Y	.003	Y
H4-3: User's social status with Internet usage	.045	Y	Null	N
H4-5: User's income with ease of access: From home	.021	Y	Null	N
H4-5: User's income with ease of access: Type of Internet connection at home	.054	Y	Null	N
H4-5: User's income with time spent per week	.001	Y	Null	N
H4-5: User's income with the preferences of using e-inf. resource: E- databases	Null	N	.046	Y
H4-5: User's income with the preferences of using e-inf. resource: E-books	Null	N	.002	Y
H4-5: User's income with the preferences of using e-info. resource: Online reference books	Null	N	.001	Y
H4-5: User's income with the preferences of using e-inf. resource: Internet	Null	N	.017	Y
H4-5: User's income with the preferences of using e-inf. resource: E- journals	.001	Y	Null	N

Sig.: significance, Y: Yes, N: No Q.: question

This finding validates that students of different age groups have different preferences for types of electronic resources. This may be due to the differences between

individuals, education styles and users' language skills. However, while KAAU students of different ages are aware of these resources they do not access them on their website. According to the interview held with the students and librarians, they also used e-books from the university website because they cannot access these from off-campus. The interviews also revealed that the students have to learn what these resources are, how to use them, and which kind of information these resources will help them to obtain. The design manager of this website has to evaluate the usability of these resources frequently to recognize the barriers that prevent students from accessing them.

KAAU and KSU students' social status is correlated with their preference for using e-databases. Furthermore, a difference between the similar educational cultures exists in terms of preferences for electronic information resources. Consequently, it could be that those with differing social status did not understand or were not aware of the different kinds of resources available in their institution. KSU users' marital status seems to have no impact on these variables, while for KAAU students there is a significant correlation between their social status and Internet usage per week (see Table 6.10).

There are issues regarding the nature of family life and social circumstances in Saudi Arabia, which have influenced owning a computer and Internet usage as well. Even if students own a computer, it is not necessary that they are fully aware of the ideal usage of the technology. For instance, the central region of Saudi Arabia did not appear to be influenced by the technological development in the academic environment. It may require more employment or development, using these electronic resources to support and motivate the education and research system. These resources are not part of the Saudi students' daily life, however, because of the lack of encouragement to use these resources in their research at the university or home even when owning computers.

It may also be that the libraries do not provide enough help to the students, if they have these resources, because library staff themselves require training in how to use these services themselves. They might not even have adequate knowledge of English to understand the instructions or the English pages that appear; or perhaps they may

not even bother to show that they provide these resources in the first place. They may not be comfortable in the environment in which the resources are provided. Even worse, sometimes the students are not able to access a very important resource from home, but their research may depend on such a resource and they need to get it through the librarians or academic staff logging in for them.

In fact, ICT has not been around for very long in Saudi Arabia. Therefore, Saudi Arabian society needs to be trained and familiarised with its capabilities so that they can use it in a productive manner. Additionally, user's income seems to have an impact on access to electronic resources, which is the logical results of the fact that a higher level of income leads to higher affordability and use of ICT.

It is clear that there was a relationship between the annual income and the places students use the Internet; the Internet was mostly accessed from home at KAAU and at KSU was accessed from work. In addition, there is a relationship between the users' annual income and the access rate of Internet connection, which the user had selected at both Saudi Arabian universities. The speed of the connection also has a significant correlation with the user's income, possibly because some might not have sufficient family income to allow them to acquire an appropriate type of Internet connection. At the same time they do not have the better choice of better ICT. Moreover, there are a limited number of telecom companies that provide the users with the Internet connection they require in a reasonable price range they can afford.

Moreover, the results showed that there was a significant relationship between the user's annual income and the frequency of Internet usage (Table 6.10) at KAAU. At both universities, the students could afford an effective type of Internet connection, and accordingly, they could access electronic information resources, yet still printed books are the most important starting point of their research.

Annual income has an impact on the preference for using e-journals at KAAU, while at KSU, there was more electronic resource access by students with a higher income (64% of KSU students had an income of more than 81,000 SR), because they can afford it. They also might have access from a particular place (e.g. the work

institutions) (see Table 6.10). With different levels of incomes in the same educational culture, the students have various preferences in electronic information resources.

Annual income also has an impact on the preference for using electronic journals at KAAU, which may be due to the lack of a high-quality Internet connection at a majority of sites and the high cost for a lower-quality connection. Also, the extent of using the Internet as a resource could be influenced by a lack in information resources in specific subjects.

6.4 Main hypothesis 5

Social/interpersonal variables may have an effect on access to electronic information.

The following sub-hypotheses were derived from this hypothesis for the purpose of this research: H5-1, H5-2 and H5-3 are sub-hypotheses of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 5). Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 6.11.

At KAAU, it appears that the role of the user has a significant impact on the time spent using the Internet per week either for studying or for accomplishing work. With reference to H 5-1, the user's role affects his or her behaviour patterns. For instance, for a full-time student or a student with full-time employment or for part-time students, the nature of a postgraduate student's role is related to his or her position, which reflects their information needs. At KSU, there appears to be no relationship between these variables, though at KAAU, it appears that the role of the user has a significant impact on the time spent using the Internet per week either for studying or for accomplishing other work.

In addition, there is another factor concerning H 5-1 that is influenced by the users' role at KAAU: the preference for electronic resources has a considerable effect on the online databases, OPAC and the Internet. These preferences could be due to the

ease of using these resources. It could also be these resources are available easily in their subjects. If the students are encouraged by members of staff to use particular types of electronic resources, this will expand and enhance their electronic information skills. There was also a significant association between students' role at KSU and the priority of using electronic information resources.

Again, printed resources stand out at KSU, maybe because it is the resource most commonly available in the libraries, or possibly, it is the resource they are asked to use by the teacher/staff. That does not mean that they do not use other resources as can be seen from Table 6.11. On the other hand, students at KAAU have other preferences, which were the online databases, OPAC and Internet. The fact that whether a student was full-time or part-time did not have any impact on their preference for electronic resources at KSU.

There appears to be no relationship between postgraduates' parents' education and Internet usage per week at KSU, and it is also true for KAAU, with the exception of the mother's education level, where there appears to be a relationship in Internet usage per week (Table 6.11).

At KSU, parents' education does not have an impact on the user confidence in adopting technology while parents' education at KAAU has impact on their children. It may be because their parents are more educated than the KSU students' parents are. This is because in the central region, society is more conservative and there is a lack in the number of highly educated parents, which may mean that it would be difficult for their children to link with modern technologies, even if they own computers. They would also find it challenging to recognize the benefit of the new equipment to gain information. This is due to the fact that parents might not agree with certain information resources, or equipment because of their cultural beliefs, which may hinder them from understanding their children's purpose in using the Internet from home.

There was a relationship between the level of parents' education and the time spent on the Internet. This indicates that parents' education at KAAU has an impact on their children's attitude towards technology. From the descriptive data, it was found that

the number of mothers with low education is very high in the KSU group compared to KAAU. From this, it can be noticed that the mothers have an important role in persuading their children to use modern technology.

Table 6.11 Correlation social/interpersonal variables and Internet usage and the preference for electronic resources (Q. No. 10; 8 and 15;27; 28)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-Value χ^2	Sig.
H5-1: User's role and Internet usage	.000	Y	Null	N
H5-1: User's role and the priority of using e- inf. resources: e-books	Null	N	.046	Y
H5-1: User's role and the priority of using e-inf. resources: e-journals	Null	N	.014	Y
H5-1: User's role and the priority of using e-info. resources: Printed books	Null	N	.003	Y
H5-1: User's role and the priority of using e-inf. resources: Printed journals	Null	N	.000	Y
H5-1: User's role and the preference of e-info. resources: e-databases	.049	Y	Null	N
H5-1: User's role and the preference of e-inf. resources: OPAC	.006	Y	Null	N
H5-1: User's role and the preference of e-inf. resources: Internet	.001	Y	Null	N
H5-2: User's parental education and Internet usage : Mother's education	.010	Y	Null	N
H5-3: User's parental education and adopting technology: Mother's education	.010	Y	Null	N
H5-3: User's parental education and adopting technology: Father's education	.010	Y	Null	N

Sig.: significance, Y: Yes, N: No Q.: question

On the other hand, a mother's lower level of education could create a barrier to her children's reaction towards the new and evolving technology; she might not value the ICT environment and the equipment it requires.

H5-4 and H5-5 were null, i.e. there were no significant relationships between the variables for both universities.

6.4 Main hypothesis 6

The environmental variables may have an effect on access to electronic information.

H 6-1: is a sub-hypothesis of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 6). There is no relationship between the location and the ease of access to electronic information resources at both universities. This may be because in general the majority of students live in metropolitan areas. However, the distance of the student's travel has an effect on the access to electronic information at both universities (Table 6.12).

Table 6.12 Correlation between the location of the user influencing access to electronic information (Q. No. 4 and 26)

	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
Access at home	Null	N	.009	Y
Access at work	.011	Y	.004	Y

Sig.: significance, Y: Yes, N: No

Q.: question

It may be that the farther the distance a student travels the more they lose the motivation to access Internet resources, because if it is a considerable distance from home then they would take into account the distance and time it would take to get to the access site and whether it was worth the time travelled. Hence, they may choose other resources that do not require such a long travel time and are quicker to access, such as printed books or journals. Some Saudi students need to come to the university campus or the library to get access to the electronic resources subscribed by the library. At both universities, the students stated that they also do not find their required information in their library on most visits. There is a gap between the user needs and the library collection. The students also do not know if the library does have the information relevant to their subjects; and the library itself does not make further effort to deliver or meet the potential users' needs.

H 6-2: is a sub-hypothesis of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 6).

Familiarity with the search environment has a significant impact on the results of a known topic search at KAAU and KSU, while it does not have an impact on the results of an unknown topic search at both universities. It may be that this result points to the user's confidence with a well-known topic and can assist the user to search more confidently than for the unknown topic, so they become more familiar with resources that are easier to search.

Table 6.13 Correlation of the familiarity of the search environment (Q. No. 54 and 49)

	KAAU		KSU	
	P-Value r_s	sig.	P-Value r_s	sig.
The familiarity of the environment in the search place				
Satisfaction of known topic	.047	Y	.017	Y

Sig.: significance, Y: Yes Q.: question

H 6-3: is a sub-hypothesis of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 6). There appears to be no relationship for this in either universities, and thus users' type of household does not have an impact on owning a computer or accessing the Internet.

6.4 Main hypothesis 7

The IS&R usability features and user interfaces may have an effect on the access to electronic information resources.

H 7-1: is a sub-hypothesis of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 7).

At both KSU and KAAU, the design of the library web interface features has a highly significant influence on the user perception, as shown in Table 6.14, and content (coverage, equality, depth, and relevance); design and layout; links; help facilities; and the personalised options at KSU, which have an impact but are not statistically significant. Electronic resources found are mostly in English, which creates a barrier for non-English speakers, because the structure and search words are all in English. In addition, the students may find it difficult to find the information they need.

Table 6.14 shows that both academic library interfaces link the presentation of the information resources and the services they provide. Moreover, the user interfaces are the gateway to information retrieval systems, which enhance the information seeking behaviour. These features have an impact on user perception of the usability. According to the findings presented in Table 6.14, it may be stated that both the universities should take appropriate measures to conduct usability study of their library websites and try to improve these features.

Table 6.14 Correlation between library interface features and the users' perception (Q. No. 57 and 55)

User Perception of Interface Features	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
Content	.000	Y	Null	N
Design and layout	.000	Y	Null	N
Ease of use	.000	Y	.003	Y
Links	.000	Y	Null	N
Searching	.000	Y	.000	Y
Readability	.282	Y	.000	Y
Help and support	.000	Y	Null	N
Options for personalization	.000	Y	Null	N

Sig.: significance, Y: Yes, N: No Q.: question

H 7-2, H 7-3, H 7-4, H 7-5 and H 7-6 are sub-hypotheses of the main hypothesis (see Chapter 3, section 3.2.2, and main hypothesis 7).

A number of sub-hypotheses were derived from the main hypothesis 7 out of which those that are significant appear in Table 15, while the following sub-hypotheses were null, i.e., there were no significant relationships between the variables.

- User's satisfaction with a known topic results with time taken to finish searching at KAAU and KSU
- User's satisfaction with a known topic results with the number of times to rephrase a known topic at KAAU and KSU
- User's satisfaction with an unknown topic results with the number of times to rephrase it at KAAU

- The level of difficulty of a known topic with the number of times rephrasing it at KAAU
- The level of difficulty of an unknown topic with the number of times rephrasing it at KAAU.

Results of the correlation study based on several factors derived from the above sub-hypotheses are presented in Table 6.15.

User satisfaction as regards a known topic search is not related to the number of searches and time taken for searching the information at KSU (Table 6.15). Furthermore, for KAAU user satisfaction with a known topic search results has no significant impact on the time taken for searching a known topic. Similarly, the user's satisfaction with a known topic search does not have an impact on the number of times to rephrase known topic search terms at both universities.

In contrast, at KAAU and KSU, it appears that there was a relationship between the user's satisfaction with a search result of an unknown topic and the time taken for searching an unknown topic (Table 6.15). While at KSU there is a relationship between the user's satisfaction with a search result of an unknown topic and the number of times to formulate search terms they used to achieve the desirable results, however, at KAAU this relationship does not exist.

However, at both universities, it is clear that the user's satisfaction with desirable results and the time spent or number of times it takes to rephrase terms for searching a known or unknown topic had a similar relationship, which may be related to the individuals' differences and topic knowledge. Students' concern about the time they spend searching about a known topic or an unknown topic might also be related to the limited time they have on the Internet, which means they cannot afford to spend too much time on a certain topic. This could be caused by the weakness in the ICT infrastructure. It may also reflect that the weaknesses of the ICT facilities at KSU are greater than those at KAAU. While there was no relationship between the level of difficulty of a known topic search and the number of times students had to rephrase it at KAAU, there was a significant relationship at KSU. There appears to be a

relationship between the two features at both universities, indicating the higher the level of simplicity; the more satisfied the students are with the results they get the more confident they will become in using the results they have found.

Table 6.15 Correlation between the user satisfaction of a known and unknown topic research and its level of difficulty (Q. No. 47; 45; 46; 59 and 48; 49; 60)

Hypothesis and Factors	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
H7-3: User's satisfaction with the unknown topic results with time taken to finish searching	.000	Y	.000	Y
H7-3: User's satisfaction with the unknown topic results with a number of times to rephrase it	Null	N	.000	Y
H7-4: The level of difficulty of a known topic search with a number of times rephrasing it	Null	N	.005	Y
H7-4: The level of difficulty of a known topic with users' satisfaction with results	.000	Y	.000	Y
H7-5: The level of difficulty of an unknown topic with a number of times rephrasing it	Null	N	.000	Y
H7-5: The level of difficulty of an unknown topic with users' satisfaction with results	.021	Y	.000	Y
H7-6: User's familiarity with electronic resources with user's perspective on its importance: e-databases	.047	Y	Null	N
H7-6: User's familiarity with electronic resources with user's perspective on its importance: e- journals	.003	Y	.034	Y

Sig.: significance, Y: Yes, N: No

Q.: question

This may be due to the fact that they have a sufficient knowledge of the topic they searched for, which acts as an enabler to rephrasing search terms (Table 6.15). However, this demonstrates that they recognize what they are looking for and they select the terms that suit their information needs. At the same time, they have to learn more about Internet searching skills, and how to use available electronic information resources for them.

There appears to be a relationship between the two features, indicating that with a higher level of difficulty, half of the KSU students highlighted that they found

searching for an unknown topic easy or somewhat easy but they also indicated that they had to adjust the search terms three times or more. Conversely, there was no relationship between the two variables at KAAU (Table 6.15). In the second part of this hypothesis, there appears to be a relationship between the two features at both universities. This may be due to the fact that the students do not have sufficient knowledge about the topic they searched for, so they will take any amount of information as a satisfactory result.

Table 6.15 points out that the familiarity with electronic information resources is significantly correlated with online databases and e-journals at KAAU and the Internet at KSU (Table 6.15). It was clearly determined that the most familiar electronic resources are online database and e-journals, which may be due to the fact that these are the generally available resources covering their subjects, while the KSU system requires more attention from the decision makers to publicize different information resources. This result again confirms that students at KAAU are more aware of some of the electronic resources. However, both universities' students require training in information skills.

H 7-7: Search process and help facilities may facilitate the IS&R process. This hypothesis discusses the help facilities available through the library website and query formulation of the selected universities.

1. Help Service

Table 6.16 presents the percentage of KSU and KAAU postgraduate students' answers about their opinions of the online help facilities which show that, overall, postgraduates of both universities prefer asking a person even if it is a useful service.

Table 6.16 Distribution of user opinion about online help facilities at KAAU and KSU libraries

Help Facilities	KAAU		KSU	
	Frequency	%	Frequency	%
Useful services, but I prefer asking a person to help me	51	37.5	11	14.7
Useful service, and easy to use	16	11.8	7	9.3
Useful service, but difficult to use	40	20.4	14	18.7
Not useful service	29	21.3	43	57.3
Total	136	100	75	100

At KAAU a large number of students think it is a useful service, but difficult to use. At KSU, a majority of students found it not a useful service, which justifies why they suggested asking a person as a better option.

Table 6.16.1 T- test for Table 6.16 at KAAU and KSU students

	KAAU& KSU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
Help facilities	Equal variances assumed	4.53	209	.000

There was evidence within the set observed that the mean of users' opinions about online help facilities of libraries were significantly more at KAAU than at KSU, $t(4.53) = 209, P = .000$.

Table 6.17 The distribution of students' opinions on the system error correction at the KAAU and KSU

The correction of the errors on the library system	KAAU		KSU	
	Frequency	%	Frequency	%
Yes	10	7.4	0	0
Sometimes	44	32.4	14	18.7
No	82	60.3	61	81.3
Total	136	100	75	100

Most of the students at both universities responded that the error correction facility on the library system does not help, which means that the service is poor and unstructured. Therefore, students will find it not useful because they did not get any directions in how to use it (Table 6.17).

Table 6.18 shows that the students have also mentioned reasons that hinder them from using the help facility. First of all, most of them did not know what the help facility is, while some said they do not need the help it provides yet. At KSU, most students stated that human help was a better choice from their point of view. A smaller number of students mentioned other important issues, for example, there are no guidelines for using the search term selection, or that they were not sure if the online help would help them with their search.

Table 6.18 Students' reasons for not using help service at the KAAU and KSU

Participants' reasons for not using help service	KAAU		KSU	
	Frequency	%	Frequency	%
I do not think I need help yet	26	19.1	20	26.7
I would rather ask someone to help me	19	14.0	25	33.3
I was not sure if online help may help me with search	13	9.6	2	2.7
I know about the online help and its role, but I did not recognize that online help is used at the specific e-resources I use	12	8.8	5	6.7
I am not sure what online help is	50	36.8	23	30.7
There are no guidelines for using search term selection	16	11.8	0	0
Total	136	100	75	100

2. Query Formulation

Most students from both universities in Table 6.19 mentioned trial and error as their first choice for query formulating followed by colleagues' help. They also prefer asking the academic staff. This indicates that there are no guidelines for the students to follow, or it may be that this service does not work properly. Therefore, they do not know how to use the service, which means they will not use the service, and would rather ask for help from an academic staff member, librarian or colleagues who could interact with them.

Table 6.19 Formulating a query on the library system at the KAAU and KSU

Formulated query on the system through	KAAU		KSU	
	Frequency	%	Frequency	%
Trial and error	108	79.4	73	97.3
Academic staff	46	33.8	16	21.3
Help facilities on the available system	23	16.9	0	0
Colleagues	90	66.2	44	58.7
Librarian	32	23.5	0	0

(The percentages add up to more than 100 because the students could choose more than one option.)

Table 6.19.1 T-test for Table 6.19 at KAAU and KSU

Formulated a query on the Library system through	KAAU& KSU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
Trial and error	Equal variances not assumed	-4.53	194.7	.000
Academic staff	Equal variances not assumed	1.99	171.5	.048
Online Help facilities	Equal variances not assumed	5.24	135.0	.000
Colleagues	Equal variances assumed	1.08	209	.280
Librarian	Equal variances not assumed	6.45	135.0	.000

It can be seen from the Table 6.19.1 that the mean of trial and error technique to formulate a query on the library system was significantly high at KSU, while the means of academic staff, online help and librarians were more significant at KAAU.

Table 6.20 shows that they have a joint opinion about the search option; they mostly use it to search by subject, though they are divided in their second option. At KAAU, it was searching by author, and at KSU it was the title of the article. There was a majority at KAAU who chose title search; contrastingly, with KSU students it was keyword. The majority of both universities' students choose the subject option as can be seen from Table 6.20, possibly because it is the easiest way they can access resources, or the most accessible search option that is available to them.

Table 6.20 The distribution of students' use of search options at the KAAU and KSU

Search options	KAAU		KSU	
	Frequency	%	Frequency	%
Title	77	56.6	33	44.0
Key word	48	35.0	46	61.3
Subject	110	80.9	66	88.0
Author	82	60.3	33	44.0
Title of article	27	19.9	54	72.0
Journal title	21	15.4	11	14.7
Truncation	10	7.4	17	22.7
Use of search operators	14	10.3	9	12.0
Date of publication	12	8.8	16	21.3
Use of available tool to word search term selection	9	6.6	0	0
Other	0	0	0	0

(The percentages add up to more than 100 because the students could choose more than one option.)

Table 6.20.1 T-test for Table 6.20 at KAAU and KSU

Search options	KAAU& KSU	Levene's Test for Equality of Variances		t-test for Equality of Means
		t	df	Sig. (2-tailed)
		Lower	Upper	Lower
Title	Equal variances assumed	1.76	209	.080
Keyword	Equal variances assumed	-3.74	209	.000
Subject	Equal variances not assumed	-1.40	177.7	.162
Author	Equal variances assumed	2.29	209	.023
Title of article	Equal variances not assumed	-8.35	137.7	.000
Journal	Equal variances assumed	.15	209	.881
Truncation	Equal variances not assumed	-2.86	106.2	.005
Search operators	Equal variances assumed	-.38	209	.705
Date	Equal variances not assumed	-2.34	113.7	.021
Available tool	Equal variances not assumed	3.09	135.0	.002

Table 6.20 shows that there was a variance between KAAU and KSU, therefore, a t-test was conducted to confirm for whom this variance was, the results show in table 6.20.1 that the mean of search options used by KSU students were more significant (such as keyword, title of article, truncation and search operators) than at KAAU, while the means of author and available tools were significant at KAAU.

Table 6.21 shows that the students at KAAU and KSU have stated that they would modify the query if they received unsatisfactory results. This might be due to the fact

that they do not have any other choices apart from this one that they can use. The advanced search option had a reasonable response at KSU, which suggests that they are aware of the advanced way of searching, because most of them are from the CS department. On the other hand, at KAAU some students (15.4%) said that they would quit the search. This is a fact for concern because it indicates that students are not skilled, or do not have good English language skills, and this may leave students confused and uninterested in completing the search.

Table 6.21 The user's actions on receiving unsatisfactory results at KAAU and KSU

User's actions on receiving unsatisfactory results	KAAU		KSU	
	Frequency	%	Frequency	%
Change database	14	10.3	4	5.3
Use the advanced search option	14	10.3	22	29.3
Modify the query	87	64.0	42	56.0
Quit search	21	15.4	7	9.3
Total	136	100	75	100

There was a significant relationship in the user's actions upon receiving unsatisfactory results at KAAU and KSU. The chi-square test was applied resulting in a value of 13.526 and significance value of .004 indicating a significant relationship between user's actions and KAAU students.

6.5 User's Perspective on Barriers to some Information Resources

This part identifies some interesting characteristics of Saudi students in terms of barriers to electronic information resources; it compares the different sets of students from the chosen Saudi universities.

6.5.1 The Internet Barriers at KAAU and KSU

From Table 6.22, it can be seen that students face a wide number of barriers. The most common one at both universities was the slow connection, and the constant loss of the connection while browsing the Internet. Another was the difficulty in finding the required web pages, which could be caused by the lack of awareness or lack of

Internet skills. Yet another was the regulations controlling the access to certain web pages. This is a major barrier because it could stop students from accessing the websites that they need for their study and research.

Table 6.22 Barriers of using the Internet at KAAU and KSU

Internet Barriers	KAAU		KSU	
	Frequency	%	Frequency	%
Slow connection	103	75.7	73	97.33
Cutting off connection while browsing	80	58.8	72	96
Expensive Internet subscription	30	22.1	41	54.66
Lack of Internet services	37	27.2	21	28
Difficulties in finding the required web page	36	26.5	52	69.33
Regulations controlling access to the Internet	51	37.5	65	86.66
Language barrier	75	55.1	50	66.66
Do not have enough time to use the Internet	10	7.4	9	12
Lower performance of computers	19	14.0	3	4
Do not trust the information on the Internet	14	10.3	9	12
Other	0	0	0	0

(The percentages add up to more than 100 because the students could choose more than one option).

6.5.2 Barriers in relation to OPAC at KAAU and KSU

Table 6.23 exhibits that the greatest barrier of students at KSU was unranked search results. Additionally, concerning the barriers with OPAC, the students at KSU and KAAU have mentioned that they cannot formulate the query easily, which might be because they do not know how to properly formulate or modify the query. At both universities, students do not know how to combine search options with Boolean operators, even though the majority of them are from the computing department at KSU. These would point out the need for workshops and training sessions for the students to improve.

Table 6.23 Barriers of using OPAC at KAAU and KSU

The major barriers of OPAC	KAAU		KSU	
	Frequency	%	Frequency	%
Cannot formulate the query easily	70	51.5	52	69.33
Unranked search results	66	48.4	61	81.33
Cannot search by subject heading list	69	50.7	59	78.66
Difficult advanced search options	48	35.3	34	45.33
Do not know how to combine search options with Boolean operators	65	47.8	60	80
Cannot limit search by date, collection and a language	60	44.1	34	45.33
Other	4	3.0	3	4.0

(The percentages add up to more than 100 because the students could choose more than one option).

6.5.3 Barriers related to e- databases at KAAU and KSU

Students at both the universities highlighted that frequent access to different databases requires the user ID and password which was their major problem because it meant wasting time, the need for typing the ID and password, and sometimes they even have to create one in the first place, which was followed by frequent run-time errors. Then, at KSU there was the problem that much irrelevant information is retrieved, which indicates students might not know how to search for the information; this means that students need to be trained in using databases to help them with their searches. At KAAU, students indicated fact that it takes a long time to revert to another database, which suggests that the ICT infrastructure is quite slow Table 6.24.

Table 6.24 Barriers of using e-databases at KAAU and KSU

The major barriers of using e-databases	KAAU		KSU	
	Frequency	%	Frequency	%
A subscription fee is required	51	37.5	54	72.0
Frequent access to different databases requires the user ID and password	89	65.4	75	100
Much irrelevant information is retrieved	50	36.8	66	88.0
It is not easy to select a database	60	40.1	70	93.33
Multiple databases cannot be searched using a single search query	32	23.5	59	78.66
It takes long to revert to another database	65	47.8	33	44.0
Information cannot be downloaded	54	39.7	43	57.33
Information overload	49	36.0	68	90.66
Frequent run-time error	65	47.8	67	89.33

(The percentages add up to more than 100 because the students could choose more than one option).

6.5.4 Barriers with regard to e-journals at KAAU and KSU

At KSU, the students mentioned that it took a long time to get the required information in the e-journals, while at KAAU the most common barrier with e-journals was that most students do not understand the several interfaces and search strategies to access the required e-journal. This clearly indicates that students require training in information searching, to understand how to use them correctly.

Table 6.25 The Saudi students' barriers of using e-journals

The major barriers of e-journals	KAAU		KSU	
	Frequency	%	Frequency	%
It is hidden under several interfaces	58	42.6	49	65.33
Produce only abstracts	73	53.7	70	93.33
Cannot determine the choice of the appropriate search service provider for required e-journals	51	37.6	64	85.33
Cannot decide on a relevant journal through all displayed journals	48	35.3	55	73.33
The structure of e-journals provider is not familiar	62	45.6	56	74.66
Long time to get required information	52	38.2	75	100
Cannot formulate search terms easily	35	25.7	5	6.66
Cannot mark the required article	32	23.5	69	92
Irrelevant information	39	28.7	75	100
Do not understand several interfaces and search strategies to access to required e-journal	91	66.9	43	57.33
Word and phrase search facilities are complex and it is difficult to differentiate among them	58	42.6	55	73.33
Do not know the difference between html and PDF	9	6.6	10	13.33
Other	0	0	0	0

(The percentages add up to more than 100 because the students could choose more than one option).

Another major problem was that it only produces abstracts, as mentioned by students from both the universities. This would lower the students' benefit and would prevent them from accessing the information they require, and it would also cost the students money and time to find the full text of the e-journals, instead of the university or library doing so for them.

6.6 Summary

The aim of this chapter was to answer, what are the various barriers to information access in an electronic environment in a culturally similar university environment? It was to present the descriptive and statistical findings obtained from the second phase. User profile at KAAU and KSU, general ICT and Internet literacy, and Barriers to information access have been presented.

The PG students at both universities differ in their computer skills and the level of confidence to use ICT. They are similar in their method of learning to use computers and information searching skills (self-instruction and school/university formal courses) and there is a shortage of courses in both universities. There are also differences between KSU and KAAU in terms of the purpose of using the Internet. At both universities PG students differ in terms of the relationship between owning a computer and accessing the Internet as an e-information resource, and the priority of using e-resources. Furthermore, the places of accessing e-resources (university labs, work, and parents computers) vis-à-vis the preferred e-resources (online reference books, Internet, e-books, and online databases) differ significantly for both universities' students. For both the universities the students' ICT expertise has a significant relationship with the usage of Internet resources, and the priority or the preference of using different resources.

Additionally, at both universities students differ in their experience of using library e-resources vis-à-vis preference for information resources (e-databases and the Internet for KAAU, and e-journals KSU). While the internet user experience and time spent on using the Internet and the priority are similar, the preferences of using some electronic resources are dissimilar for students from both the universities. Although students come from a similar academic environment (KAAU and KSU), they differ in the attitudes for using the electronic information resources; the reasons may be the differences between individuals, education systems, teaching styles, and the ICT facilities and e-information resources available. Moreover, the PG students at both universities differ on the user's language in correlation to the ease of searching, the preference of the information resources (e-databases for KAAU and Internet for

KSU), in the information results on the Internet, and in correlation to justifying the time spent in searching. Furthermore, there are relationships between users' language skills and the preference for electronic resources and information results on the Internet. There are also relationships between the students' first degree, current subject and the type and the preference of information resources at both universities. In general, the current subject has an impact on the priority and the preference for different types of electronic information resources.

Moreover, PG students at KAAU and KSU differ in the demographic and cultural variables in association with the type and preference of e-information accessed; and with regard to the influence of the gender and age, there was no relationship between gender and Internet usage, and priority of information resources at both universities. At KSU there was no relationship between users' social status and the Internet usage. At KAAU user's income had influenced the ease of access from home, the type of Internet connection at home and time spent per week. There were differences in the type of electronic information resources that had been influenced by users' income in both universities.

In addition, at both universities students were different with regard to the social/interpersonal variables, particularly on the students' role on the usage of the Internet, in the type and preference of e-information resources, and in the mother's education level influencing the user confidence in adopting technology.

At both Saudi universities the design features of the library web interfaces has a significant influence on the user perception. However, at KSU most library interface features did not have relationships with the users' perspective. PG students at both universities were similar in their opinion that the error correction system on the library interface was not effective, and they preferred the human help or support for search process and help facilities during the IS&R process. At both universities' most students were not aware what the help service is.

There were similarities and differences at both universities with regard to the Internet barriers. They were similar in terms of criticizing the speed of connection, the frequent rate of disconnection, and language barrier. With regard to OPAC search the

most common difficulty for students from both universities was formulating the query, and there were differences with regard to the other issues of OPAC search such as unranked search results, lack of awareness on how to combine search options with Boolean operators and searching by subject headings. Lastly, there were differences at both universities in the degree of difficulties facing the students. The most common barrier was the long time taken to retrieve required information at KSU, while at KAAU it was the difficulties related to several interface features and search strategies to access the required e-journals.

Chapter 7: Descriptive and Statistical Data Analysis for KAAU and KSU Undergraduate Students

7.1 Introduction

This chapter presents the descriptive data, outcomes of statistical data analyses and hypotheses testing to investigate differences in the computer, Internet, and information-seeking skills of users to discover to what extent they are able to use the electronic resources and have the ability to find different types of electronic information and to assess the differentials that exist among the various universities in Saudi Arabia. A shorter version of the questionnaire was conducted for undergraduate students. This includes the results of tests arranged by main variables: differences among KAAU and KSU undergraduates in terms of ICT infrastructure, users' computer and Internet competence, access to electronic information resources, personal characteristics, and demographic, social/interpersonal and environmental variables.

7.2 User Profile at KAAU Undergraduate Students

Out of the 239 students at KAAU, 65.3% were female, with 88.7% of all students being single (85; 35.6%) students were in the Computer Science Department, Business students comprised (78; 32.6%) and (76; 31.8%) were students from the Library and Information science. Nearly all (97.1%) of the students were between 20 to 25 years old, while 1.7% represented the age group between 26 and 30 years and 1.3% represented the age group between 17 to 19 years (Table 7.1).

The majority of students (92.1%) live in Jeddah, eight (3.3%) students live in the university halls of residence, ten (4.2%) live in a town and one (0.4%) resides in a village. The majority of them (187; 78.3%) have their own accommodation or live with their family while the rest (33; 13.8%) live in a private house and 19 (7.9%) live in a group in rented accommodation. Twenty seven (11.3%) students were married, 5 of whom were married male students who have a working wife.

Table 7.1 Undergraduate students' profile at KAAU and KSU

		KAAU		KSU	
		Frequency	%	Frequency	%
Gender	Male	83	34.7	129	54.9
	Female	156	65.3	106	45.1
Total		239	100	235	100
Age	17-19	3	1.3	5	2.1
	20-25	232	97.1	224	95.3
	26-30	4	1.7	3	1.3
	36-40	0	0	3	1.3
Total		239	100	235	100
status	Single	212	88.7	215	91.5
	Married	27	11.3	20	8.5
Total		239	100	235	100

Fourteen (about 6%) students have children; eight (3.3%) of these have one child, five respondents (2.1%) have two children, and one student (0.4%) has three children. The majority of students (228; 95.4%) are unemployed full-time students; seven (2.9%) were part-time employed full-time students. However, one (0.4%) student had full-time employment and was a part-time student (Table 7.2).

Table 7.2 Undergraduate students' status at KAAU and KSU

Student's status	KAAU		KSU	
	Frequency	%	Frequency	%
Unemployed and full-time student	228	95.4	212	90.2
Full-time employment and part-time student	1	0.4	6	2.6
Part-time employment and full-time student	7	2.9	8	3.4
Part-time student and part-time employment	3	1.3	9	3.8
Total	239	100	235	100

All KAAU female students (156) are studying full time, and the male students who have work for the government. Although all of the 228 full-time students get university rewards (178; 78%) also get some family support. Moreover, 15 (55%) of the female married students said that their husbands are professional workers. Eight (30%) undergraduate students have routine jobs, and four (15%) undergraduate students selected managerial jobs to provide their spouse's work.

Forty-three (18.0%) of mothers are university educated (39; 16.3%) hold a college certificate and 6 (2.5%) are highly educated. However, the majority of mothers (149; 62.3%), have ten or less years of education. It can be seen also from the responses

collected that there is a high number (104; 43.5%), of fathers with ten or less years of education. However, there is still a higher number of fathers (64; 26.8%), compared to mothers with a university education; also (31; 13.0%) hold a college degree, and some (16.7%) belong to the category of highly educated and vocational degree (Table 7.3).

Table 7.3 Parents education at KAAU

Parents' education	Mothers' education		Fathers' education	
	Frequency	%	Frequency	%
Educational Less than ten years	149	62.3	104	43.5
University educated	43	18.0	64	26.8
Holds a college degree	39	16.3	31	13.0
Highly educated	6	2.5	27	11.3
Vocational degree	2	.8	13	5.4
Total	239	100	239	100

The majority of fathers (73; 30.5%), are in business/self-employment; a fairly high number (52; 21.8%) are in semi-professional and skilled work; and another 48 students (20.1%) stated that their fathers have professional jobs, while 21 (8.8%) indicated managerial and supervisory jobs. An additional 35 (14.6%) revealed that their fathers are either a house person or retired.

Table 7.4 Parents work at KAAU

Father' categories of job	Father's job		Mother's job	
	Frequency	%	Frequency	%
Professional (doctors, professor, accountant, lawyer, engineer, IT etc.)	48	20.1	21	8.8
Semi-professional and skilled	52	21.8	2	0.8
Managerial & Supervisory jobs	21	8.8	2	0.8
Routine jobs (secretarial, sales and office assistant, etc)	4	1.7	0	0
Technical (Builder, Plumber, Electrician etc)	6	2.5	0	0
Business/self – employment	73	30.5	2	0.8
House person /unemployed	35	14.6	212	88.7
Total	239	100	239	100

Almost all the mothers of KAAU students, (212; 88.7%), are house persons or unemployed, although a small number (21; 8.8%) were professionals. It can be seen from this that the number of female workers is lower than the male workers in general, and fathers are employed in a greater variety of different types of jobs than the mothers.

The majority of students (139; 58.1%), have a family income or their own income of 60,000 RS or less. A quarter of them (60 students) have a family income of 81,000 RS to 100,000 R.S or more which is equivalent to £11,571 to £ 14.285.

Nearly all KAAU undergraduate students (234; 97.9 %), have a computer at home. In addition, the majority (214; 89.6%), connect to the Internet from home, with 182 (76.2%) students connecting through a modem, and (32; 13.4%) link through broadband.

7.3 User Profile at King Saud University (KSU)

Out of the 235 students from KSU, 129 (54.9%) were male, and 106 (45.1%) were female (Table 7.1). Most of the respondents (121; 51.5%) study in the Computer Science Department. Business students comprised 59 (25.1%), and the rest were male students from the Library and Information Science Department. There were 224 students (95.3%) aged between 20-25; 5 (2.1%) were between 17-19; and 6 (2.6%) students ranged between 26 and 40 (Table 7.1). There were (227; 96.6%) students who were based in Riyadh, and the rest, eight (3.4%) indicated that they live in another town. With regard to the time to commute to the university, the highest number of students, (116; 49.4%) indicated it took between 25-35 minutes, followed by 82 (34.9%) students reporting 10-20 minutes, and the rest, 37 (15.8%) students said that it took between 36 minutes to an hour to reach the university.

The majority of students (153; 65.1%) indicated that they own a house with their family, followed by 42 (17.9%) that chose private rental. Additionally, only 20 (8.5%) students revealed that they are married 5 (2.1%) of whom stated that they have one child, one student mentioned he has two children, and the rest said that they have none.

The majority of KSU students (212; 90.2%), are unemployed full-time students, while six (2.6%) students were full-time employed and part-time students. However, the rest

of them 17 (7.2%) were part-time employed and full-time students or part-time employed and part-time students (Table 7.2).

Of the KSU undergraduate female students, there were 106 (98.1%) full-time students, two of which (1.9%) were part-time students and full-time employed, while the male full-time students were 108 (83.7%) out of the total 129 male undergraduate students. In contrast, nearly all KAAU female undergraduate students were unemployed (99.4%), one student was part-time employed and full-time student, and (72; 86.7%) males out of 84 were full-time students. Out of 212 (90.1%) KSU full-time students, 209 (88.9%) students received university awards, and 186 (79.1%) of them supported by their family.

Students' mothers at KSU who have only been educated for ten or less years was 124 (52.8%), whereas the figures for fathers is 63 (26.8%) for the same level of education. Moreover, the data revealed that there are 48 (20.5%) mothers who have a university degree or higher and 99 (42.1%) fathers are university educated or higher. In Riyadh, it appears that the minority of students' parents were illiterate, with 25 (10.6%) mothers illiterate, while the figure for the fathers is only 12 (5.1%). Given these facts, the parents of KAAU students seem to be better educated than those at KSU.

Table 7.5 Parents education at KSU

Parents' education	Mothers' education		Fathers' education	
	Frequency	%	Frequency	%
Educational Less than ten years	124	52.8	63	26.8
University educated	46	19.6	70	29.8
Holds a college	38	16.2	43	18.3
Highly educated	2	.9	29	12.3
Vocational degree	0	0	18	7.7
Illiterate	25	10.6	12	5.1
Total	235	100	235	100

At KSU, most of the mothers (197; 83.8%) were unemployed or house persons; by comparison, there are only 18 (7.7 %) unemployed/retired fathers. Sixteen (6.8%) of their mothers were professional workers, and 12 (5.1%) mothers indicated supervisory or managerial jobs. Furthermore, for the fathers' work group, most students (77; 32.8%) indicated that their fathers are in business or are self-employed persons, followed by 71 (30.2%) who are professional workers; and 55 (23.4%) of their fathers

have managerial or supervisory jobs (Table 7.6). Generally, it is clear in Saudi Arabia that fathers are more employed at all the different categories of jobs than the mothers did.

Table 7.6 Parents' work at KSU

Father' categories of job	Father's job		Mother's job	
	Frequency	%	Frequency	%
Professional (doctors, professor, accountant, lawyer, engineer, IT etc.)	71	30.2	16	6.8
Semi-professional and skilled	4	1.7	1	0.4
Managerial & Supervisory jobs	55	23.4	12	5.1
Routine jobs (secretarial, sales and office assistant, etc)	9	3.8	4	1.7
Technical (Builder, Plumber, Electrician etc)	1	0.4	0	0
Business/self – employment	77	32.8	5	2.1
House person /unemployed	18	7.7	197	83.8
Total	235	100	235	100

On the other hand, 63 (26.8%) students revealed that their family income is less than 20,000 RS a year, 76 (32.4%) indicated 21,000-60,000 RS, and 70 (29.8%) students' income ranged between 81,000 to more than 100,000 RS which is equivalent to £11,571 to £ 14.285. There were 210 (89.4%) KSU students who said that they have a computer, while 25 (10.6%) said they do not have a computer at home. In addition, at KSU, not all students who have a computer have Internet connection from home; 140 (59.6%) students have access through a modem and 71 (30.2%) students have broadband connection.

7.4 General ICT and the Internet Literacy

This part gives data showing the phenomenal development in computing availability and Internet access between KAAU and KSU undergraduate students. The majority of KAAU students 166 (69.5 %) have been taught computer skills since higher school while 73 (30.5%) do not have any. At KSU, 191 (81.3%) of students have been taught computer skills in schools which is significantly higher than at KAAU.

When they were questioned about where they usually use a computer if they do not have one of their own, at KAAU, 33 (13.8%) students answered they used a friend's, and this was 12 (5.1%) at KSU; university libraries are used for this by 24 (10.0%) students at KAAU, and for KSU this figure was less 2.1%.

Table 7.7 Places to access a computer

Places to use a computer	KAAU		KSU	
	Frequency	%	Frequency	%
University labs	13	5.4	18	7.7
University library	24	10.0	5	2.1
Friends	33	13.8	12	5.1
Parents' computer	11	4.0	18	7.7
Internet café	8	3.3	9	3.8
Public library	0	0	13	5.5
Work	2	0.8	2	0.8

In Riyadh, 13 (5.5%) of KSU students accessed the computer at a public library; at KSU university labs were used by 18 (7.7%) and at KAAU by 13 (5.4%) students; parents' computers were used by 11 (4.0%) of KAAU students, and at KSU it was 18 (7.7%) students; 8 (3.3%) students at KAAU access the computer from Internet cafés and this was 9 (3.8 %) at KSU; and computers were used at work by two students in each university (Table 7.7).

At both universities, the students indicated that they can access the computer from different places. Yet, there was only a small percentage for important places such as university libraries and labs; this indicates that the libraries' role in providing computers is less significant among students, maybe because of the lack of the awareness of the library facilities on one hand, and the shortage of university labs on the other hand.

When KAAU and KSU undergraduate students were questioned about the learning methods for using the computer facilities, the majority of CS and LIS students at both universities indicated that they learnt through formal courses given at the universities, while business school students have an obviously lower percentage in this option. It appears that there was a slight impact on the CS and LIS students on gaining skills through the courses given by university library or computer centre at both universities

while this method does not have an impact on the business school students at KSU. Most students at both universities learnt about computer through self-instruction or assistance from colleagues (Table 7.8).

Table 7.8 The distribution of the learning computer facilities at KAAU and KSU across departments

The departments	BA		CS		LIS	
	% KAAU KSU		% KAAU KSU		% KAAU KSU	
A course given by the high school	41.0	64.4	55.3	24.8	35.5	32.7
A course given by the university department	43.6	27.1	100	85.1	95	96
A course given by the library or the computer centre	7.7	0	8.2	3.3	9.2	3.6
A course given elsewhere	14.1	10.2	15.3	6.6	13.2	14.5
Individual instruction by library staff	1.3	0	0	.8	6.6	16.4
Assistance from colleagues	47.4	28.8	64.7	15.7	53.9	25.5
Self-instruction	69.2	50.8	84.7	50.3	88.2	34.5
Literature (manuals, computer and/or library magazines)	23.1	6.8	36.5	100	22.4	10.9
Online instruction /guides and manuals on the interface itself	6.4	0	90.6	13.2	23.7	9.1
Others	0	0	0	0	0	0

(The percentages add up to more than 100 because students can select more than one option).

Meanwhile, at KAAU most (90.6 %) of the computer science students learnt to use a computer through online instruction, while at KSU all the computer science students learnt through reading manuals, computer magazines, etc.; these results reflect the difference within the same disciplines in the means of learning computer skills. This may be because the computer facilities are more available for the KAAU students than for KSU students. However, individual instruction by library staff was picked as the least option to learn how to use the computer.

Table 7.9 Students' confidence in computer skills (in a 7-point scale)

Scaling confidence	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAAU	19	7.9	6	2.5	16	6.7	35	14.6	41	17.2	54	22.6	68	28.5
KSU	12	5.1	8	3.4	22	9.4	18	7.7	25	10.6	30	12.8	120	51.1

F: frequency

Table 7.9 shows that 163 (68.3%) of KAAU undergraduate students ranked themselves as confident in using computers. Also 175 (74.4%) of KSU undergraduate students graded themselves as confident (Table 7.9). There seems to be differences among the students from the two universities in terms of the methods of learning to use a computer and the level of confidence to use ICT facilities.

While 141 (59.0%) of KAAU undergraduate students had used the Internet between one and three years, 86 (36%) of them had used it between four and seven years, three students (1.3%) had experience for more than eight to ten years using the Internet, and nine KAAU students had used it for a year or less than a year.

Table 7.10 The experience of Internet use at KAAU and KSU

The experience of Internet use	KAAU		KSU	
	Frequency	%	Frequency	%
1-3 years	141	59.0	66	28.1
4-7 years	86	36.0	109	46.4
8-10 years	3	1.3	17	7.2
Less than 1 year	9	3.8	12	5.1
More than 10 years	0	0	1	0.4
Do not use before	0	0	30	12.8
Total	239	100.0	235	100

On the other hand, 109 (46.4%) of KSU students had used the Internet between four and seven years, while a third (33.2%) of them had used the Internet for three years or less. Although 30 (12.8%) of them have not used the Internet before, 18 (7.6%) students had used the Internet for eight to ten years. It thus appears that there was a difference among students from the two universities in terms of their experience in using the Internet (Table 7.10).

Another important element in ICT facilities is the time spent in using the Internet among undergraduate students. At KAAU, about half (52.3%) of the students use the Internet every day or three times a week, with 70.3% of them using the Internet four hours to less than one hour per week. In contrast, 56.1% of KSU students utilize the Internet daily or three times weekly, with 59.2% of them using the Internet four hours

to less than one hour weekly. Most students (82.4%) at KAAU indicate a confidence in using the Internet, while it was slightly less than this (70.2%) for the KSU students. However, the results illustrate that the use of the Internet as an information resource is better at KAAU than at KSU (Table 11 and 12).

Table 7.11 Frequent Internet using at KAAU and KSU

Internet use	KAAU		KSU	
	Frequency	%	Frequency	%
Daily	52	21.8	72	30.6
2-3 times a week	73	30.5	60	25.5
At least once a week	55	23.5	50	21.3
At least once a month	33	13.8	24	10.2
Less than once a month	22	9.2	21	8.9
No option used	4	1.2	8	3.4
Total	239	100	235	100

Table 7.12 Spent times for using the Internet

Spent time per week	KAAU		KSU	
	Frequency	%	Frequency	%
One hour or less	70	29.3	53	22.6
2 hours - 4 hours	98	41.0	86	36.6
6hours - 8 hours	37	15.5	40	17.0
9 hours - 12hours	10	4.2	15	6.4
13 hours - 15hours	9	3.8	18	7.7
16 hours- 18hours	2	.8	9	3.8
19 hours-21 hours	5	2.1	1	.4
More than 22 hours	4	1.7	6	2.6
No option used	0	0	3	2.9
Total	239	100	235	100

Only 35.1% of KAAU and 37.0% of KSU undergraduate students agreed that they have adequate information skills, while the majority at both universities revealed that they do not have any information skills. This indicates that they need to be trained in information skills. The decision makers should redesign the study plans and add courses to support students in their information skills.

However, there has been surprising results from KAAU and KSU responses with regard to the methods by which they acquired training for information skills. Only 3.8% of KSU students specified that they learnt through a course given by the library or computer centre, whereas 7.11% of KAAU undergraduate students have gained

their information skills via a course given by the library or computer centre. This important result refers to the lack of a role from these centres to train and develop skills for undergraduate students (Table 7.13).

Table 7.13 The methods of learning information skills

Ways of learning information skills	KAAU		KSU	
	Frequency	%	Frequency	%
A course given by the university department	107	45	63	26.8
A course given by the library or the computer centre	17	7.11	9	3.8
A course given elsewhere	12	5.0	11	4.6
Individual instruction by library staff	25	10.5	13	5.5
Assistance from colleagues	80	33.5	28	11.9
Self – instruction	84	35.14	47	20.
Literature (manuals, computer or/and library magazines)	39	16.3	6	2.55
Online instruction /guides and manuals on the interface itself	91	38.1	12	5.1
Others	0	0	0	0

Again, the most common method cited by students of both universities was via a formal course given by a university department in information skills, which was about 45% for KAAU and 26.8% for KSU. There was also a preference named for learning from online instruction, colleagues and self-instruction etc. at KAAU. These interesting outcomes signify that although students may prefer to think they are proficient in using the computer, they have a diverse preference for informal training for information seeking skills. In addition, at both universities they have to provide continuing training courses through the formal channels. This indicates that the university policy makers need to consider that issue while designing information systems or supporting information literacy plans.

Eighty-two percent of the KAAU respondents (Table 7.14) specified a preference for using the Internet as their first option for searching information. In addition, printed books and journals were common favourites with KAAU students. On the other hand, it is clear from Table 7.13 that although the undergraduate students at KSU do have

the desire for using the Internet as the first choice, as it was at KAAU they do also have a preference for using printed books.

Table 7.14 Preferred first choice information channel at KAAU and KSU

Searching through	KAAU		KSU	
	Frequency	%	Frequency	%
Internet	196	82.0	188	80.0
Printed books	160	66.9	67	28.5
Electronic books	19	7.9	13	5.5
Printed journals and magazines	86	36.0	28	11.9
Electronic databases	10	4.2	17	7.2
Electronic journals	14	5.9	5	2.1
Other	0	0	0	0

(Note they could mention more than one information channel, the percentage in the table exceeds 100%).

Overall, printed resources are more preferable than electronic resources. However, preferred electronic information resources are e-journals, electronic databases, and e-books, which were used by a small number of undergraduate students at the two chosen universities.

Saudi Arabian undergraduate students use the Internet for pursuing not only their studies but also for other activities such as reading general information, e-mail, entertainment, etc. (see Table 7.15).

The majority of undergraduate students at KAAU uses the Internet to learn how to use the PC and the Internet; from this one may assert that the students need to teach themselves ICT skills. In addition, it shows the lack of ICT training in the university, this is different in case of KSU because a small percentage (23.8%) uses the Internet to learn how to use the PC and the Internet. This may be because the majority of KSU students were from the Computer Science department, and they do not need to learn the PC application and Internet skills as those from other disciplines in the same university, or in the other university may be required for, 56.2% of KSU

undergraduate students use the Internet to study or pursue course work, whereas, 45.2% of KAAU students do the same.

Table 7.15 Distribution of user's web search interests at KAAU and KSU

Using the Internet	KAAU		KSU	
	Frequency	%	Frequency	%
To read e-mail	122	51.0	142	60.4
To learn to use PC and Internet	164	68.6	56	23.8
To read general information	149	62.3	141	60.0
To chat with others	90	37.7	95	40.0
To find free software to download	79	33.1	86	36.6
To browse web for own enjoyment	131	54.8	109	46.4
To study or do coursework	108	45.2	132	56.2
For online shopping	19	7.9	19	8.1
To obtain information through distance education classes	57	23.8	24	10.2
To do part of your work	8	3.3	43	18.4
To find job and career information	32	13.4	58	24.7

(Note: they could mention more than one purpose; the percentage in the table exceeds 100 %)

However, the KAAU and KSU undergraduate students do not use the Internet that much for other purposes, such as online shopping, looking for career information, and obtaining information through distance education classes. This may lead to believe that the undergraduate students may not be aware of these kinds of Internet usage, or that Internet training courses are available only in English language, and due to their poor English language skills, undergraduate students cannot use the Internet properly. It may also be due to the fact that some students have never used the Internet.

It is noticeable from Table 7.16 that the three main problems among the students groups from the two chosen universities are the slow Internet connection, frequent rate of disconnection and language barriers.

The language barrier is a serious concern because it can prevent students from reaching important English resources that be useful to them. At KAAU, the lack of awareness in how to use the Internet skills was indicated by 101 (42.3%) of the students while it was 66 (28.1%) at KSU. This reinforces the fact that students require training courses to aid them in using the Internet. Moreover, 33.9% of KAAU respondents found the subscription to the Internet expensive because there is only one

network that provides this service; the same number of KAAU students mentioned that they find difficulties in identifying the required web page, which might be due to the lack of Internet skills they have.

Table 7.16 Barriers to Internet access for KAAU and KSU

Internet barriers	KAAU		KSU	
	Frequency	%	Frequency	%
Slow connection	199	83.3	135	57.4
Cutting off connection while browsing	161	67.4	102	43.4
Language barrier	149	62.3	82	34.9
Regulations controlling access to the Internet	68	28.5	32	13.6
Lack of Internet services	101	42.3	66	28.1
Difficulties in finding the required web page	81	33.9	30	12.8
Expensive Internet subscription	81	33.9	52	22.1
Lower performance of computers	35	14.6	30	12.8
Do not trust the information on the Internet	25	10.5	14	6.0
Do not have enough time to use the Internet	39	16.3	24	10.2
Other	0	0	0	0

(Note: they could mention more than one Internet problem; the percentage in the table exceeds 100%).

Another barrier is the regulation controlling their access to the Internet, which was mentioned by 68 (28.5%) students, and this could hinder students from accessing web pages that are relevant and vital to their research or study. At KSU, the same barriers were found, but with a lower percentage which could be because they might not have much access to the ICT and Internet, or they could have used the Internet for a limited time without facing many barriers.

7.5 Barriers to Information Access

The study proposed various hypotheses derived from the intervening variables which are investigated below among KAAU and KSU undergraduate students.

7.5 Main hypothesis 1

Differences among universities in terms of ICT infrastructure and access to electronic information services may have an effect on access to electronic information resources.

H1.1: Internet access and availability may have an impact on the usage and type of electronic information resources accessed.

At KAAU, (Table 7.17) there is a relationship between owning a computer and Internet access/availability and the usage of electronic resources accessed, while it appears that is no relationship between owning a computer and the usage of Internet resources among KSU undergraduate students. For both student groups there is a correlation between university labs and using the Internet. The availability of specific electronic information resources also has a correlation with the university libraries, such as electronic books and e-databases.

Jeddah does not have a public library, while Riyadh does have a great (in terms of good facilities and services) public library available separately for both male and female users. Therefore, there is no relationship between Internet access and the use of electronic information resources in the public library among KAAU students, while for KSU students there is a relationship between the public library and Internet access. Moreover, it could be seen that using the parents' computer among KAAU students has a significant relationship, whereas this impact does not exist among the undergraduate students at KSU.

It may be stated that the location of the Internet access/availability and the use of electronic information resources have influenced user information behaviour. Use of a particular type of electronic information resource is dependent on the facility or the availability of resource concerned.

Table 7.17: Correlation between owning a computer, and Internet usage and priority of electronic resources (Q. No. 15; 16, and 23; 28)

Hypothesis and Factors	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
H1-1: Owning a computer and Internet usage	.000	Y	Null	N
H1-1: Owning a computer and priority of inf. resources: Internet	.000	Y	Null	N
H1-1: From university labs and priority of inf. resources: Internet	.026	Y	.048	Y
H1-1: From university library and priority of inf. resources: e- books	.022	Y	.010	Y
H1-1: From university library and priority of inf. resources: e-databases	Null	N	.001	Y
H1-1: From university library and priority of inf. resources: Internet	Null	N	.017	Y
H1-1: Access from parents' computer and priority of inf. resources: Internet	.036	Y	Null	N
H1-1: From Public library & priority of inf. resources: Internet	Null	N	.002	Y

Sig.: significance, Y: Yes, N: No

Q.: question

7.5 Main hypothesis 2

Personal characteristics may influence the usage and the type of electronic information resources accessed.

A number of sub-hypotheses were derived from this hypothesis (H2) for the purpose of this research (see Table 7.18), while the following sub-hypotheses were null, i.e., there were no significant relationships between the variables (and hence are not shown in the table)

- Internet user confidence and time spent per week at KSU
- Users' language with the ease of searching on the Internet at KAAU and KSU
- Users' language with information results on the Internet at KAAU and KSU
- Users' language and justifying the time spent in searching on the Internet at KAAU and KSU

Results from the correlation study based on several factors derived from the above sub-hypotheses are presented in the Table 7.18. Hypothesis 2-1 states that user

expertise in ICT by students at both the universities has a significant relationship with the usage of Internet resources. At KAAU, there is a relationship between the user expertise in ICT and the priority of using the Internet and e-books. The same relationship exists also for KSU students.

Table 7.18: Correlation between some personal characteristics and Internet usage; the type of electronic information resources (Q. No. 22; 30, 25 and 23; 28; Q. No.5 with 33; 34; 35)

Hypothesis and Factors	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
H2-1: ICT expertise and time spent per week	.000	Y	.001	Y
H2-1: ICT expertise and the priority of inf. resources: Internet	.000	Y	.001	Y
H2-1: ICT expertise and the priority of inf. resources: e- databases	.009	Y	Null	N
H2-1: ICT expertise and the priority of inf. resources: e-books	.000	Y	.001	Y
H2-1: ICT expertise and the priority of inf. resources: e- journals	Null	N	.025	Y
H2-2: Internet user confidence and time spent per week	.000	Y	Null	N
H2-2: Internet user confidence & priority of inf. resources: Internet	.003	Y	.004	Y
H2-2: ICT expertise and Internet user confidence	.000	Y	.000	Y
H2-2: User's computer skills confidence and ICT expertise	.000	Y	.000	Y
H 2-3: Experience of Library electronic resources with the priority of using them: e- databases	.021	Y	Null	N
H 2-3: Experience of Library electronic resources with the priority of using them: e- journals	Null	N	.023	Y
H 2-3: Experience of Library electronic resources with the priority of using them: e- books	Null	N	.020	Y
H 2-3: Experience of Library electronic resources with the priority of using them: Internet	Null	N	.019	Y
H2-3: Internet user experience and priority of inf. resources: e-books	.000	Y	Null	N
H2-3: Internet user experience and priority of inf. resources: Internet	.001	Y	Null	N
H2-3: Internet user experience and priority of inf. resources: e-databases	Null	N	.007	Y
H2-3: Internet user experience and time spent on using the Internet	.000	Y	Null	N

Sig.: significance, Y: Yes, N: No

Q.: question

The result might refer to the differences at both universities in their acquisition policy and strategies, and also in the availability of these kinds of resources, or teaching style, and lack of knowledge about these resources and how to use them. For KAAU students with different levels of ICT competence there is a correlation between user's ICT expertise and the priority for using e-databases, while for KSU students there is a relationship for using e-journals. There is also a difference among the students' choices of electronic resources accessed.

For KAAU undergraduate students there appears to be a relationship between Internet confidence and the time spent on the Internet weekly, while there is none at KSU. Both KAAU and KSU there appear to be a relationship between ICT expertise and Internet user confidence. This shows that the students' skills in ICT have an impact on their confidence in using the Internet.

The correlation between the users' expertise and confidence in ICT came out positively in both universities, which could be because most students who are satisfied with their expertise in ICT are confident that they are generally capable in ICT. Overall, user confidence in using the computer and Internet to gain the required information does have an effect on the usage patterns.

There is a difference between KSU and KAAU concerning the correspondence found between the experience of using library resources with the priority of using the electronic databases found by KAAU, and electronic journals, electronic books and Internet highlighted at KSU.

H 2-5: Users' current subject of study may have an effect on the preference for the type of electronic information resources accessed.

H 2-6: Use of the Internet as part of daily routines may have an effect on the usage of electronic information resources accessed.

Results of the correlation study based on several aspects taken from the above sub-hypotheses are presented in Table 7.19. For KAAU students, the students' current

subject has an impact on their preference for printed books and journals as well as electronic information resources.

Table 7.19: Correlations between users' subject background and current subject and the type of information resources (Q. No. 13, 14 and 23; 28)

Hypothesis and Factors	KAAU		KSU		Test type
	P-Value	Sig.	P-Value	Sig.	
H2-5: The users' current subject and priority of inf. resources: Printed books	.003	Y	Null	N	r_s
H2-5: The users' current subject and priority of inf. resources: e-books	.006	Y	Null	N	r_s
H2-5: The users' current subject and priority of inf. resources: Printed journals	.000	Y	Null	N	r_s
H2-5: The users' current subject and priority of inf. resources: e- journals	.008	Y	Null	N	r_s
H2-5: The users' current subject and priority of inf. resources: e-databases	.005	Y	Null	N	r_s
H2-5: The users' current subject and priority of inf. resources: Internet	.001	Y	Null	N	r_s
H2-5: The users' current subject and priority of inf. resources: e-books	Null	N	.000	Y	r_s
H2-5: The users' current subject and priority of inf. resources: Printed journals	Null	N	.000	Y	r_s
H2-5: The users' current subject and priority of inf. resources: e- Journals	Null	N	.005	Y	r_s
H2-5: The users' current subject and priority of inf. resources: e-databases	Null	N	.000	Y	r_s
H2-5: The users' current subject and priority of inf. resources: Internet	Null	N	.000	Y	r_s
H2-5: The users' current subject and time spent on using the Internet	.011	Y	.000	Y	r_s
H2-6: Frequent Internet usage and reading e-mail	.000	Y	.000	Y	χ^2
H2-6: Frequent Internet usage and reading general information	Null	N	.000	Y	χ^2
H2-6: Frequent Internet usage and learning the use of PC and Internet	Null	N	.002	Y	χ^2
H2-6: Frequent Internet usage and browsing for own fun	Null	N	.000	Y	χ^2
H2-6: Frequent Internet usage and Chatting	.000	Y	.000	Y	χ^2
H2-6: Frequent Internet usage and obtaining information through distance education	.023	Y	.008	Y	χ^2
H2-6: Frequent Internet usage and finding free software	.008	Y	.000	Y	χ^2
H2-6: Time spent per week on the Internet and reading e-mail	.000	Y	Null	N	χ^2
H2-6: Time spent per week on the Internet and chatting	.004	Y	.026	Y	χ^2
H2-6: Time spent per week on the Internet and obtaining information through distance education	.025	Y	Null	N	χ^2
H2-6: Time spent per week on the Internet and learning the use of PC and Internet	Null	N	.020	Y	χ^2
H2-6: Time spent per week on the Internet and studying or doing course work	Null	N	.000	Y	χ^2
H2-6: Time spent per week on the Internet and finding free software	Null	N	.000	Y	χ^2

Sig.: significance, Y: Yes, N: No

Q.: question

In contrast, for KSU students, users from different subjects were different in their information seeking behaviour, and their current subjects have an effect on their priority of using any format of information resources, excluding printed books.

It appears from the table that there is a relationship between frequent Internet usage and the daily activities at both universities such as email, reading general information, learning the use of PC and Internet and chatting at KSU; and email, chatting and obtaining information through distance education at KAAU (Table 7.19).

For KSU undergraduate students there is a correlation between the time spent weekly on the Internet and performing their study or course work. This might be because most of the KSU undergraduate students sampled for this study were from CS.

7.5 Main hypothesis 3

User's Internet competence may have an impact on the IS&R process.

Three sub-hypotheses were derived from this, which are shown in Table 7.20. Results of the correlation study based on a number of factors derived from the sub-hypotheses are also presented in Table 7.20. Although for KSU students there appears to be a relationship between the user's Internet competence and the extent of information obtained, there is no significant relationship between these two variables for the KAAU students (and hence does not appear in Table 7.20).

From Table 7.20, there is a relationship between Internet user competence and extent of information obtained during IS&R process at KSU, while it is not so at KAAU. There appears to be a relationship between Internet user competence and the efficacy of time taken to obtain results at both the universities. Similarly, for both universities, as is shown in Table 7.20, students' Internet competence has an effect on the ease of access to electronic resources during an IS&R process.

Table 7.20: Correlation Internet user competence and the efficacy of the Internet results (Q. No.30 and 33; 34; 35)

Hypothesis and Factors	KAAU		KSU	
	P-Value r_s	Sig.	P-Value r_s	Sig.
H3.1: Internet user competence and extent of information obtained during IS&R process	Null	N	.010	Y
H3.2: Internet user competence and the efficacy of time taken to obtain result	.037	Y	.017	Y
H3.3: Internet user competence and ease of access of Internet information during IS&R process	.000	Y	.000	Y

Sig.: significance, Y: Yes, N: No

Q.: question

H 3-4: User education in information literacy skills may have an effect on the ease of access to electronic resources during an IS&R process.

H 3-5: User education in information literacy skills may have an effect on the extent of information obtained during an IS&R process.

Table 7.21 presents the results of the correlation study found on a number of factors taken from the above sub-hypotheses, while the following sub-hypotheses were null, i.e. , there were no significant relationships between the variables.

- Methods of learning computer skills influencing ease of use of Internet information at KAAU
- Methods of learning computer skills influencing Internet information found at KAAU
- Methods of information searching skills influencing Internet information found at KAAU.

Information access during an IS&R process would be easier to accomplish if the users were educated and trained. There was not a relationship among user education skills at KAAU and the easiness of the students' IS&R process, while at KSU students' computer skills are significantly related to reading about the computing subjects and

self-instruction. This leads to the deduction that it is essential to integrate information skills as part of the course.

For KAAU students, user education and training in computer and information skills do not have any effect on the extent of information obtained during an IS&R process (and hence is not shown in Table 7.21). However, for the KSU students there was a relationship among user education skills and the courses given by their universities and assistance from colleagues. As it is shown in section 7.4, for both the universities, the students have poor information skills.

Table 7.21 Correlation between methods of learning computer and information skills and the ease of access to the Internet; information obtained and the efficacy of time taken to obtain results from the Internet (Q.No. 18; 20 and 35;34;33)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-Value χ^2	Sig.
H3-4: Methods of learning computer skills influencing ease of using Internet information: Reading about the subject	Null	N	.022	Y
H3-4: Methods of learning computer skills influencing ease of using Internet information: Self-instruction	Null	N	.033	Y
H3-5: Methods of learning computer skills influencing Internet information found: A university course	Null	N	.036	Y
H3-5: Methods of learning computer skills influencing Internet information found: Assistance from colleagues	Null	N	.048	Y
H3-5: Methods of information skills influencing Internet information found : Assistance from colleagues	Null	N	.010	Y
H3-6: Methods of learning computer skills influencing the efficacy of time taken to obtain results during an IR&S process: Self-instruction	.040	Y	Null	N
H3-6: Methods of learning computer skills influencing the efficacy of time taken to obtain results during an IR&S process: Reading about the subject	Null	N	.010	Y

Sig.: significance, Y: Yes, N: No

Q.: question

7.5 Main hypothesis 4

Demographic variables may have an effect on usage, type and preference of electronic information accessed.

Table 7.22 presents the results of the correlation study found on a number of factors taken from the above sub-hypotheses H4-1 to H 4-4. A number of sub-hypotheses were derived from this hypothesis, out of which those that are significant appear in Table 7.22, while the following sub-hypotheses were null; i.e., there were no significant relationships between the variables.

- Gender with Internet usage at KAAU and KSU
- Gender with priority of information resources at KAAU
- Age with Internet usage at KAAU and KSU
- Age with priority of information resources at KAAU and KSU
- User's marital status with priority of information resources at KAAU
- User's social status with Internet usage at KAAU and KSU
- User's income with ease of access and type of Internet connection at home at KAAU and KSU
- User's income with time spent on the Internet per week at KSU.

Table 7.22: Correlation between demographic variables and Internet usage, type of information resources (Q. No. 1; 2; 6; 12 and 23; 26; 28)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-value χ^2	Sig.
H4-1: Gender with priority of information resources: Printed books	Null	N	.028	Y
H4-1: Gender with priority of information resources: Internet	Null	N	.000	Y
H4-3: User's marital status with priority of information resources: E-books	Null	N	.028	Y
H4-3: User's marital status with priority of information resources: Internet	Null	N	.028	Y
H4-5: User's income with ease of access: from home	.039	Y	.032	Y
H4-5: User's income with time spent per week	.001	Y	Null	N

Sig.: significance, Y: Yes, N: No

Q.: question

For the KAAU undergraduate students, income and accessing the Internet from home or the time spent on the Internet per week were correlated, but for other factors no correlations have been found. However, for KSU students, users' gender, marital

status and income level have correlations with their information seeking behaviour; e.g., Internet access and the priority for printed books, Internet and e-books.

User's income also seems to have an impact on the ease of access to electronic resources. Table 7.22 illustrates that there was a relationship between the annual income and the places, where students use the Internet, which was mainly access from home at both KAAU and KSU, yet there was no relationship between the annual income and the type of connection at home at both universities.

7.5 Main hypothesis 5

Social/interpersonal variables may have an effect on access to electronic information.

The following sub-hypotheses were derived from this hypothesis for the purpose of this research, and these were null; i.e., there were no significant relationships between the variables:

- User's role with Internet usage, priority of electronic information resources at KAAU
- Parental education of a user with having a computer and Internet usage at KAAU
- Parental education of a user with the user confidence in adopting technology at KAAU
- Mother's education level for a user in association to the user confidence for adopting technology at KSU
- Parental work of a user with the user confidence in adopting technology
- Parental work of a user with the ease of access of electronic information on the Internet.

For KSU, the students' status i.e. a full-time student or a student with full-time employment or a part-time student, is related to their information behaviour patterns. There appears to be no such relationship for the KAAU undergraduate students (and

therefore is not shown in Table 7.23). In the case of KSU students, it seems that the role of the user has a significant impact on the priority of using electronic information resources as well as printed journals.

There appears to be no relationship, for KAAU undergraduates' parents' educational level and Internet usage per week (and thus is not shown in Table 7.23), while for the KSU students parents' education has an impact on the weekly usage of Internet. Additionally, for the KSU students there was a relationship between the father's education and the adoption of technology. Hence, it appears that there is a difference among KAAU and KSU students in terms of the influence on students' use of information technology and parents' educational level.

Table 7.23 Correlation social/interpersonal variables and Internet usage and the priority of electronic resources (Q. No. 10; 8 and 15; 27; 28)

Hypothesis and Factors	KAAU		KSU	
	P-Value χ^2	Sig.	P-value χ^2	Sig.
H5-1: User's role and Internet usage	Null	N	.028	Y
H5-1: User's role and the priority of using electronic resources: e- journals	Null	N	.009	Y
H5-1: User's role and the priority of using electronic resources: Printed journals	Null	N	.025	Y
H5-1: User's role and the priority of using electronic resources: e-databases	Null	N	.001	Y
H5-1: User's role and the priority of using electronic resources: Internet	Null	N	.000	Y
H5-2: User's parental education and Internet usage: Mother's education	Null	N	.018	Y
H5-2: User's parental education and Internet usage: Father's education	Null	N	.004	Y
H5-3: User's parental education and adopting technology: Father's education	Null	N	.000	Y

Sig.: significance, Y: Yes, N: No

7.5 Main hypothesis 6

The environmental variables may have an effect on the access to electronic information.

The sub-hypothesis was null, i.e., there was no significant relationship between the variables.

H-2: Location of the user (city, suburban, rural areas) associated with the ease of access to electronic information resources.

Most students live in Jeddah or Riyadh where there is a similar living style; therefore, there was no correlation between the user's location and access to electronic information resources, including the Internet. They all share the same location in terms of the facilities. More details about the environmental factors that influence student's behaviour are discussed in Chapter 9.

7.6 Summary

The aim of this Chapter was to answer, what are the major barriers to information access in an electronic environment in culturally similar university environment? It was to present the descriptive and statistical findings obtained from the second phase. User profile of undergraduate students at KAAU and KSU, general ICT and Internet literacy, and Barriers to information access have been presented.

It appears that both universities' students are similar in the way in which they learned computer skills in high school, but with a higher figure for KSU (81.3%) than for KAAU (69.5%). Even though there is a variety of places or locations (university libraries, friends' homes, public libraries, Internet cafés etc.) where students at both KAAU and KSU who do not own computer can use one, the universities' libraries and labs were the least important places for the students to use computers. Although the majority of students at both universities indicate that they are confident in using computer, differences appear in the methods of learning and the level of confidence in using ICT facilities, for their experience of using the Internet, in the length of time of using the Internet, and in the methods of acquired training for information skills.

Usage of the Internet at home and printed books seems to be similar for UG students at both universities, while they vary as to preferred information resources, such as e-books, printed journals and magazines, e-databases, and e-journals. The limited use of e-books and e-journals by UG students at both universities points to the lack of

English language and information skills. The location of Internet access/availability and use of e-information resources have influenced user information behaviour, which is dependent on the facility or availability of using specific resources.

The similarities between UG students at both universities appears in the usage of the Internet to read e-mail, to read general information, to chat with others, to find free software to download, to browse the web for their own enjoyment, and to study or do coursework. Thus, a minority of participants at both universities are similar in their use of the Internet for online shopping. However, Similar barriers appear when using the Internet for both universities' participants, i.e. the slow connection, the expensive Internet subscription fees, disconnection while browsing the Internet, poor performance of computers, and the language barriers.

In terms of the personal characteristics, students at the two universities differ in their level of skills and use of the Internet, expertise in ICT use in association with the usage of the Internet resources, and the priority of using the Internet, whereas they seem to be similar in their level of using e-books as a source of information. The two universities' students differ in their information-seeking behaviour in terms of the users' current subject in association with the priority of information resources (e-books, printed and e-journals, e-databases), while the similarity between them is in the use of printed books.

In terms of the influence of demographic variables on the use, type and preference of e-information resources, students at both universities are similar in the influence of income and accessing the Internet from home and the time spent on the Internet per week. They differ in the type of connection, the impact of users' gender in association with priority of information resources (printed books and Internet at KSU). For students at both KAAU and KSU, some of the sub-hypotheses did not have significant relationships between the variables, such as gender with Internet usage for both universities, gender with priority of information resources at KAAU, age with Internet usage and priority of information resources at both universities.

In the light of the social/interpersonal variables, the universities' students diverge in the influence of the user's role and Internet usage (printed and e-journals, e-databases,

and the Internet) and the user's role in and priority of using e-resources (Internet). In addition, they differ in the user's parental education and Internet usage (both father's and mother's education), and user's parental education and adopting technology (father's education).

Although the impact of the environmental variables on the access to e-information did not have significant relationship, there were similarities in the living style and the facilities available in the location; however, no influence or impact of the user's location and access to e-information resources, including the Internet, were found.

Chapter 8: Interviews at IMBSIU

8.1 Introduction

In line with the main objectives of this study (Chapter1, section 1.3) the qualitative study was designed for collecting information in three key areas. The first objective was to gather information on the ICT Infrastructure (the quality and availability), preferences for electronic information resources and other demographic and environmental factors. These may have influence on the user's information seeking behaviour in Saudi Arabian universities. These data were collected through interviews.

The second objective was to increase the generality and test the validity of results, conducting multiple methods to investigate information behaviour of students in Saudi universities. The qualitative method can confirm the relationships initially discovered via a quantitative method.

The third objective was to mark from the library and information personnel perspectives, which aspects or issues influence user information seeking behaviour and to recognise the internal institutional factors in general and the ICT infrastructure, training courses for university students and the shortcomings in particular, and the information planning and support services provided by the library services.

This Chapter focuses on the information revealed by eight postgraduate students at the LIS Department at IMBSIU. It is important to mention that this department was the only discipline selected from this university, as Computer Science and Business Science postgraduate studies are not available at IMBSIU. In addition, the rationale for using this approach was that students would be able to recall related examples, and offer the researcher the chance to write notes of the participants' information-seeking behaviour patterns. Finally, this section will illustrate and present the results obtained from these interviews in seven categories as follows:

1. Students' characteristics
2. ICT infrastructure (the quality and availability)
3. Users' Internet competency in information access
4. Demographic and/or social/interpersonal variables in information access
5. Environmental and cultural variables in information access
6. IMBSIU interface services and recognized barriers for accessing and using electronic resources.

8.2 Students' Characteristics

A total of eight postgraduate students at IMBSIU were interviewed, of whom six were male. It is important to mention that the number of postgraduate students at IMBSIU is far smaller than at KAAU in the LIS department.

In terms of the participants' ages, one female and two male students were aged between 26 and 30. The rest of this group was aged between 36 and 40. They were all located in Al-Riyadh. Furthermore, it appears that the geographical distribution of the participants' homes differed significantly. This was determined according to the time they take to reach the university on a daily basis. For example, while one female student and two male students took between 25 to 35 minutes to reach the university, the other female participant and other three male respondents reached the university within 10 to 20 minutes. One male student had to make the longest journey, between 36-45 minutes (Table 8.1). It is helpful to bear in mind that Riyadh is a very large city with an estimated population of over 4,260,000 people, or around 20% of the nation's population (Arab news, 2005; Saudi Arabia Information resource, 2005) according to the High Commission for the Development of Riyadh (HCDR).

A long journey and distance to reach the university campuses for the students of both genders at different times during the day might hinder their studies, imply time-consuming, and further cost, especially as they had affirmed that IMBSIU does not have any computer centre or Internet facilities.

Table 8.1 IMBSIU students' profile (N=8)

User characteristics		Frequency	%
Gender	Male	6	75
	Female	2	25
Age	26-30	3	37.5
	36-40	5	62.5
Marital status	Single	3	37.5
	Married	5	62.5
University's journey	25-35 minutes	3	37.5
	10-20 minutes	4	50.0
	36-45 minutes	1	12.5

Regarding the eight participants' marital and family status, one female student was married with three children, while the other was single (Table 8.1). Five of the male students were married with varying numbers of children (e.g., two students each had 3 children and one male student had 7 children), only one male participant was single. Their family situation may restrict the women's efforts to visit the campus later in the day, due to their responsibilities of taking care of their families and looking after their children. This may also give them less time to access electronic information resources or adequate time to browse the Internet, while the opposite is true for the men students; they have time to visit the library any time they decide to go.

In terms of the participants' annual income, the vice-administrator stated that he had an annual income of 100,000 SR or more. Four other male students' annual income ranged from 81,000-100,000 SR while one of the female students had an annual income that is similar to these four male participants, and the other female student and the last remaining male participants had similar annual incomes ranging between 61,000-80,000 SR (Table 8.2). However, all the students of both genders had their own computers.

Table 8.2 students' annual income

Annual income	Frequency	%
61,000-80,000 R.S.	1	25.0
81,000- 100,000R.S.	5	50.0
More than 100,000	2	25.0
Total	8	100

With regard to the participants' parents' level of education, it was found that both female students' fathers' level of education ranged between less than ten years of education to holding a college degree. The education level of the male students' fathers was between less than ten years of education and holding a college degree, while only one had an illiterate father.

The level of education of the mothers of both the women students was ten years or less, and this was the same for all but one of the male students. The mother of the male student with an illiterate father also happened to be illiterate.

8.3 ICT Infrastructure

The interviews revealed that although the students of both gender are entitled to enrol and attend the introductory course in library skills, all the students affirmed that it was a theoretical course only, and it did not provide any practical methods.

Furthermore, the respondents (2 female and 3 male students) asserted that they did not use computers when they were in a school, while only three male students had been exposed to computers in high school. However, all of them use a computer since they start the master course. In addition, when the students were asked about learning methods for computers skills, three male students had learnt this during high school study as a written theoretical method; and due to the limited number of the computers available, they were booked only once a week for each class. They stated that the lack of practical computer skills and the limited knowledge they acquired during their school days had affected their confidence and ability with regard to the use of ICT in the academic environment. They state during the undergraduate stage, there was no need to use a computer as it has to be in the master's course.

Two female participants asserted that while the male students' library centre was equipped with the latest computer technology, Internet connection, and direct link to electronic databases, such as a dissertation abstracts database, LISA and ERIC, there was no computer centre and these facilities and services were not provided at the

female students' campus. Both female students also asserted that they had to visit the male students' computer centre at the KSU library at the weekend to use the computer and access the Internet in order to link to databases or e-resources. The alternative choice for the female students would be to use their own computers and get access from home, but they affirmed that this puts further financial demands on their limited budget and also further demands on their time, and that a home Internet connection is very slow and expensive. This assertion corroborates findings revealed in Chapter 4 about the speed and the connection charges, as the Internet connection in most homes depends on the dial-up connection, which is about 3 RS per hour with a connection speed of 512 kbps, and broadband costs in Saudi Arabia are nearly twice that amount. However, although the male students have the facilities and services of the Internet at their campus provided by the computer centre, they also have alternative access such as from home, workplaces, and public Internet cafés. It is important to reiterate that of the male students who participated in this study, three worked at the IMBSIU library either as librarians or as vice-administrator of collections, while a fourth worked outside IMBSIU as a librarian at King Fahd National Library, which provides them better access to the ICT and Internet compared to the female students. For example, the male librarian who works in the King Fahd National Library said:

“I am so lucky because the connection through King Fahd National Library is faster than the connection from home, and it is not as distracting as other places.”

Moreover, all the eight participants affirmed that they have to use one similar username and password, which is provided by IMBSIU for all the academic disciplines to access and use the Internet, to link to KACST database (i.e., there is no database specifically for the university), and to search for e-information resources. However, due to this when many students with the same user name and password access the university server at the same time, it slows down the uploading of databases and causes a conflict between the university systems and databases, and the university server sometimes switches off. Yet, access to the Internet is only provided at the male students' campus, while the female students have to access it from outside the university.

Surprisingly, when participants were questioned about the purpose of accessing the Internet, there was unanimous agreement among all the participants about reading e-mail. Similarly, they all agreed to the fact that they use the Internet to study or do course work. Some of the male students used the Internet as part of their work, while there was a common answer that they all needed to use the Internet to learn how to use the computer and the Internet. Furthermore, they also mentioned using it to find a job, to access career information, and to browse it to find information about the latest Internet features. For example, one female student said

“I browse the Internet to do some of my online shopping even though there are not that many good websites online in Arabic, to do some of my course work and if I have time I browse the Internet to find new features or just for fun, and sometimes if I have finished my research I start downloading songs.”

8.4 Users’ Internet Competency in Information Access

One female student asserted that she spent around 20 hours a week, while the other spent about 14 hours, referring to her need to deal with domestic responsibilities and her work obligations as a teaching assistant. Two out of six male students claimed that they used it between six to eight hours a week, whereas other two male students stated that their usage of the Internet depended on the availability of time they had during a week, so they assumed they probably spent around twenty-one hours a week. The remaining two male interviewees affirmed that they used it more than twenty-two hours a week, because they could access the Internet from various places (home, work, and public Internet cafés).

Furthermore, all the students asserted that they believe that they were confident in using the Internet, but they claimed that the slow speed and the distraction from losing the connection due to a poor service would sometimes affect their temper and may distract them from continuing to use the Internet. Additionally, all the respondents confirmed that although they were confident when they browse the Internet in Arabic,

they had less confidence when they browsed or searched English websites or electronic information resources.

8.5 Demographic and/or Social/Interpersonal Variables in Information Access

Niedźwiedzka's (2003) definition of the social role is a set of rules and expectations of an individual's behaviour, which is socially customized for a particular situation related to that individual's social position. In other words, information needs are related to or caused by the roles a person plays in a particular society or group. This indicates that those roles are the effect of the behaviour patterns created in a society for a specific role, which is associated directly with the position occupied by the individual that consequently indicates specific information needs.

All the students at IMSBIU agreed that the availability of the Internet connection and/or the services of its supporting facilities, and the availability of access to modern libraries or digital libraries differed significantly between the students who are resident in a developed city and those who live in the countryside.

Furthermore, they all agreed that there was no difference between male and female students in using the Internet or e-resources, but that it depends on the individual's abilities, search skills, preferences and previous experiences, rather than the gender. They also assumed that the belated introduction of Internet in Saudi Arabia at the end of 1990s has had an effect on the majority of Saudi users because of the fear, the lack of technological knowledge, and the misunderstandings related to its use and abuse. This applies to the majority of Saudi families in general, and those who live in the urban areas or the countryside in particular.

Both female students, who participated in this interview, claimed that they respected the Islamic religion's concern about the separation between men and women in the places of education, work, meetings or informal gatherings, and the rights and

obligations of each gender. Nevertheless, it appears that there is inequality in the facilities and services provided for each gender, because they believed that men tended to take and keep most of these resources for themselves. They also believed that this was due to the nature of Saudi society's tradition, which bestows dominance to men who sometimes misuse or misunderstand their responsibilities.

In terms of the educational facilities, there was unanimous agreement from all the students that there was no equality in the academic educational materials between the campuses, such as the availability of access to the Internet or databases at the university, because the female students' campus did not have a computer centre or laptops or computer equipment itself.

8.6 Environmental and Cultural Variables in Information Access

The LIS Department at IMBSIU, operates like any other university department throughout the entire Saudi university environment, as they all follow and are regulated by policies and rules of the Ministry of Higher Education (see Chapter 4, section 4.4.3). The LIS department also has an analogous situation in terms of separating the male students' campus from the female campus.

Like all other Saudi universities, the administration of the female campus is under the same authority as that of the male campus. However, it is clear that the female students' campus differs in its competencies, as they lack IT facilities, there is a shortage of specialist technicians for ICT maintenance, and the overall computing facilities are not comparable in size and facilities to those of the male campus. Furthermore, the LIS division does not have computing facilities at all, even in the library at the female students' campus. Therefore, access to electronic information resources within the female students' campus does not exist.

The previous points revealed by all the interviewees who indicated that the major barriers they faced with ICT appear to be as follows:

- Internet cost and slow speed-connection;

- The lack of computer facilities and equipment as well as the shortages of technical staff, especially on the females' campus;
- The poor quality of IT services provided by the university and the computer centre;
- Both male and females students' lack of the English language skills, particularly when browsing or searching English language materials from the databases or e-information resources,
- The lack of ICT facilities and availability of ICT courses, workshops and a learning centre to support the academic environment.

These findings are not entirely new; it has been revealed before in both KAAU and KSU. This indicates that the Saudi Arabian policy makers in the education sector need to redesign their educational strategies, and they can gain information and experience from one of the developed countries, such as the United Kingdom, which have more clearly laid out policies and sophisticated practices.

8.7 IMBSIU Library Services and the Barriers of Electronic Information Resources

It appeared from the information revealed by the students that they faced several barriers while using the electronic information resources. All the eight students affirmed that although the university had established its website, it did not provide links to every discipline and it was difficult to navigate. Electronic information resources were not divided into subjects or disciplines. They did not know about electronic information resources, as the library website did not provide links to subject gateways or search engines.

Moreover, most of the students highlighted the problems of the OPAC; e.g., seven out of the eight said that there were problems with the unranked search results, and they assumed that they could not limit their searches by date of collection and /or by language if it was sometimes in English, and the advanced search options were problematic. For example, two male students stated that

“I found it difficult to formulate the query and I could not search by subject heading list”.

Another problem stated by the female students was that

“Students do not find electronic resources on the library catalogue”

In addition, the majority of students pointed out some barriers to accessing e-resources and databases. They mentioned that even though the university had provided links to KACST databases, all the university students browsed different databases at the same time, they had to re-enter a different ID and password for each database. They therefore found searching on databases a waste of their time since it only provided abstracts and because they have to carry the ID and password list for the various databases. Therefore, users could get frustrated and often they would abandon the search.

Furthermore, all the students agreed that they all had a problem with the information overload and too much unwanted irrelevant information being retrieved. All the students stated that it was not only a problem of using English for searching, but also of the structure of the databases, as it took more time to understand the required information and interact to obtain the information needed.

The use of e-journals appears to be a rather more complex issue for the students, and these are not easy to search. There is the linguistic (English language) barrier and also the problems of formulating the appropriate search strategies. The majority of the subjects involved in this interview seemed to lack confidence, have insufficient search skills and competence, and poor English language skills.

The following two examples would confirm these findings. One male student said:

“I do not understand the use of several interfaces and search strategies to access the required e-journals. Therefore, I do hope that there would be training courses for this type of resources, so I could use it more confidently.”

This point was reiterated by a female student:

“The structure of the e-journals by the provider was not familiar to me; therefore, I could not use it appropriately.”

One female student noted that

“It is quite difficult for us since e-journals only produce the abstracts, and we do not reach or obtain the full text of the information, especially if we really like the topic or need it for some study or course work. It takes a long time too, because I have to order the printed version of the retrieved e-journals through an application to the male section, and try my best to make sure the full procedure is fast enough for me to get a hold of the paper before my course work is due in. However, sometimes it arrives late, so I end up having to use printed books and journals, and forget about this one.”

Finally, it is clear from the interview survey that the university library website does not provide any link or icon for “help-services” and it does not provide any contact information (i.e., telephone number, email, and/or link/s to the navigating instructions) for further help or support. Overall the students did not find it to be a useful service. They claimed that the library staff did not offer much help with regard to how the students could take advantage of the electronic information resources, or even offer them any helpful instructions for accessing and navigating the required e-information resources. Consequently, all the respondents pointed to the need for establishing training courses or sessions by the university library, IT department, or each university discipline, and that attendance should be compulsory for the postgraduate students to raise their awareness of the existence and availability of these e-resources, as well as to improve their information skills.

8.8 Summary of Finding from the IMBSIU Students’ Interviews

First, it is clear that the number of postgraduate students of both genders in the LIS division at KAAU is much greater than at IMBSIU, particularly the number of the female students.

Secondly, it is clear that infrastructure and facilities at KAAU are better than those at IMBSIU, especially in the females' campus, where the female students' library is fully equipped with computers, has an Internet connection, and provides direct links to its databases and KASCT databases; it also provides more facilities such as copying and searching electronic information resources.

Thirdly, in the female's campus at IMBSIU, there is no computer centre or information centre, while in the female's campus at KAAU there is a well-equipped information and computer centre with the opportunity to access the databases or e-resources on campus and some of them are available off campus. The access to e-resources at IMBSIU for female students is only available off campus, and there is no Internet connection inside the females' campus at IMBSIU for students.

Lastly, the library website of IMBSIU does not provide links to external search engines or subject gateways. The library website does not give descriptions or instructions when seeking for electronic information resources, nor does it give announcements of updated electronic information resources.

In terms of the demographic and/or social interpersonal influence on information access, there were significant differences between the resident students in a city and those who lived in the countryside. This also affected the availability of access to a traditional library or digital library.

However, although no significant differences were found between male and female students in the use of Internet or e-resources, some differences may appear in:

- the individuals' abilities
- the level of experiences and information skills
- and the preference of resources accessed.

In addition, the lack of technological knowledge and the misunderstanding of the use of the Internet have a great influence on Saudi individuals and families.

Moreover, the inequality in the facilities and services provided for male and female students plays a significant role as a barrier to:

- computer use
- Internet access
- the academic educational resources within the campuses.

The environmental and cultural variables influence information access in general and that of the female students in particular. The female students' campus differs from the male campus due to:

- the lack of IT facilities available in the female campus
- the shortage of female technicians for ICT maintenance.

In addition, the major barriers that face students when using ICT are the following:

- lack of ICT facilities and equipment in the campus
- poor quality of IT services at the computer centre
- slow and expensive Internet connection
- lack of English language skills
- lack of ICT courses, workshops and learning centres to teach the students how to interact with modern facilities and support the academic environment.

Chapter 9: Semi-Structured Focus Group Discussion

9.1 Introduction

This chapter aimed to find out the role of Internet competency in information access. Such as, what Internet competence is in the students' view; the impact of Internet competence on the efficacy of the search process; the level of the user's satisfaction with the search results according to Internet competence; and the role of demographic factors on information access. It also focuses on the social/interpersonal variables for information access (e.g., the impact of user's preferences, parents' level of education, and the impact of cultural aspects), and the influence of the environmental variables for information access (i.e., the usability aspects such as design, layout, and help facilities).

Consequently, the in-depth semi-structured focus group discussion method was applied in this study to the two selected Saudi universities, KAAU and KSU. This approach seemed to be an appropriate methodological tool that would enrich the researcher's knowledge in investigating the barriers to Electronic Information Resources (EIR) of the Saudi Arabian Internet and Communication Technology (ICT) infrastructure. It would also help to explore the role of the ICT in general and its impact on Saudi Arabian universities' postgraduate and undergraduate students in particular. This would include the quality of the ICT infrastructure, types of Internet connection and access (broadband/dial-up), the government regulations and policies on access, and the level of the digital divide. This approach would also help to illustrate the proposed solution (suggested from the focus group) to overcome this problem, and how to enhance or rectify it for improved information access.

The findings of all categories in this qualitative data have been discussed in relation to quantitative data (i.e., questionnaire) that is identified in Chapters Six and Seven to illustrate the evolving relationship between the statistical findings and the participants' assertions. The subsequent parts of this Chapter are categorized according to the sequences of broad topics covered during the discussions with all the study groups.

9.2 ICT Infrastructure and its Role for Accessing e-Information Resources

According to the information revealed in Chapter 4, section 4.6.3, it appears that in Saudi Arabia, the telecommunications company is the main provider for telecommunications and Internet connection and services. Here university students confirm that the Internet connection methods used are dial-up, DSL, and recently, via satellites, although none of the participants mentioned used this last method. In addition, a prepaid card through other subsidiaries such as NESMA NET, AWWAL NET, and SAUDI NET etc. provides Internet connection.

The majority of focus group students asserted that the quality of the technical structure of the telecommunications and information technology in KSA appears to be poor in comparison with advanced countries in general. Yet, although they affirmed that home was the most preferable location for accessing the Internet, they claimed that Internet connection and access was very slow, because of the use of the slow dial-up connection. They also believed that obtaining high-speed connection, e.g., DSL, was costly. For example, three female and four male students from a group at KAAU stated, in general,

“Even though the DSL connection with monthly subscription fees would be around 300 SR (which is equivalent to £42.85 per month) in addition to the installation fees, it seems to be unaffordable for some of the individual students or families, and even the connection through the DSL is a bit slow.”

9.2.1 Control Regulations of the Internet

Another aspect that was raised by the participants was the obstacles they faced when using the Internet to access some particular scientific website to obtain information related to their subject. This barrier was mentioned by the majority of the participants at both universities (KAAU and KSU) as a “restriction” by KACST for the huge number of scientific websites because they either contain information that challenges

political views, are sexual in content, or offend religious traditions. Some female students at LIS indicated that KACST took a long time to unlock the required website.

Furthermore, all the students from both universities pointed out that KACST which monitors and allocates the controlling policies and procedures did not distinguish between the searching objectives of the universities, educational institutions, medical or scientific research, and individuals searching or seeking prohibited websites.

Moreover, some of the students at both universities (6 female and 7 male students), asserted that the additional cost and complicated procedures required for opening blocked websites, such as calling KACST and waiting for a long time, providing personal information, and stating the reason(s) for using a website could be the barriers. It also frustrates and hinders a user from continuing, and/or might result in quitting the search, whereas the use of the Internet through an audio-video camera in chat rooms, and exchanging prohibited pictures or files by e-mails are easily accessed and not blocked.

Additionally, the majority of participants at KSU and KAAU claimed that the limited time on using and accessing the Internet within the campus in general and within the females' campus in particular, forces them to use either the home Internet connection; which has a further cost, or terminate seeking electronic information resources. Especially since the Saudi education system and/or policies do not depend much on or support searching and obtaining information via the Internet. Consequently, they would prefer to use traditional information resources (i.e., printed books, journals, and periodicals) only. This might also hinder the student from increasing their self-confidence, information skills, and/or their awareness of the availability of those e-resources. The majority of the respondents in all groups (10 male and 9 female students) agreed that Internet laws of KACST did not, to any great extent, have a negative effect on the use of an electronic library, but they declared that the provider responsible for the electronic library ought to understand the importance of expanding academic scientific websites.

In terms of government strategies and plans for Internet connection and access, the majority of the respondents affirmed that, although the aim of the Saudi government

was to start e-government by 2008, up to the present the majority of the Saudi people were not qualified in using this technology to any great extent. They assumed that at present, there were a large number of school teachers and university lecturers who were either not skilled or lacked confidence in searching the Internet, and so did not encourage their students to use the Internet as a source of information.

They elucidated the necessity for providing an information technology section or department at each university or college, in order to increase the awareness of ICT skills and applications in different educational or network activities, which are responsible for the establishment, renovation, and maintenance of the university ICT services. This point clearly confirms the findings and recommendation of a study made by Marghalany and Abdul-Fatah (2003), which called for the establishment of the position of Information Technology vice Dean in Saudi universities. In addition, they claimed that Saudi universities lacked coordination between the deans of computer centres, departments, and library affairs with regard to the development of technical specifications for information technology. They also believed that Saudi universities needed organized qualitative and quantitative training courses provided by departments, the deanship of library affairs and colleges.

9.2.2 Universities' Labs

The majority of the female students at KAAU from LIS affirmed that the art college at the female's campus had only one computer lab for all the disciplines, which also are used for lectures. They stated that all the students were allowed to use the computer and access the Internet only for a limited time (1 hour or less), which is also constrained by the timetable of the college courses. However, they are not allowed to use it unless a teacher or library staff supervises them. They also indicated that these labs are not designed for the use of postgraduate students. In addition, the working hours for the females' campus are between 8 AM and 2 PM; and there is always a long queue of students who want to use this service. Yet, there are only 20 computers, according to the female participants, of which three are reserved for the use of the academic staff.

Moreover, the majority of the male students who participated from the Computer Sciences department at KAAU declared that although computers and Internet access were available, they were not allowed to use the computer centre unless there was a lecture. It has to be used for the purpose of the subject, not to browse for personal information or entertainment or for reading personal e-mail. It is important to mention that the female students from the Administration and Management college at KAAU confirmed that the establishment and the implementation of the computer centre of their college was made by a private organization (The Saudi National Bank), but then came under the control and supervision of the university.

In contrast, KSU undergraduate students in Business Science of both genders confirmed that the department did not have a lab for computer practice. KSU postgraduate male students said that they used the Internet in different places, in the university library, the public library and Internet café, while female students indicated that they preferred to use the Internet at home, because they did not find enough time to use it during their study timetable.

At KSU, Computer and Information Science undergraduate students confirmed that they did have computer labs in order to fulfil the study requirement, and this was also not the case with postgraduate Business students who do not have computer labs to cover their information needs or to do their tasks.

Economic conditions of the local university may have an effect on the use of electronic information resources. The universities' facilities do not fulfil students' information needs in that there are shortages in the number of the labs and computer facilities on their campuses in general and in the libraries in particular. Additionally, the libraries themselves do not have clear laid out policies for acquisition and development. In addition, the KSU female campus for MBA students does not have labs or computers to access.

9.3 Personal Characteristics for Information Access

9.3.1 Individual Preferences

All the groups who participated in the focus group discussion at both the universities (KAAU and KSU) were asked about the factors that might influence the individuals' choices or preferences for the use of e-resources. There was a unanimous agreement from all the groups of postgraduate and undergraduate students of both genders that the need for specific information was the factor that directed the researchers to use specific types of resources. However, all the female postgraduate and undergraduate students at both universities indicated that they would prefer to use the Internet as a first source to search for the desired information, but if the search subject required previous studies, they would turn to the e-databases and that sometimes they searched in printed books.

In addition, all the participating students confirmed that they would prefer to start their information search with the easiest ways, and then proceed to the more difficult ones. On the other hand, they commonly agreed that the databases were the most difficult to search, because they were only available in English, in which the majority of Saudi students are deficient. However, all the undergraduate participants of both genders at both universities indicated that they did not use e-resources extensively due to the prevailing educational practices, e.g., high schools and universities that depend on the subject textbooks or their lecture notes and handouts. They affirmed that it was rare to be instructed by the lecturer to use e-resources for study purposes.

All the students from CS at KAAU asserted that they were allowed to use the computer only for computing applications; therefore, they were not very much aware of the information resources available on the university databases.

However, three postgraduate female students at KSU and KAAU from LIS and BS departments claimed that when the search is about a specific subject, such as pharmacology, medicine, and computer and information sciences, this would involve the use of the Internet. They believed that the use of the Internet would allow the

researcher to obtain a great deal of up-to-date information, but female students claimed that they preferred to use the scientific journals due to the nature of the research and the subject itself, which compelled the users to search specific resources.

In addition, all the male and female students in all the group discussions, particularly in LIS and BS studies, indicated that they did not depend only on the Internet as a resource to search for information, and that they still considered the use of printed books and periodicals to be primary. In contrast, three postgraduate male students pursuing a master's in Computer Science and Business at KSU asserted that they would prefer to use digital libraries. These are not available on the KSU library website, but they accessed them from either home or work. They also preferred to use online databases and e-journals directly, because they believed these were more organized, easier to use and had additional secure websites.

9.3.2 Individual's Background

The majority of students assume that there is no direct relationship between the individual's background and their choice of using e-information resources. They, however, indicated that appropriate training mechanisms might encourage individuals and improve their search skills.

On the other hand, the majority of the students of a group interviewed at KAAU stated that the effect of the individual's background on the use of the e-resources might play a significant role; and that identifying specific websites would ease the search for information. Thus, experience would enable the researcher to gain a superior understanding of e-information resources. This was also the view of female students. For example, one LIS student at KAAU mentioned that she had enough experience to enable her to access these resources compared to other academic disciplines; and she stressed that information awareness and the individual skills of the searcher to specify his or her needs would affect the use of the information resources. The LIS students appeared to be more aware of, and familiar with, the electronic information resources.

Similarly, a group of postgraduate male students at KAAU asserted that they believed that previous experience has influence on the students' electronic information seeking behaviour. Thus, they assumed that these previous experiences would also motivate and encourage the students to challenge their performances and encourage them to seek better job opportunities.

These results coincide with the statistical findings in Chapter 6, as illustrated in Table 6.5, which is correlated to sub-hypotheses 2-5 and 2-6: *The users' subject background and users' current subject of study may have an effect on the preferences towards use of certain types of electronic information resources accessed.*

This means that the diverse subject background of students has an impact on the type of electronic information resources accessed, as shown in Table 6.5. Accordingly, it appears that the first degree of students at both universities seems to have an impact on the preference of electronic information resources accessed.

9.3.3 The Purpose of Using the Internet

All the participant groups agreed that people tended to use the Internet for different reasons: educational purposes, entertainment, trade, and for communication or chatting. Furthermore, it appears from the participants' responses that there was a difference in the use of the Internet between the male and female students. While the majority of the female participants in the groups indicated that the Internet was commonly used for surfing and looking at fashion and cosmetic websites, only a few female participants from various groups stated that they would surf the Internet to buy books from some websites such as Amazon. However, when buying scientific books from outside Saudi, it can take a long time to receive them due to the control regulations.

On the other hand, a number of male students from different groups affirmed that the majority of male students surf the Internet for entertainment purposes, such as downloading music and pursuing sports news, which appears to be larger than the

number of researchers and postgraduate students surfing scientific websites. It is not surprising that there is a scarcity of these websites.

The students of both genders were asked about the differences between the methods and styles they used for accessing the Internet. Consequently, there was an agreement from all the participating groups that the ordinary user, who uses the Internet for e-mail and chat rooms, might not encounter any difficulties, unlike students who search for specific information to fulfil their information needs. Yet, one group of male students who participated at KSU from the business department affirmed that the methods of Internet application differed among people, depending on the following points: users' age and position; types of friends and other relationships; and the family attitude to guiding their children in the use of the Internet.

However, a postgraduate group of female students at KAAU stated that

“A student’s activities on the Internet during study time would cover only information related to their study subject needs, while their usage of the Internet during holidays would vary between cosmetics, cooking, online shopping, and chatting.”

In addition, one female participant from the same group added that

“My job in the university relied heavily on using the computer; therefore, I would use my break time to do online banking such as settling bills or transferring money, and, as I used the computer for my job requirement between six to seven hours daily, therefore, I would not use it at home at all.”

Again, these outcomes appear to be corroborating the findings of the statistical analysis in Chapter 6 (Table 6.6).

9.3.4 The Role of Internet Competency in Information Access

Concerning Internet competence, the majority of the both male and female students emphasized that awareness of using the Internet would positively improve accessing

information resources, because it would ease and speed up the researcher's ability to access the required information resources. They also assumed that the Internet searching skills would be enhanced by regular use and practice, and by studying or reading about Internet use. For example, one female participant in a group at KAAU stated that

"I learned how to use the Internet from one female colleague, and then by continuous practice I have improved my Internet skills and ability to access required information or pursue specific resources, as well as advanced my English."

Furthermore, there was unanimity from the students of both genders at KSU that there were no general gender differences in using the Internet or e-resources, and that it depends on the individual's abilities, skills, preferences and previous experiences, but not on gender as such.

The majority of female and male undergraduate students at both universities stated that the development of information skills was not provided by the universities; instead students built their skills through self-instruction, asking fellow students and reading any resource to increase their skills as best they could. On this point three female business undergraduates said

"At this stage, technology use does not have a role in our degree."

In addition, four female students from different groups, two at KAAU and two at KSU, assumed that the male's work obligations are less demanding than the female's. Therefore, they stated that

"While a male person might have more time to access and use the Internet, a female who is working or studying might be busy most of the day outside her house, and must then look after her house and take care of the children, and hence, she has fewer opportunities to use the Internet than a male. However, these obligations would not stand as obstacles, but it might sometimes motivate her to seek the best way of using the Internet."

One female student at KAAU cited an example of her female colleague, who works as a teacher in a school, saying that

“Her usage of the computer is superior to that of her husband, who only uses the Internet for reading his e-mails.”

However, undergraduate and postgraduate students at both universities stated that the selected universities did not provide courses or workshops to teach them how to use a computer and the Internet, with the exception of the Computer and Information Sciences departments at both universities, and therefore, they taught themselves or read about computing and Internet use.

9.3.5 Users’ Language Ability and its Impact on Information Access

The user’s language ability and its impact on information access seem to have a significant impact on all the students at both universities at both postgraduate and undergraduate level. According to the claim of the majority of the group participants at both universities, English language skill is very much needed to help the researcher to understand topics that are written in English and not translated or found in Arabic in online references.

The majority of students of both genders asserted that most of Saudi researchers lacked adequate English language skill, and hence, access to English information is difficult. For example, four female students at KSU and four male participants at KAAU declared that

“Because of the lack of English we had to translate many articles that are related to our topics, and this would raise costs and time required, whereas, if it is in Arabic, it would be easy to understand its concept, and save time, costs, and effort. This is despite our studies requiring reading material in English.”

Another group of female students from KSU stated that sometimes the structure of the interfaces or applications of the electronic English resources were difficult to use, and that would affect and might hinder the researcher.

Furthermore, a group of male students at KAAU confirmed that, although linguistic abilities have a great effect on access to information resources, their ability to search in Arabic is different from their ability to search in English. They stated that English still stands as a barrier for using information resources and access to e-information. It is a challenge to obtain information and to reach information resources in foreign languages. They claim that their lack of English is the consequence of the Saudi education system, which does not support teaching English at the earlier school stage, such as to starting from the primary school levels.

Consequently, the majority of the groups' participants of both genders from both degree levels suggested that providing training sessions or courses in English language skills might overcome the weaknesses, difficulties, and/or the lack of English.

9.4 Role of Demographics in Information Access

With regard to the issue of age and technology utilization, all of the students of both genders agreed that the user's age has nothing to do with the use of the technology. Nevertheless, they felt that adopting and enforcing the use of the Internet as a part of the Saudi education system and policies would enhance the use of this technology and interaction with the database resources, which would, indeed, increase the awareness and influence of this technology among the majority of the Saudi people. For example, all the female students who participated in all the groups at both universities stated that

“Because of our conservative community, we are forced to learn how to use the Internet and create our own e-mail to communicate with our male colleagues at the males' campus in general, and my male supervisor in particular during our master's degree study.”

In addition, the majority of both male and female students emphasized that there was no gender difference in terms of choosing information resources, but the difference might be due to the subject of study. For example, when the study subject is less modern, the user might have to use traditional information resources that would cover that subject. Yet, the difference between them might be in the availability of accessing the Internet and the location of access, due to the conservative nature of Saudi society that segregates men and women, which might place further pressure on female students more than their male counterpart. Nevertheless, they agreed that options for information access for male students were more on campus, at home, and at work in addition to the Internet cafés which are mostly for male users only.

In contrast, all the female students assumed that female students tended to be more patient than male students when searching the Internet, despite the fact that the teachers or professors sometimes gave male students some search tips such as keywords.

However, respondents of both genders in all the groups at both universities stressed the values of the user's (student's) background and information skills as a crucial experience that differentiates the individual (male or female) in the methods of accessing and using electronic information resources.

A group of part-time male students pursuing a master's degree in Business from KSU believed that because they were members of the library staff and could access and use the Internet for a longer time, they had better opportunities to gain advanced computer and information skills.

9.5 Role of Social and Environment Variables in Information Access

9.5.1 Social Variables

The participants were asked to describe the social variables that had an influence on the access and use of e-information resources. It is important to mention here that the use of the Internet in Saudi Arabia only started in the late 1990s.

The majority of the students of both genders in all groups declared that the belated introduction of Internet has had an effect on the majority of Saudi society. This might be due to the type of conservative social culture; the fear and the lack of technological knowledge; and/or misunderstanding of its benefits by the majority of families. For example, one female student who participated into a group at KSU asserted,

“When the Internet was introduced in 1999, all of my family members and relatives prohibited me from using it, because they were afraid of the appearance of sexual websites while browsing the Internet.”

Furthermore, the majority of students of both genders at both universities claim that the higher number of illiterate parents, in addition to their technology and computer illiteracy, play crucial roles as barriers to accepting this technology as a channel of various information media, especially for female individuals' use. In this sense, it is important to point out the view of two groups' (one male and one female) students at KAAU, who stated that:

“Some parents, young people, and families would refuse the use of Internet or sometimes prohibit their female members from using it because of this drawback of using the Internet and the bad ideas about this technology.”

This point includes not only the social impact on the user but also the parents' education level, and attitudes to technology besides the technological availability aspect. In addition, one married female student at KSU group affirmed that

“The usage of the Internet seems to vary between married and unmarried female students due to the differences of their family responsibilities and time availability, especially since Saudi culture relies utterly on the female for caring and looking after the house and children”.

Moreover, the majority of students of both genders believed that the role of parents is monitoring and observing, and this would not directly affect the use of the Internet; they stated that,

“It is noticeable that the children of the new generation are becoming familiar with the usage of the latest technology.”

Another valuable point to be mentioned was raised by a group of female participants at KSU, who agreed with the following statement:

“Despite the fact that there are some people with a higher education level, they still don’t allow the females to use the Internet and some other technological devices.”

Furthermore, it is necessary to mention that the separation between the female and male students’ campus and male’s campus at all the Saudi universities in general, and at KAAU and KSU in particular, is due to the order of the religious applications that the Saudi government follows. The Saudi higher education authorities have allocated leadership and administrative authority (e.g., management, decisions, employment, procurement, and the establishment of ICT facilities) to the universities’ male campuses. Thus, access and use of the Internet to reach e-resources is usually through the ISP that is connected to both Saudi Telecom and KACST, which is located in the male campus. It reflects the impact of the social culture on the university’s organizational structure and services that are provided commence from a male administrative body, which might sometimes hinder the effectiveness of these services.

According to a previous statement, all the female participants in the groups from both universities agreed that the separation between the males’ and females’ campuses has created unequal distribution of the ICT infrastructures, disparity of ICT quality and services, and inappropriate ICT qualified staff. For example, two females’ groups at KAAU asserted that

“Although there are computer labs at the females’ campus, it is limited to one lab at each college which is used by all the disciplines, and which has an insufficient number of computer devices.”

It is also important to draw attention to another point made by two other female groups at KAAU; they claim that in the event of computer breakdown in the females’ campus, the availability of computers or Internet use may be delayed by a week or more. This is because there are no qualified female staff who can check the system or a machine and fix them. Consequently, they have to wait until the male campus sends some technicians to do so, and as they are not allowed to enter the females’ campus if

there are any women there; they therefore have to do it either after regular working hours or during the weekends. This will force the students and the teaching staff to discontinue using these facilities, and may cause loss of trust in these services. In contrast, at KSU the situation is even worse, because the female campuses are not near the male campus, and are scattered throughout different districts of Riyadh.

In terms of disparity of ICT quality and services, all the female groups' participants from KAAU, indicated that due to the shortages of computers and labs, and printed resources in the female's library, they have to use the male's library. However, accessing the male's library is restricted to one day at the weekend only, with limited facilities, such as copying printed books or articles; accessing databases or the Internet is not allowed at KAAU although this is available at KSU. Female students feel that this creates barriers to the search process and the educational functions needed to complete their academic assignment/essay to a satisfactory level.

On another note, three female students from a group at KSU pursuing a master's in Computer Science stated that

“The university library provides its services for subscribers only, but not for the entire postgraduate student population.”

(The students have to register their names at the library, and have an ID from the library)

They believe that the library facilities and level of assistance are not sufficient due to the shortage of a library orientation programme. Male students at both universities share the view with female students that a library has to generate an IT centre in order to pursue and develop the academic facilities in information and communication technology.

Female students also affirmed that at KSU central library there are only three librarians employed to assist and serve the entire teaching staff, both postgraduate and undergraduate. The majority of the participants confirmed that the university library provides its services for limited users only, and does not address the users' needs due to the implementation of improper applications and language inefficiency, which makes the level of utilization lower if compared to the subscription value.

9.5.1.1 Parents' Education Level

Hellwig and Lloyd (2000) acknowledge that the level of educational attainment of an individual or single family is a strong indicator of having a home computer and Internet access. The level of education also indicates the gaps in ability between groups to use ICT effectively, because of the different levels of literacy and technical skills, and access to quality and useful digital content (Hellwig and Lloyd ,2000).

When the students were asked if the parents' level of education had any influence or impact on the usage of the computer and access to the Internet, the majority assumed that the parents' education level, thoughts, orientation, and the nature of their work might have an effect on their use of electronic information resources.

For example, three female students in a Business Science group at KSU said,

“If one of the parent’s work requirements is related to technology, this would boost the interest of individuals in the use of information technology.”

Furthermore, the majority of students at both universities also assumed that the educational background of the parents would have a significant impact on their children, because there would be a positive interaction between them, they would encourage their children to use the computer and teach them about the positive use of Internet resources. This would enhance the education process, and the importance and accuracy of technology tools in saving time and costs.

Another Computer Science and Information Science groups of KSU students raised another reason to have technology and use it:

“The family’s information awareness has a role in allowing the use of modern technology, and browsing Internet websites by their children, even if the parents do not use it.”

One male business student however stated that

“The parents’ education does not have impact on the Internet use.”

It is important to point out the view of the participants of two groups (some male and some female students) in LIS at KAAU, who stated that

“The appearances of new technology devices in our Saudi community are linked with their misuse. For example, the use of Bluetooth on mobile phones started by sending celebrity gossip, but the use of it by some of the youth to distribute indecent pictures would have an effect on the younger generation. Therefore, some of the elderly/mature and young people would reject the use of the new technology or sometimes prohibit their females from using it because of this downside of using the Internet.”

One male student from LIS said:

“Sometimes parents observe and support their children using a computer and the Internet. Therefore, they can exchange their experience with each other.”

9.5.1.2 Digital Divide

When the participants were asked about the Saudi educational policy regarding e-information resources, the majority of the postgraduate and undergraduate respondents affirmed that the Saudi education policy always concentrated on the traditional sources of teaching and learning materials (i.e., printed books). They also referred to the Prince Abdullah Bin Abdul-Aziz project in 2004 for providing more computer labs and establishing network connections between schools in order to accustom the population to the Internet and e-resources (United Nations, ESCWA, 2005). In this sense they assumed that this type of project requires a long-term strategy to attain its advantages, but it is faced with various obstacles such as the slow-speed Internet connection, lack of qualified staff, and insufficient ICT infrastructure within the school buildings, which may delay the implementation of such technology and involve further financial costs.

9.5.1.3 Level of Income

It is clear that the level of income (individual income, a family, parents) is an important factor in determining who benefits from the use of this technology and the access to the Internet. This factor also influences their ability to afford to have a computer and Internet connection.

Regarding this, the majority of the three groups (two female groups and one male group) at KSU declared that:

“The family income might affect the use of the technology, because of the consequences of purchasing hardware and Internet subscription fees.”

However, all students at both universities said that Internet subscription fees were very expensive. They claim that families with higher incomes would have enough to obtain high quality computers, and subscribe to high-speed Internet connections (e.g., the cost of an annual subscription to DSL via satellite is estimated to be 10,000SR) to reach desired information resources. This appears to confirm the statistical finding revealed in Chapter 6 (Table 6.10), that there is a relationship between the annual income and the places students mostly use the Internet from; the Internet was mostly accessed from home at KAAU, while at KSU it was accessed from work. It also refers to the speed of the connection, which has a significant correlation with the user's income. Students at both universities complained about the speed of Internet connection being very slow.

The preference of Internet use at home appears also among KSU students. They indicated that Internet use at home was more comfortable. However, the preference of Internet use at work was justified by some KSU male students. They indicated that

“Internet use from work is much better because in our location, we have a computer for every employee, the Internet is available all the time and its speed is faster than at home”.

Another important factor is that the Internet connection is free for the institution's staff, which was substantiated by most of the male students who used the Internet at their workplace.

Both female and male respondents at both universities commented that

“Recently, families, regardless of their level of income, still want to own a computer, because they know that it is a key facility in the modern world, but they do not know how to use it”.

In addition, two female students from those groups asserted that

“The Saudi computer market needs consumer protection and that is because prices of computers are high while the internal specification of the computer device appears to be poor.”

KSU students were not the only students with this concern; some male students at KAAU also expressed a similar worry about the computer hardware and software market. They wished to have an authority service body to ensure the products served by these markets.

9.5.1.4 Freedom to Use the Technology

Another social impact is that, in general, the male students are not as restricted in the number of places from where they can connect to the Internet, e.g., they do not have a problem in going to an Internet café. In contrast, the female students indicated that they are limited by the places from which they can search.

Some female students from both degree programmes stated that there were not enough computers in the library, so *“there is no point in going to the library to search if you are not sure that you will get a chance on the computer.”*

Moreover, most students responded that they depended on the Internet at home, and when they were asked about the freedom and flexibility they were given at home to use this resource, most of the male students stated that they had no problem in using the Internet from home, because:

- When they are at home, they can access it from their rooms without any restrictions.
- They have the freedom to access the Internet when they need.

On the other hand, the female students highlighted the fact that it was a major problem to access the Internet from home, without being asked why by parents or guardian. Therefore, they could not access the information they need for any specific research because:

- If at home and a male resident asks to use the computer, he will get to use it even if it meant that this female cannot.
- The computer is usually placed in the living room (as indicated by some female students from the focus group) and therefore, female members of the family do not have any privacy when browsing the Internet.
- Female students are limited in the time they can spend on the Internet, due to their family obligations.
- Some Saudi families' attitudes restrict single females from searching the Internet without supervision.

Finally, the majority of the groups' respondents comprising both female and male thought that the parents' educational background may have a significant impact on their children, and that because there would be a positive interaction between them, they would encourage their children to use the computer and teach them the positive use of Internet resources. This in turn would enhance the educational process, and raise awareness of the efficiency and effectiveness of using these technological tools in saving time and cost.

9.5.2 Geographical Location

In this study, geographical location was used to classify the places or the location from which Saudi students of both genders access e-information resources. The aim was to find out whether the location of Internet access acts as a barrier to information use. There was a common agreement among the students at both the universities that, whenever the student lived in a developed city where modern libraries, computers facilities, Internet connection and maintenance services are available, it would be easy for them to access e-information resources.

Furthermore, the majority of the participating female students from KAAU affirmed that although the geographical location of the females' campus was carefully chosen to be within the same location as the males' campus, there was a lack of ICT facilities, such as computers/hardware, and sufficient number of computer labs.

In contrast, KSU female's campuses are located in different locations or districts of Riyadh and are far from the male campuses. Even after moving the female students in Business Administration to new buildings, they did not have basic information facilities such as a large library building and ICT facilities (i.e., computer labs and Internet connection). Surprisingly, male postgraduate Business School students at KSU said that there was no Internet access at the campus. There was the same problem at the females' campus.

However, Business postgraduate students stated that

“We cannot use the Internet from the campus but we can connect to the Internet from the work place.”

9.6 Educational Culture

All undergraduate students at both universities stated that they relied on textbooks and the lecturers' notes to gain information; it is important to mention here that they also indicated that most teachers did not use ICT facilities in the courses. Additionally, these facilities were available in English, while they used Arabic language in the

subjects studied. LIS postgraduate students at KAAU recognized that they had a problem with English language, which is an obstacle to using and reading the literature, especially in LIS, as most of these resources are available in English. Some postgraduate LIS students indicated that

“there is a digital divide due to the lack of an educational system of teaching computer skills to students at an earlier stage, and they deem that it is necessary that some of the homework should be exchanged by e-mail as a part of the educational system in order to improve students’ skills and abilities.”

Business postgraduate students at KAAU said

“Our teachers recommend using electronic information resources, particularly electronic journals, but we do not know how to use them.”

While Business postgraduate students at KSU indicated that they generally did not have a problem with English language, they did have a problem with how to search and use the Internet and/or electronic information resources. They started searching with Google in Arabic or English, because such search engines are easier to use than databases.

The students who participated from the CS departments at both universities showed that Internet and computer use depends on the nature of the discipline. Although they were familiar with English computing terminology, they did not know what the library had for computer science. Some of them might not recognize the library terms for specific resources in Arabic.

Furthermore, there was a consensus from all the groups of both genders at both universities that there was a digital divide in Saudi Arabia in general, and in the university students’ skills and abilities in using the computer or the Internet in particular. Furthermore, a female group from different departments at KAAU raised the following point:

“A number of teachers and university lecturers seem not to be skilled or confident in the use of computers or software for searching the Internet. They do not ask students to use Internet or electronic resources.”

Furthermore, three female and one male student pursuing a master's in CS who participated in a group at KSU stated that

“They do not identify the university library's services for their information needs; our information-seeking behaviour depends on computer labs. In addition, teachers or professors do not visit or use the library.”

The general opinion of the business undergraduate students at both universities was that

“It may be that computer facilities and electronic information resources are important for our study but in reality we do not feel that, because we mostly depend on printed materials, which are sometimes recommended by our lecturers.”

Some LIS and BA postgraduate students from both universities indicated that

“Since the first year of university we found that there was a lack in knowledge and skills in computer and Internet use, besides English skills.”

Undergraduate students in BA and LIS at both universities stated that the university should provide intensive English language courses, as they found searching on the Internet for scientific subjects available only in English, which was difficult for them to understand.

Most female and male students thought that the level of assistance and facilities were not sufficient due to the lack of a library orientation programme. For example, all the female students at KSU in the BA department said,

“The University did not offer us the chance to use the Internet on the university campus, and there is no Internet connection either for studying or searching.”

Surprisingly, the undergraduate female students in BA at KSU did not know if they had a library in their campus to use either printed or electronic resources. This might be due to the move to the new campus.

However, in comparing Western university libraries and the Saudi participants' university libraries, all the groups participating in this study declared that scientific research in developed countries such as the United States and Britain is much better compared to that in their own libraries; this is because of the awareness the importance of information and the ease of acquiring such information.

9.7 University Library Websites and Their Services

9.7.1 Help Service

When the participants were asked about the university interface "Help services/facilities," there was general agreement from all that the help services links on the libraries' websites were not functional, unstructured or provided irrelevant information and that compelled the students to approach the librarians to seek their help to obtain the required information. For example, two female students who participated in a group at KAAU stated that

"if the help service is designed in such a way as to teach me how to use information resources, the load and pressure on the library and its staff will be reduced, and they can then direct their attention to other library users' needs."

While some male Business students at KAAU was:

"The library facilities are available, but we do not visit the library frequently."

One LIS male student at KAAU said

"Our knowledge about the printed and electronic information resources have helped to search for information without assistance from library staff."

It could be seen that the undergraduate students' views about the library website features were not clear, and the help services were not comprehensible either. Saudi education system does not involve the regular use of the library website, therefore, they rarely used the library and they do not have sufficient idea about its library website, while postgraduate students at both universities expected the university library help services to be like the Western ones. In fact, from their experience with these services they highlighted the fact that they do not work properly in providing assistance for university users.

9.7.2 Interface Features

All the groups of both genders participating in this study were asked to comment on the usability aspects of their university library websites. It was noted that undergraduate students do not normally use the library website; they go to the library if they want to search or use the printed resources. Although the Library and Information Science students said they used the library website, especially the OPAC, but they did not like it because it was unhelpful. Overall, the postgraduate students articulated freely that they did not like the library interface features because they did not represent their needs and were not easy to use (see Appendix G).

Regarding the library interface, there was again agreement from all the groups' participants (of both genders) that it was very difficult to navigate through the interfaces of Saudi libraries. For instance, three male students at KAAU stated that

“Even though I had used the proper terminology of keywords to search the subject, and I might have spent a long time, still I could not retrieve or reach any result of required resources, and that would discourage the user from using the library interface.”

Furthermore, one group of participants at KAAU indicated that the library's current services were not sufficient to cover educational and research purposes, and they proposed that at least one Saudi university should adopt the design and style of an

electronic library from a Western country to address the needs of the libraries in Saudi universities.

Additionally, two female students at KSU asserted that

“The use of the Internet from home to access the university library interface is either denied or requires the availability of some related operational software programme to open or download certain files.”

The female Business postgraduate group said,

“We do not use the library website because its features are not understandable or are difficult to reach; instead we use Google or search engines first.”

Two male students from the LIS department at KAAU stated that the bibliographic data of resources should be embedded into the university curriculum so that all university students could become familiar with the key search terminology.

It appeared from group discussion that the majority of students at both universities seemed to have a degree of information illiteracy because they have not been taught how to learn, do not know how information is organized, or how to find information and how to use it. Additionally, to become information literate persons, students have to obtain the necessary skills to retrieve information from printed and electronic resources to meet their information needs.

This result confirmed the statistical outcome of postgraduate and undergraduate students presented in Chapter 6 (Table 6.8) and Chapter 7 (Table 7.9), which showed that the students at both universities had poor information skills and insufficient ICT skills courses. All the students at KAAU from LIS made the following comments concerning the university library website:

- the Arabic and English indexes adopted by the library are unclear, and seem not to be beneficial;

- the library website can not be accessed easily;
- the designer responsible for the library website is a private agency, not the university, and it has been designed without any involvement or participation from the library staff;
- unanimously, students are not interested in the library website because it is boring and of poor quality; it focuses on the appearance more than the content, and has broken links;
- the library website does not offer the chance to use e-resources directly;
- e-journals are unavailable and/or inefficient;
- the databases cannot be accessed without a username and password for each database, and the library index does not include all the library contents;
- university theses are not provided at all on the library website, not even the abstracts or summaries;
- the traditional library index is preferred more than the e-index on the library website because it is not activated, and does not list all the actual library sources and /or the available resources on both sides (male and female sections);
- computers provided by the library are old and limited in number (14 PCs in KAAU library), and the printing paper is provided by the students not by the University, which might hinder the student due to the additional cost and efforts; in addition, there are only two printers in KAAU.

It is interesting to mention here that most students from BA and CS departments at both universities were not concerned to give their view about the library websites. However, they did state that library websites were not clear, and the terminology was ambiguous. They need frequent workshops to understand the library interfaces' structures. In particular, KAAU and KSU Computer Science students who used the information retrieval system from the library stated that:

“Information retrieval was difficult in Arabic and if it was in English it would be easier retrieve information.”

Three postgraduate Business students at KSU frankly stated that

“We do not use the KSU library website to access electronic information resources; we prefer to use the direct link for these scientific websites.”

With regard to searching for known and unknown topics, the majority of postgraduate participants of both genders at the two universities claimed that the simplicity or the difficulty of a subject influenced the search terms, because a search strategy of a subject varied according to the need. For example, one female group at KAAU asserted that

“Understanding and knowing the exact subject and its sub-disciplines would help the researcher to direct his or her search, but an unknown topic would require extra time for the researcher to understand and identify the keyword search.”

It is very important to mention that not all the participants of either gender at KAAU and KSU could clearly distinguish between search skills and computer skills. It appears that the majority of Saudi university students need to raise their awareness of ICT skills and information search skills, and they need continuous training courses or sessions to elevate these skills and advance their information seeking and use.

9.8 Summary of Focus Groups' Barriers to Electronic Information Resources

The purpose of focus groups has been to increase the generality and test the validity of quantitative results. It appears that the lack of appropriate ICT facilities influences the users' IS&R of electronic information resources for both genders at both universities in general and at the females' campuses and at home in particular. Besides, the government control regulation of the Internet. There is an agreement in the limited time to use the Internet connection and lack of effective information retrieval skills in using electronic information resources.

The parents' education level has a significant impact on the use of ICT facilities. Moreover, the social attitude towards the Internet influences the use of technology. Furthermore, the differences caused by the local believes gave the male persons more freedom in using the ICT facilities than the female.

The educational culture and practices have an impact on the use of ICT facilities; the UG students in Saudi Arabia rely on textbooks and lectures' notes to gain the information they need. The use of Arabic language in the education system creates a barrier when using electronic information resources that are available in the English language.

There are many difficulties that face the students in the university library websites. They are not attractive for students to use; the difficulty of exiting the navigation and going back to the library home page to use other services, also the library staff are insufficiently qualified. The help services do not provide assistance for university students.

Moreover, the students pointed out that they are not familiar with the electronic information resources; they also had a lack of awareness towards the electronic resources provided by the library. Also there is the difficulty of searching in more than one database at the same time and as a consequence the students have to ask the librarians to help them identify the proper one to use for their search. Some databases, such as Science Direct, require the students' identification to be presented to the librarians to get the password. E-journals come under different interfaces and it is difficult to reach a specific article. Furthermore, it is difficult to understand the interface strategy (terminology) and multi-interfaces to enter the new journals, and it is difficult to identify search terms.

Chapter 10: Interviews of Library Personnel

10.1 Introduction

Saudi university libraries are assumed to be a hybrid library type. Oppenheim and Smithson (1999) defined the hybrid library as “a halfway step towards the fully digital library”, while Chowdhury and Chowdhury (2003) define it as a library that comprises various contents of information resources of both the digital and printed form that could be accessed physically and remotely. Rusbridge (1998) indicates that the hybrid library employs a range of technology from diverse sources (i.e., printed and electronic forms) and utilizes them for its systems and services for both the printed and electronic context.

The part of the qualitative data presented here came from 15 library and management staff in the selected universities through face-to-face or telephone interviews. The three main aims of these interviews were:

1. To gather information about the facilities provided by the library, and ICT infrastructure and policies for students.
2. To verify the issues introduced in the survey by obtaining more details about them.
3. To correlate the interview data with the quantitative data.

Interview questions were divided into themes (see Appendix C). The library personnel (administrative and professional) were interviewed over a two-month period (May and June 2006).

One of the aims of this study is to mark from the library personnel in selected Saudi universities (KAAU, KSU, and IMSIU) which aspects influence user information seeking behaviour. It also focuses on the internal institutional factors in general and the ICT infrastructure and its policies, and ICT training courses for university students.

10.2 Organizational Structure

A range of library administrators and librarians from the three selected universities were chosen for this study. The semi-structured interview method was used to obtain in-depth information about library issues in general, particularly the library ICT infrastructure, the quality and availability of access to electronic information resources, and the acquisition policies and strategy. Additionally, it was intended to investigate the computer facilities provided to the users (e.g., academic staff, postgraduate and undergraduate students), the accessibility to the Internet connection, the speed of connection, the length of time offered to the various users, and the capability of accessing and using the electronic databases.

The data in this part was obtained from respondents as follows:

- 2 male vice-deans and 1 female vice-dean from each campus, and 1 male and 2 female librarians from KAAU.
- 1 male library's vice-dean and 2 male and 1 female librarians from KSU,
- 1 library vice dean and 2 male and 2 female library staff from IMBSIU.

However, all the female personnel who participated in these interviews referred the researcher to the males' campuses when they were asked about the ICT policies and strategies or the collection and the services of the library with regard to electronic information resources. These referrals indicate that the female's divisions do not have any authority or power in relation to the ICT strategies or any influences on university procedures and policies. This also indicates that the male administrative staffs dominate and control the authority and power. It also confirms the finding of the group discussions concerning the lack of qualified information technology specialists at the females' campuses of all Saudi universities (Chapter 9, section 9.2.2). This may also relate to the impact of the dominant culture of the educational system.

In the light of the above observations, it is clear that Saudi culture has to a great extent an impact on the structure of all Saudi institutions in general and educational organizations in particular. This is because these organizations tend to follow the classical male-dominated management model that implies forming a clear relationship and responsibility, which is restricted to following only the rules of the organizational

structure within the organization and within its subdivision structures. All this is based on the national culture and religious beliefs.

10.3 ICT Facilities and Services

10.3.1 The Available ICT Policies at the Selected Libraries

The findings that were revealed from the student group discussions at the three universities (KAAU, KSU, and IMBSIU) were the driving forces that encouraged the researcher to investigate more deeply the current situation of the facilities and services provided by these university libraries and or computer centres to their users.

Subsequently, the researcher asked those library personnel if their library had clearly laid out strategies and policies for the access and use of the available information technology. The majority of the administrators at KAAU and KSU asserted that they had written ICT strategies and policies that facilitated and controlled the usage of the library printed resources in general (e.g., the acquisition strategy, following up loaned materials etc.

However, when asked for a copy of the ICT strategies and policies, regretfully, they replied that a copy of these policies was not available, whereas at IMBSIU they stated clearly that they did not have a written form that they could offer to the researcher. The Internet usage policies and strategies at KAAU and KSU appeared to be an individual and internal procedure that each university forms. At IMBSIU Internet use was limited to scientific research only.

According to the librarians at the three chosen universities, different library systems have been adopted by each university. The DOBIS/LIBIS and HORIZON systems are used by KAAU libraries, while at KSU library DOBIS/LIBIS and UNICORN systems have recently been adopted. In the IMBSIU library, the HORIZON system is used. The adopted automated systems at all the three universities use a dual language system, English and Arabic.

Despite the administrative and library staff statement about the evaluation and updating of the library strategies and policies by a committee, which consists of the Vice Dean of Library Affairs in addition to the library manager and some library staff, it is clear that the library strategies and policies of the three selected universities' appear to be vague even to them. The only exception might be for KAAU's policies and roles for using the Internet, as these have been stated in printed form for their students, although the ICT strategy and policies are not.

10.3.2 Different ICT Guidelines at the Selected University Libraries

At KSU the three library staff stated that there were around 100 computers; the two librarian participants from IMBSIU mentioned that there were 90 computers, whereas at KAAU they claimed that there were only about 40 computers available. However, in all the universities these computers are located in the male campuses only.

In contrast, at KAAU library they allocated only 20 computers to the females' campus library. At KSU, there are two female centres for different subjects, in different districts of Riyadh. The former is the "Centre of Science and Medical Studies for Girls" at Al-Malaz, and the latter is the "Girls' University Studies Centre", located in Oleshah. Each centre has a library building containing one or two computers with limited information resources. Oleshah's Centre has terminals to connect with the library catalogue at the male campus.

According to the female librarians' responses, its services are not sufficient for female students. Consequently, for further information needs, the female students at both campuses are required to use the "Girls Central Library" in the Al-Malaz district, which is the oldest and the original location for female students. This KSU central library for female students includes 16 computers to serve all the female students from different subjects. However, this is certainly inadequate for female students, and hinders the female students' use of electronic information resources. Additionally, the IMBSIU female campus has a small and limited library, which provides limited

printed resources; however, it does not provide ICT services to the academic community.

The opening hours of the KAAU library for male students are: daily from 8 am to 10 pm except for the weekend, which is limited to one day for use of female students for a few hours from 8 am to 2:30 pm. This confirms the information revealed by the undergraduate and postgraduate students' group discussions about the limited access for female students to the central library resources. The library in the female campus is open daily from 8 am to 2.30 pm, but as mentioned earlier this library has very limited resources, and moreover the opening hours are much less compared to the library at the male campus.

Furthermore, they asserted that the librarians, i.e., 6 at the male campus and 2 (non-Saudi) at the female, supervise the use of the Internet for the entire university community. This again draws attention to the problems of the need for qualified Saudi female support staff for computer and IT services, because the majority of the female technicians who work at the Saudi female campuses are non-Saudi. It seems that there is insufficient ICT service maintenance in academic environments, particularly in the female sections.

In terms of Internet usage time, they affirmed that the length of time allowed for the use of the Internet varies according to the types and levels of users. At KAAU, the academic staff and postgraduate students are permitted to use the Internet until they finish their research, while the library staff and undergraduate students are only allowed one hour per day.

However, the users of the computers and the Internet facilities are not allowed to print or use any saved subject brought into the library on a portable memory, except for those subjects obtained from the Internet, and this is limited to 20 pages. The use of chat rooms, browsing e-mails, and changing the settings of the browser or the system are not allowed for any users.

In contrast, in KSU the library opening hours are 7.30 am to 9 pm for male users, and the opening hours of the library in the female campus are 7.30 am to 2.30 pm. The

library is closed over the weekends, except that for female users the library in the male campus opens on Thursdays from 7.30 am to 5 pm. at KSU. The library staff claimed that the central library (which is called Prince Salman Central Library) in the male campus housed 100 computers. They also asserted that the Internet connection was available 24 hours a day, and access to electronic resources depended on the validity of the user's authority (valid user name and password) and that accessibility depended on the user categories (postgraduate or undergraduate students, academic staff or library staff). Furthermore, undergraduate students are not allowed to use the Internet facilities. Additionally, the following restrictions are in place for all the users:

- The use of portable memory (e.g., floppy disk, USB, and CD) is allowed (with permission from the library supervisor) only for saving results obtained from the databases or the Internet regarding scientific research;
- Chat rooms are prohibited;
- Internet use time is limited to give a chance to other users;
- The library hall is monitored to ensure the proper use of the library and ICT facilities.

The library opening hours of IMBSIU are between 7.30 am to 9 pm for the male users and the female library is open between 7.30 am to 2.30 pm; and both the libraries are closed at the weekends. According to the assertions of the library staff, Internet use is allowed only for scientific research and only at the male campus. However, it was surprising that the females' campus library is not connected to the database network or the Internet service. They offer female students access to the databases from outside the campuses. It is noticeable that the undergraduate CS department at the female campus has a fully equipped computer lab with an Internet connection; and it is only open to their female students because of the nature of the subject.

It is important to mention that all the participants from all the three universities confirmed that the speed of connection (512 kbps for the general public) appeared to be the major obstacle that face the students and that it delayed access or hindered usage of the available electronic information resources. This has an impact on the user information seeking behaviour in the library. However, the Saudi universities are

connected to the ISU link via the national ATM fibre optic network which makes the connection faster.

Another crucial issue that all the respondents in administrative capacities in the three universities pointed out is that some of the students misuse the computer facilities, which cause frequent breakdowns of the devices and the system. This information confirms the findings of quantitative and qualitative data among postgraduate and undergraduate students concerning their lack of computer and Internet skills in the descriptive data in Chapters 6 and 7 and Chapter 9 section 9.3.4. Therefore, they need comprehensive training courses and/or frequent sessions that raise their ICT competency and awareness.

10.4 Qualifications of the Library Staff

The chosen library personnel at the three universities were asked about the library staff and their qualifications that correspond with the changes in information technology. They all said that there was a shortage of qualified manpower in Saudi for some specific library and information technology specialties. They pointed out the lack of qualified personnel (professional and paraprofessional) for particular job specifications, such as electronic database consultant, technology consultant, network administrator, information system coordinator, automation consultant, system manager, etc.

They affirmed that although there were certain kinds of training programmes to upgrade the quality of the library staff and qualify them to certain levels, there was still a scarcity of comprehensive internal and external training programmes. These courses should encompass the theoretical and practical methods for effective use of the computer and electronic information resources, which is required for library automation.

Given that the librarians are not qualified enough to support the development of the ICT facilities, they cannot provide proper information services to meet the user needs.

This is in line with the finding of Al-Qublaan (2001) who concluded that Saudi academic libraries have a lack of qualified library staff, because the majority of the librarians only hold either a baccalaureate degree or secondary school certificate.

Furthermore, although the administrators at those universities asserted that they overcame the shortage of computer and the Internet skills by offering several training sessions or workshops, it seems that there is still a huge gap in the adequately qualified and trained manpower to fulfil the specific information needs. As a result as discussed in section 9.7.1, Chapter 9, most university students do not rely on the library staff when they have a problem with their information access.

10.5 Information Skills Training for Students

With regard to the type of training programmes that they provided to the undergraduate and postgraduate students, the majority of the participating librarians said that they arranged few training sessions and workshops for the postgraduate students during the academic year, but that these sessions depended greatly on the availability of the trainers' time and the location. In contrast, only one library orientation session is offered for the undergraduate students.

It is important to note that the availability of electronic information resources is not effectively publicized by the library. In addition, it appears from the library respondents that there are unclear acquisition collection policies, which are based on primarily the offers of the providers of the electronic information resources.

10.6 The Influence of Saudi Culture

According to Hofstede (1994), cultural factors may affect the decision maker in a certain society because they could be influenced by the consequences of the society that they live in, and are affected by. In addition, communication processes are influenced by the culture, which influences the appropriateness of the message (who

can communicate with whom), time and location, choice of medium, needs, and gender. Therefore, the management style is influenced by the culture it operates within and interacts with.

Saudi culture is a conservative culture that places the male at the top and segregates the genders at all levels. Consequently, authority and power are usually on the side of the male, and any communication or correspondence between genders is constructed in a formal written form. Therefore, communication tends to be one-way and feedback from the female side is not always expected.

In addition, it appears that Saudi culture is associated with a large power division. Thus, Saudi educational institutions tend to rely on authority, rules, and policies as the primary vehicles for coordinating the work. Therefore, the hierarchically superior is usually the individual male who is in charge of making decisions. As a result, power or authority appears to be the privilege of a selected minority from the male campus, which prevents female employees from contributing to the decision making and lowers their motivation or the possibility of them gaining a position of authority. This cultural impact has formed a marked inequality in the distribution of authority, position and power between the female and male staff. This also indicates that Saudi educational institutions seem to follow the classical bureaucratic-mechanic model that clearly delineates the responsibilities and relationship between both campuses (male and female staff) with inflexible communication channels, and is based mainly on the so-called authoritative rules.

Furthermore, Saudi culture also tends to be a high masculine society, which could be due to the rules of inherited culture that have a great influence on the entire society, which also recognises as acceptable behaviour that the male staff lead and that the female are led. Therefore, the need for information in Saudi academic institutions seems to be influenced by this culture (e.g., what sources of information are needed in the educational process), where the students of both genders at both campuses are directed and recommended to use specific information resources; this indicates the existence of uncertainty about the use of information for learning.

10.7 The Weaknesses of the Selected University Libraries from the Library Staff's Perspective

The following points are a brief summary of the major findings that were revealed from the interviews with the administrators and library staff about the existing barriers for accessing and using library resources (printed and electronic forms) at the three selected universities viz. KAAU, KSU, and IMBSIU.

- The Saudi educational institutions apparently follow the classical bureaucratic-mechanic management model. The major administrative practices are dominated by the male staff who have the authority, thus, communication and correspondence between genders is structured in a formal written frame.
- KSU female campuses are spread around the regions of Riyadh, which leads to small collections of library contents; consequently, they have to use Prince Salman Central Library at the centre of the city, which imposes further costs and time on the female students.
- Unequal distribution of authority and power between male and female employees (female staff cannot participate in the decision-making stage), particularly in the ICT strategies and policies, and also in information strategies and policies
- Varying degree of inadequate ICT infrastructure, strategies, plans, and policies at the three selected universities.
- The Internet usage strategies and policies appear to be individualized internal procedures that vary among the three universities.
- There is an inequality with regard to library opening hours and use between the female and male students in general and limited services in the female division in particular.
- Unequal permitted Internet usage time among the academic society e.g., postgraduate students and academic staff use it until they finish their research, while library staff and undergraduate students are allowed to use it for one hour per day only.
- The lack of qualified ICT specialists among library staff of both genders and at the female campuses in particular.

- The shortage in the number of qualified librarians in the workforce in general and at the female campuses in particular was generally agreed. KSU and IMBSIU suffer from a scarcity of specialist librarians, as well as a lack of clear, written policies to follow.
- Unequal Internet connection between male and female campuses (some female divisions do not have an Internet connection).
- Lack of regular updating of the library resources and inadequate electronic resources in Arabic
- All the librarians underlined the linguistic barrier caused by the lack of English language skills, which in turn is caused by the scarcity of training sessions and shortage of the number of students studying abroad.
- IMBSIU female campus has small and limited library resources and services without any or appropriate ICT facilities.
- Access to some electronic resources and databases (e.g., ACM, Ebray, and Georef) from outside the campus is not permitted for the students.
- Internet access and use for the postgraduate and undergraduate students is restricted to scientific research only (students are not even permitted to look at personal e-mail).
- Scarcity of training courses or sessions for both the library staff and students of both genders.
- Poor ICT and information skills of the library staff and students of both genders.
- Insufficient awareness of the contents of the libraries' electronic resources among library users and unclear acquisition policies of electronic information resources for the librarians.

Chapter 11: Summary, Conclusions and Recommendations

11.1 Introduction

In order to study the major barriers to information access facing the university students in Saudi Arabia, this research aimed to identify whether and how socio-economic characteristics of users, their ICT and information skills, ICT and information infrastructure of the country and the specific institutions, and geographical location as well as religious and social customs and practices impact the information behaviour of university students in Saudi Arabia.

One of the strongest aspects of this study in the realm of information seeking is the inclusion of the social attributes such as gender, age, education and level of income of the study sample. These socio-economic characteristics were used in this study to portray the differences between the abilities of users in information-seeking behaviour and to perform various retrieval processes, differences in computer and Internet use, and differences among student generations in approaching information-seeking tasks. This goes along with Hargittai and Hinnant's (2006) perspective which concerns "including enough detailed information about the study's participants, their demographic characteristics, the conditions of their use and experiences, and their information-seeking behaviour."

This Chapter is organized as follows: Section 11.2 aims to highlight the results of the hypotheses that were discussed in Chapter 1 and to underline the major conclusion of this research. Section 11.3 introduces the proposed new and extended intervening variables of Saudi universities, whilst Section 11.4 presents some recommendations that could be employed in order to overcome the barriers to accessing electronic information resources at Saudi Arabian universities. Finally, areas of further research have also been identified.

11.2 Conclusion

The following conclusions are drawn from the present study.

11.2.1 Differentials in ICT and Information Infrastructure and their Impact on Information Seeking

As results indicate, there are differences in terms of ICT infrastructure among universities in the West and those in Saudi Arabia. There are also significant differences in terms of organizational structure at national as well as institutional levels, as described in Chapter 4 sections 4.4.

Not surprisingly, this study shows some significant differences in the information seeking behaviour of the two groups of students, and some of these differentials are due to the availability of and access to ICT and Internet, while others are due to the cultural, linguistic and social differences among the students in the two countries.

It is clear from the results that ICT development in the UK is more sophisticated than it is in Saudi Arabia in general; development was much slower in Saudi Arabia than in the UK, largely as a result of the lengthy discussions that took place before the Internet was introduced in Saudi.

In addition, use of ICT in Saudi Arabian higher education institutions is less diversified than in the UK. Within Britain, the ICT infrastructure and policies at every university are clearly laid-out, which means that university students can find ICT policies and the university regulations. In contrast the standard policies and terms that the authorised users have to follow in Saudi Arabia are unclear. This information is also confirmed by the staff of the libraries at the selected universities as discussed Chapter 10, sections 10.2 and 10.3.

The findings indicate that students from both societies use the Internet for information, but KAAU postgraduate students have less experience with ICT than do the SU students. These findings correspond with the assertions of Haythornthwaite

and Hagar's (2005) study, that access to the Internet means that individuals (users) are aware of the availability of Internet and online resources and also have the level of skills and experience to make effective use of it.

The results show that there are also differences between the information-seeking behaviour of users in Western and Saudi university environments, many aspects of which stem from the users themselves and depend on the individual's preferences and their personal abilities.

British students have the option of gaining free access to ICT, the Internet and information services through public libraries located within the community. However, since there are very limited number of public libraries in Saudi Arabia (only one in Riyadh, and, to date, another non-active one in Jeddah), students there do not have this option, and therefore, they have either to use the university computing facilities or access and use the Internet from home, the latter often being costly for students. As was clearly illustrated in Chapter 4, section 4.6.1, this finding supports Schmid's (2004) view that an individual's information-seeking behaviour and satisfaction is influenced by the additional cost and effort of continuing to seek information.

This study has found that generally universities in the West, UK in this case, through a specialised body or committee called JISC (Joint Information Systems Committee), have clearly laid out their ICT and information policies to ensure fair and uniform access for users. While they impose some restrictions on use, they also ensure users' rights, and protect the users and the community against misuse of personal information and rights. However, as the result shows there are no such national bodies, committees, or policies in the Higher Education Sector in Saudi Arabia. Consequently, it may be inferred that Saudi Arabian society in general and the scholarly environment in particular, is still in the early stages of ICT development and use, and that training and familiarisation with its information services are necessary in order for them to be employed in a proper manner.

Lastly, in contrast with the situation in UK, Saudi ICT infrastructure influences Saudi students as to the places where they can use the Internet and the priority and preference of the type of use of specific electronic resources. This reflects the fact that

Western students enjoy better conditions due to the stability of the ICT infrastructure provided to them all day, every day, on the campus or off the campus. Even students who do not live in the university halls of residence will have broadband Internet connection with a price that is cheaper compared to that to be paid by Saudi students. This finding is in line with that of Haythornthwaite and Hagar (2005) that the availability and use of the Internet and the configuration of an ICT infrastructure as well as the place and time of access affect the individual's access to the Internet.

11.2.2 Differences in ICT Infrastructure in Selected Saudi Universities

It is clear that there are differences in ICT infrastructure, national and institutional policies, and provision and access to electronic information services in Saudi university libraries. Each university has an internal but often not quite clearly laid-out policy governing access to the Internet and electronic information resources.

There are many differences among the Saudi universities selected for this study, which cause some of the factors that act as barriers to information-seeking and information use. As discussed in Chapter 10, section 10.8, the principal factors which act as barriers to information access are:

- The lack of a common national policy governing ICT and information services within universities.
- Inequalities in the distribution and administrative authority of ICT facilities between female and male staff.
- Inequality in the library opening hours and services of the library designed for female and male users.
- Inequality of permitted Internet usage time among the academic community e.g. postgraduate students and academic staff use it until they finish their research, while library staff and undergraduate students use it for one hour per day only.
- The lack of qualified IT specialists among library staff of both genders, and in the females' campuses in particular, as well as the shortage of qualified

librarians in the workforce in general and at the females' campuses in particular, was unanimously agreed. KSU and IMBSIU suffer from a scarcity of specialist librarians, as well as a lack of written policies to follow.

- Differences in the distribution of ICT facilities among the universities' disciplines, e.g. there are many computing and Internet facilities for the CS students compared to LIS and BA students, students have to access the ICT facilities from the single lab available to their college, and with limited time. Thus, there is a lack of appropriate facilities skills in all these areas that affect information seeking behaviour of all Saudi students. This is in line with Haythornthwaite and Hagar's (2005) viewpoint that having electronic information resources, the Internet, and the skills, could make facilitate use of these resources.

This also calls for measures about spreading awareness of existing ICT facilities and the availability of accessing and using them. This could be accomplished through establishing and providing some basic ICT training and information skills through various governmental bodies and educational institutions. However, these findings agree to those of the studies of Bundy (2004b); Hepworth and Wema (2006); and Hepworth (2007) concerning the necessity of training courses to raise awareness of information literacy and ICT knowledge and skills in a specific society or community.

11.2.3 Impact of Personal Characteristics on Information-Seeking Behaviour of University Students

The findings revealed that users' confidence and experience in using the Internet, users' computer experience, language skills, subject background and current subjects of undergraduate and postgraduate students and the use of Internet as part of daily routine can have an impact on the information-seeking behaviour of Saudi Arabian university students. The results of this investigation show that postgraduate students in the Western world are more confident in their use of technology (ICT in particular) as it forms part of their daily life. In the case of Saudi Arabian students, there is a difference in the degree of their confidence in the use of ICT, which influences their

information-seeking behaviour, as shown in Chapter 5, section 5.4; Chapter 6 section 6.3; and Chapter 7, section 7.4.

11.2.3.1 Users' Computer and Information Skills

The results indicate that current users of hybrid library have to deal with a combination of the information skills and the requirement to gain new ICT skills for IS&R process (Scammell, 2001). As far as the users' computer experience is concerned, the result shows that SU students have been exposed to computers since their early schooldays, but this is not the case for KAAU students. The majority of students at Saudi universities have studied computers in high school, but mostly theoretically rather than through practical exercises, and as a result they still lack the skills to use a computer and the Internet.

Moreover, Saudi Arabian students' in postgraduate and undergraduate studies appear to be different in a similar academic environment, where user confidence in adopting technology has an impact on the type and the preference of electronic information resources, as shown in Tables 6.4 in Chapter 6 and 7.18 in Chapter 7. The results may have been caused by the differences in the acquisition policies and strategies at the two universities, as well as the availability of these kinds of resources, or teaching style, and lack of knowledge about these resources and how to use them. Nevertheless, these findings match with Allehaibi's (2001) conclusion concerning Internet adoption and its diffusion in Saudi universities, and their concerns about Internet technology.

Students from both the universities (SU and KAAU) indicated that self-instruction was the most common way of learning ICT skills; a course offered by the university was the second option for both. There seemed to be a slight variation at both universities in the methods of learning how to use computers and the level of confidence they have in using the ICT. However, it indicates that ICT skills should form part of the university programme, this supports the view of Ray and Day (1998) who state that at the university, the ability to seek and retrieve information effectively

is a useful skill for future life and facilitating the positive use of electronic information resources.

In terms of information skills, students at both SU and KAAU showed surprising results with regard to the way they gained training in these skills. Both universities' students had been taught through several informal methods, but there was less impact from the formal courses given at both universities, which was about 30% for SU, and 23.5% for KAAU (Chapter5, section 5.4).

The majority of students from Saudi universities revealed that they did not have adequate information skills. While most of the students at KAAU considered themselves to be confident ICT users, less than half (49%) of KSU undergraduate students in different subjects had adequate ICT skills, particularly in the Business Administration and Library and Information Science departments. Saudi students do not have provision for adequate training courses on information literacy through formal channels. This indicates that university policy-makers should consider this issue while designing information systems or supporting information literacy plans. This is in keeping with the conclusion of Mittermeyer's (2003) study on students' limited knowledge of basic elements that characterize the research process, and their incompetence in dealing with an information-intensive learning environment, such as library resources.

11.2.3.2 Internet Utilization

As far as the use of Internet as part of a daily routine is concerned, it is clear that since Internet and ICT do not form part of the overall education system, they are not adopted and used in the daily lives of people, while the opposite is the case at SU. This supports the view of Haythornthwaite and Hagar (2005) who asserted that the use of the Internet has become a part of the daily life activities of western people and it changed how they communicate with each other. However, there appears to be a clear relationship between Saudi Arabian students' ownership of a PC and Internet usage in general, and their preference for the use of specific electronic information

resources, mainly in terms of using electronic databases and online reference books. This is illustrated in Tables 5.4, 5.5 and 5.6 in Chapter 5; Tables 6.4, 6.5 and 6.6 in Chapter 6 and Tables 7.18 and 7.19 in Chapter 7.

This study shows that the Internet plays an important part in most of the activities of SU students. However, it has yet to become an important part of Saudi Arabian culture, and therefore its availability or otherwise does not have any significant impact on students' information-seeking behaviour.

At Saudi universities, all students preferred accessing the Internet from home. They also expressed a preference for printed books and journals. Only a minority chose e-journals, e-books, and e-databases. The condition of the Saudi undergraduate students is not far removed from that of the postgraduate students. As was discovered in the analysis of undergraduate students at both Saudi universities, they do not use the Internet for communication purposes such as emailing and chatting with others. This could be because:

- Most of them do not have an email address.
- They might not know how to use the software features supported on such programs.

The UG students did not use the Internet for study or course work, and when they did they looked mainly for Arabic resources. Due to their limited information retrieval and language skills, the students depend on the printed resources. Therefore, as concluded in Ray and Day (1998) the lack of information retrieval skills acts as a barrier to using electronic information resources.

It could be said that sometimes in the academic library or educational system the use of the Internet covers the lack of electronic resources no matter what their age; the Internet is the preferred resource for postgraduate students at Saudi universities. However, their usage depends on various socio-cultural and control-regulation factors. These facts demonstrate that students at Saudi universities may continue to experience a digital divide because they do not have adequate ICT facilities organizationally or personally in order to connect to the Internet and other types of information resources,

such as databases, in order to gain better access to information. This has an influence on the students' information-seeking behaviour patterns.

11.2.3.4 The Students' Subject Background

It is clear that the SU students' subject background has an impact on their preference for electronic resources. At KAAU too, users from different subject backgrounds differed in their information-seeking behaviour. Different subjects seem to have an impact on the type of electronic information resources accessed, as shown in Table 5.5 Chapter 5. This finding supports Tenopir's report

Skilled users in different subject disciplines (work fields) have different usage patterns and preferences for print or electronic. There is no one right solution for services or system design for every subject discipline (Tenopir, 2003).

The findings show that Saudi Arabian students from different subject backgrounds also have diverse levels of experience and confidence in ICT skills. These have an impact on their information behaviour. At KAAU and KSU different subject backgrounds have an impact on the priority of using electronic information. At the former, the students' priority, according to subject background, are electronic journals, electronic databases and the Internet, while the main concern for students at the latter are electronic books, electronic journals and the Internet. This situation is the same at IMBSIU, which means that the current subject of students has an impact on their information seeking behaviour.

It is obvious from the findings that the students' subject backgrounds influence the use of the Internet. The most frequent users of the Internet are the students from mathematics and computer science backgrounds at KSU and KAAU, but they differ in terms of their disciplines. These findings confirmed with Ray and Day's (1998) study that the computer subject has influenced the coursework due to the importance of this subject to learn the successful use of the Internet. The following could be the cause for the lower extent of use of electronic information resources in Saudi universities:

1. Electronic information resources are available only in the English language.
2. Electronic information resources might only be available in limited subjects.
3. There is a shortage of computer equipment and a need for labs in their college buildings or in the library.
4. There is a lack of ICT training programmes at Saudi universities. Thus, they had to seek instruction in Internet usage by themselves. Accordingly, limited access to a computer terminal acts as a barrier to perform their academic tasks (Ray and Day, 1998).

11.2.3.5 English Language Skills

The statistical and qualitative findings indicate that the English language has an impact on the Saudi postgraduate and undergraduate students at the selected universities. It was revealed that at the selected Saudi universities there was a significant relationship between the level of English language skills and the preference for electronic resources. Language skills act as a barrier to making sense of the required information and to Internet use. In addition, the importance of learning English at an early age appears in the focus group discussions as seen in Chapter 9, section 9.3.5. This agrees with Haythornthwaite and Hagar's (2005) statement on the effect of linguistic differences. Moreover, Barsky and Bar-Ilan (2005) confirm that carrying out a search in a language which was not that of the users (i.e. English) would act as a barrier for the task description formulated in another language.

It is also important to note that teaching the English language at Saudi educational institutions begins at quite a late stage (i.e., intermediate and secondary school) and this could be one of the major barriers to the students' information access and use.

11.2.4 The Impact of User's ICT and Internet Competence on the IS&R Process

The user's Internet and ICT competence and education and training methods in information skills influence the extent of information obtained (see Tables 5.7 and 5.8, Chapter 5). These skills have a diverse impact on the Saudi students' information-seeking behaviour, as shown in Table 6.7, Chapter 6 and Table 7.20, Chapter 7. Saudi students' Internet competence has a significant relationship to the familiarity with the resources accessed through the library websites. In Table 6.7 it appears that there is a difference in KAAU and KSU postgraduates' individual skill levels, which has an impact on the IS&R process.

11.2.5 Impact of Demographic Variables on IS&R Process

The demographic variables in this study (as demonstrated in Table 5.10, Chapter 5, Table 6.10, Chapter 6 and Table 7.22, Chapter 7) involved age, gender, marital and social status, and individual and family income and these had different impact on the study sample in terms of Internet usage and the type and preference of using electronic information resources. The variables of age and gender of the SU students in this study did not influence Internet usage, nor the type and preference of electronic resources. In addition, marital status at SU did not influence Internet usage, nor the priority of using specific electronic information resources, and their income influenced the ease of access from home and the type of Internet connection at home. This may be due to the easy availability of ICT facilities in UK.

From the findings presented in Chapter 5 it can be seen that there were differences between the two cultures with regard to social status vis-à-vis the users' preference for, and usage of, electronic resources and the time spent on the Internet for searching for information.

In Saudi Arabia, at both universities, the gender, age and social status of undergraduate students did not have any influence on their Internet usage, nor on the

priority of electronic information resources. In addition, at both universities, it was found that user's income had no impact on the ease of access and the type of Internet connection at home (see Table 7.22, Chapter7). This might be because the undergraduate students are not required to use electronic information resources for their studies. On the other hand, students' gender did not appear to have an impact on Saudi Arabian postgraduate students regarding Internet usage and the priority of using electronic resources.

However, the findings indicate that age and gender among KAAU, KSU, and IMBSIU postgraduate students appear to have an impact on the preference for electronic information resources (see Table 6.10, Chapter 6). This may relate to the disparity of access (particularly for female students) and availability of these resources at those universities. The difference between the similar educational cultures lies in the preferences for electronic information resources. Consequently, this may relate to the lack of electronic information resources. It could also be that those with differing social status either did not understand or were not aware of the different kinds of resources available in their institutions. This coincides with the findings of Prabha et al.(2007) which suggest that the library needs to promote the full-text sources available to users through library hosted databases.

It could also be the case that the libraries do not provide enough help for the students, because it appears (Chapter 8, section 8.7 and Chapter 9, section 9.5.1.2) that the library staff themselves require training in how to use these services. They might not even have adequate knowledge of the English language to understand the instructions or the English pages that appear; or perhaps they may not even bother to indicate that they provide these resources in the first place. In addition, they may not be comfortable in the environment in which the resources are provided. Even worse, sometimes the students are not able to access a very important resource on which their research may depend, from home, and must obtain it through the librarians or academic staff logging in for them, as was revealed in the focus group discussion (Chapter 8 section 8.7, Chapter 9, section 9.7.1 and Chapter10, section.10.8).

User's income also has an impact on access to electronic resources, which is logical in that a higher level of income leads to higher affordability and use of ICT. However,

there was a difference among the Saudi students in the level of income and the preference for electronic information resources. This might be due to the lack of a high quality Internet connection or the availability of these resources for particular subjects.

11.2.6 Impact of Social/Interpersonal Variables on Access to Electronic Information Resources

11.2.6.1 The Two Saudi Regional Differences

It could be observed that society of the central region in Saudi Arabia has concerns about the unknown effects of using the Internet on their personal lives, while the Western region is more comfortable with using ICT facilities. This is related to the role the family takes in using technology. Students at both universities have computers and use the Internet for information. There are many interesting and possibly contrasting aspects of the ICT availability and utilization in the Central Region of Saudi Arabia, particularly in Riyadh (where KSU and IMBSIU are located) as opposed to the Western Region, specifically Jeddah (where KAAU is), and these are:

1. The people of the former appear to be wealthier than the latter, which enhances their use and utilization of ICT.
2. The expenditure of the government on the universities and institutions in the Central Region is much greater than what is being spent in the Western Region. In addition, there are many more institutions that deal with ICT in Riyadh than in Jeddah, such as King Abdul-Aziz City for Science and Technology (KACST); King Abdul-Aziz Public Library (KAPL), King Fahd National Library (KFNL), The Ministry of Communication, the Communication and Information Technology Commission (CITC), etc.
3. There are also many more information facilities (libraries and information centres) in Riyadh than in Jeddah.

4. The degree of cultural openness in the Western Region is greater than in the Central Region, and this should have a positive influence on people's use of ICT in the Western Region. Society in the Central Region is more conservative.

Both societies have controls on Internet use. However, the Central Region is a more restricted society than the Western Region. This was highlighted in the following findings in the quantitative and qualitative analysis: parents' level of education; society's perception of the Internet, and the practical values of Islam in Central Region society. These findings coincide with Hargittai and Hinnant's (2006) about the importance of studying the freedom of perspective for users' typical ICT access and experiences, time of access and use, the travelling time to and from the location of access, family or organization strictures on ICT usage and access to the Internet, and users' ICT skills, these influence the type of information behaviour and the understanding of human information behaviour.

11.2.6.2 Socio-Cultural Impact

In Saudi Arabia there is a separation between men and women individuals caused by the religious factor, which operates the entire country; this acquires the separation of male and female individuals. This also creates a separation in their education; male and female individuals have separate campuses. This portrays the impact of the social culture on the organizational structure of the university. Moreover, this separation creates an unequal distribution of the ICT infrastructure, a disparity in ICT quality and services, for the female campuses, which creates a disadvantage for female students concerning these facilities. Furthermore, the Saudi culture segregates the genders at all levels and in most cases the male individual is given more power and choice than the woman individuals. The Saudi society is influenced by the religious impact, which allows the male to be the leader and the female to be the one led.

11.2.6.3 Internet Usage and Parental Education

The user independence variable is correlated to Internet usage, and the type and the preference for electronic information resources. Parental education of a user is correlated to owning a computer, Internet access, and user confidence in adopting technology. The findings show that while there was no relationship with regard to the above variables for SU students, in Saudi Arabian culture, the poor level of education of mother could be a barrier to her children's perception towards developing technology, as she might not value the ICT environment and the equipment required (as shown in Table 6.11 in Chapter 6 and section 9.5.1 in Chapter 9 by the focus groups). It was noted that the number of mothers with higher education qualifications is greater at KAAU than at KSU. Furthermore, Saudi students' fathers are better educated than their mothers are; the majority of their mothers are unemployed/homemakers. In contrast, parents in the western countries are better educated than those in Saudi Arabia, while only a minority of SU students' mothers are unemployed/ homemakers.

Parental education of KAAU students has an effect on their children's confidence in ICT. This may be due to the fact that the Internet and ICT are more common in educated families in the Saudi Arabian society. The culture has an impact on the places where female students can use the Internet. However, there are still rules in the family when using the Internet, as was mentioned in the group discussion in Chapter9, section 9.5.1.4. In Saudi Arabia the limitation of the availability of ICT facilities causes some difficulties (separation between genders entails different places for access, necessitating more time and expense, particularly for female students). It also coincides with Hargittai and Hinnant (2006) about the influence of social or cultural, and monitoring legalisation, such as the families or organizational structures on IT usage and access to the Internet.

11.2.7 The Effect of Environmental Variables on Accessing Electronic Information

The environmental variables include the location of the user with the ease of access to electronic information resources; user's perception of ambiance of the search environment having an impact on user satisfaction during the IS&R process, and type of user's household having an impact on owning a computer and Internet usage. In addition, economic conditions of the local university may have an effect on the use of electronic information resources.

In Saudi Arabia, due to cultural issues, the places for accessing ICTs are segregated for male and female users, which lead to more time and money being required. Therefore, most Saudi students prefer accessing the Internet from home (Tables 5.10, Chapter 5; 6.10, Chapter 6; and 7.22, Chapter 7). It appears that Saudi Arabian universities suffer from inadequate ICT facilities. Accordingly, their libraries do not provide adequate resources or proper facilities and services. It is noticeable that information-seeking behaviour depends on individual efforts. In addition, familiarity with the search environment does not have an impact on the results of unknown topics at either of the two universities (KAAU and KSU).

At Saudi universities, the students also stated that they rarely find their information needs appropriately met during their visits to their libraries. There is a gap between users' needs and the library's collection. In addition, the students do not know if the library has the required resources or documents for their subjects, and the library itself does not make further efforts to deliver or develop the potential users' needs. This agrees with the focus group findings of Prabha, et al. (2007), which stress the importance, for the libraries to be relevant to their users' needs by advancing their collection of all types of information (books, articles, journals or web pages, etc.).

11.2.8 Impact of Educational Culture

Many factors influence the information-seeking behaviour of the university students. These include the user's skills, availability of ICT facilities (hardware and software) in the university, qualified teachers, teaching style, educational resources (electronic or printed), English language skills in the education system, qualified teachers of ICT, ICT training programmes and qualified library staff in ICT services.

Many studies in the context of Saudi Arabia for example, Al-Hamed et al (2004), and Alsonbol et al (1996) indicate the importance of teaching information skills to the students to improve their learning skills. Al-Hamed et al (2004) also point out that information skills imparted to students in Saudi Arabia focus on students' acquiring of skills to find information for examinations, but not for problem solving and life-long learning. Moreover, Oraif (2007) confirms that

The university system tends to continue with the same approach, lecturers delivering information, which is to be memorised and recalled. The educated output of the system tends to be the generation of students who can recall knowledge for examination purposes (often forgetting much of it soon after) and who have little or no critical faculty. There is little confidence when it comes to knowing how to find out, how to consider information critically, how to evaluate, analyse or be creative with ideas.

This may highlight the gap between the library services and teachers' perception and use of these services in teaching.

The findings (Chapter 9, section 9.6) show that a number of schoolteachers and university lecturers are not skilled or have a lack of confidence in using computers and the Internet. This could be due to the lack of qualified teachers or lecturers in ICT, or it might possibly be due to the education system, which does not use electronic resources in practice and depends on traditional methods of memorising the information. Moreover, some members of the teaching staff avoid using computers and the Internet and they depend on their lectures and textbooks. This gives an indication that there is a lack in the education system in the teaching of computer and

Internet skills, which hinders the use of electronic information resources even when they are available. Therefore, training programmes for students should be encouraged in order for them to gain knowledge of ICT literacy. This supports the view of Ray and Day (1998) that if the academic staff are confident and promote the advantage of using electronic information resources, they will encourage their students to gain skills to use them via the curriculum, thus they would be more likely to make use of these resources for academic purposes.

Another essential factor is the lack of qualified staff and their low level of language skills that create a barrier for both teacher and student. These teachers cannot convey information from the Internet or electronic resources because of its being in English. Moreover, the students are not provided with a sufficient quality of education skills. Thus, it can be seen that in the Saudi education system there is a need for ICT skills in order to understand and increase the level of awareness of using ICT facilities optimally.

Generally, but not surprisingly, it seems that the LIS students were more familiar with electronic information resources and library terminology. In contrast, the BA students were not aware of the names of electronic information resources, which could be because the teaching style does not depend on these types of resources and academic staff might not include them within the course work. Moreover, CS students were aware of the use of the Internet and the names of the electronic information resources, but they lack the adequate IR skills information needs. Therefore, it can again be seen that a different type of skills is required due to the students' lack of information skills and use of electronic resources. These findings match with the study of the similar environment (Kuwait University) which showed that science students can have more prior knowledge of ICT terminology and can acquire more terms during assignments, while social science students have a difficulty in achieving similar results (Hamade, 2007).

Librarians are an important component in the support of the educational process and the encouragement of the information behaviour of a user. It appears in this study that the librarians at Saudi universities do not assess users in different subjects in order to fulfil their information needs. This may be because the library staff cannot provide

sufficient information services for the diverse information need of users due to their low level of qualification, training, poor ICT skills or possibly their lack of language skills.

11.2.9 Effect of IS&R and Usability of Interface Features on Access to Electronic Information Resources

The findings and conclusions with regard to information search and retrieval and usability of information services, etc. are discussed in the following sections.

11.2.9.1 The Universities Library Interfaces

It is clear from the study results that the users at SU are affected by the library interfaces (see Appendix G). However, the dual language use (English and Arabic) on all the library websites at the selected universities in Saudi Arabia has an impact on their users' information-seeking behaviour (Tables 5.12, Chapter 5 and 6.14, Chapter 6 and Chapter 9, section 9.7.2) and (see Appendix G).

11.2.9.2 Searching for Known and Unknown Topics and Search Time

The findings with regard to searching for known and unknown topics, and the time spent in searching and reformulation of the search are influenced by the difference in the educational cultures in SU and KAAU universities, or due to the differentials in the individuals' knowledge and familiarity with the topics and the corresponding information channels, etc. The weakness in the ICT infrastructure can be seen again at KAAU through its correlation between user satisfaction and time taken in rephrasing search terms, which may be because they are concerned about spending too much time searching for a certain topic.

At SU students do not have any difficulties in searching for a known topic or an unknown topic, because they have a variety of resources from which they can choose.

In contrast, at KAAU, students would rather search for a known topic, as they would know the search terms and resources needed to find the information. Moreover, at KSU, students find it easier to search for simple tasks, which take less time, rather than searching for complicated tasks, which requires translation, as they are searching through English resources to complete a task in Arabic language. This is asserted by Barsky and Bar-Ilan' study (2005) that a lack of expertise and domain knowledge can have a negative impact on search results.

At both Saudi universities, searching for a known topic or unknown topic is affected by the time spent in doing so and social effort (seeking colleagues' help). These findings correlate with those of Barrett (2005) concerning the strategy that information seekers employ in their search for information in order to fulfil their information needs with least cost in terms of time and social efforts. It is also found that most students acquired the skills necessary to use the electronic resources via trial and error or through guidance from other students, raising the subject of the effectiveness of these skills (Ray and Day, 1998).

11.2.9.3 Users' Satisfaction with the Search Results

At Saudi universities, the user's satisfaction with desired results according to the time spent or number of times required to rephrase terms for searching a known or unknown topic contains a similar association, which may be interrelated with individuals' personal differences and topic knowledge. This may be because the limited time they have on the Internet means that they cannot afford to spend too much time on a certain topic at the university or home. This could reflect the weakness in the ICT infrastructure of the Saudi universities. It may also mean that the weaknesses of the ICT facilities at KSU are greater than those at KAAU. There is also a different socio-cultural factor in the availability of using these technologies at home between the two regions, as stated previously.

11.2.9.4 Help Facilities and Formulating the Query

This study shows that the students at SU find the online help service useful because of the ICT facilities available to them, and because every student is issued with an e-mail address and a password, but still they prefer to ask for human help. Furthermore, SU students seem to be aware of the online help service, but prefer not to use it. On the other hand, the online help service at KAAU is of poor quality and the majority of students find it difficult to use, due to the poor quality of library interfaces of the help services. At KSU, students prefer asking a person because they do not find the help service useful. IMBSIU students are similar to KSU students. From this, it can be seen that all the students prefer human help, despite the infrastructure of the help service. Hence, this corresponds with Sadler and Given's (2007) findings about the power of personal contact with librarians as an effective communication tool. However, as highlighted in the statistical and qualitative findings (Table 5.16, Chapter5; Table 6.18, Chapter6 and Chapter8 section 8.2.7.1), the hindrances to using the help facility for students at the selected universities include the following:

- They do not know what the help facility is.
- They do not need the help it provides yet.
- There are no guidelines for using the search terms.
- They are not sure if the online help would help them with their search.

There was a variation in the most common techniques that were used for searching. For example, in SU these were title and keyword, whereas in KAAU, they were subject and author, and at KSU, subject and title of article. It may be noted that the higher response in favour of subject search, as opposed to the keyword search, was indicated by the KAAU students, which may be attributed to the fact that the students may not be fully aware of the differences between a keyword and a subject search.

For Saudi students more user education is required to motivate and enable them to use online help services, although, in general, it may be stated that the online help services themselves need to be improved in order to add new features, such as automatic error corrections, etc. At both Saudi universities, the error correction facility in the library is unstructured and insufficient to help the students when they are seeking

information. Modifying the query seems to be the principal solution for formulating the query in order to reach satisfactory results at the universities selected for this study (SU, KAAU, and KSU). The findings of the focus group interviews indicate that library systems need to be as easy to use as a popular search engine like Google and this collaborates with the study of Prabha et al. (2007).

Students at SU and KAAU universities showed insufficient information skills; and this is more prominent at KAAU. Both groups of students may need to improve their information search skills and have an increased awareness of the OPAC features because it is an important key to library systems. This could be accomplished through an introductory session, or regular workshop, printed guidelines and electronic guidance on the library web sites. KAAU students were very limited in the way they can search for information because the majority were not able to search by the date, library collection and a language, while only a small minority of 12 people indicated so in SU.

There are some significant differences between SU and KAAU in terms of the barriers to electronic information resources; for example, databases at KAAU have a different access policy, which means frequent access to different databases requiring the user ID and password. Moreover, SU students encounter fewer problems than KAAU students due to the availability of electronic journals in English. Some findings of the barriers to use OPAC corroborate with Prabha et al. (2007) which indicated that the inconsistent search protocols of library web sites and online catalogue discourage effective use.

Finally, Saudi Arabian students faced barriers when they searched or browsed the electronic information resources, for example, barriers of the Internet, e-databases, OPAC and e-journals that are available in the university library. However, this is in concordance with the findings of Finder et al. (2006) regarding the impact of role of the library's web site as an enabler or barrier for the students' subsequent steps in.

These observations indicate that the all the Saudi university libraries need to establish an ICT support department to support the postgraduate and undergraduate student services. This division should be responsible for planning, organizing and evaluating

the training sessions in order to increase the ICT capabilities of librarians as well as the users in assessing the value of electronic information resources. Additionally, due to the conservative nature of Saudi culture, one of the responsibilities of this department might be to overcome the barriers to providing females with training sessions or workshops at the appropriate times and places to fit in with female work and family obligations.

11.3 Wilson's HIB Model and the Proposed Intervening Variables

Though the Wilson model is a general behaviour model it provides a good framework for understanding the various processes present during information seeking. The various barriers are termed as intervening variables. These intervening variables may prevent the emergence of the coping strategy or may intervene between the acquisition of information and its use. Wilson introduced this concept to suggest that certain factors may act as enablers or detractors during the information seeking process.

This research has advantaged from the modifications of Wilson's model proposed by Niedźwiedzka (2003), however the new model proposed here has introduced some new variables on the basis of research into information seeking behaviour of university students in Saudi Arabia (as shown in diagram 11.1).

The present study considered to investigate the barriers of access to information in the Saudi universities. These required the study of three elements that are defined by the access to information: connectivity, content and services, and usability (Borgman, 2000). Additionally, the use of electronic information requires users to have ICT and information skills to make effective use of the information as proven by related literature reviews of many other studies, such as: Bawden (2001), Savolainen (2001), Hargittai (2002), Chowdhury and Chowdhury (2003) and Eskola, (2005).

Given that this research seeks to address barriers to information access in an electronic environment, Wilson's model was chosen as a good starting point. Furthermore, this study proposed a model of intervening variables in Saudi universities (diagram 11.1) that charted the factors which act as barriers during the

information seeking behaviour. We can identify work on the following sets, explained under the above headings in the conclusion:

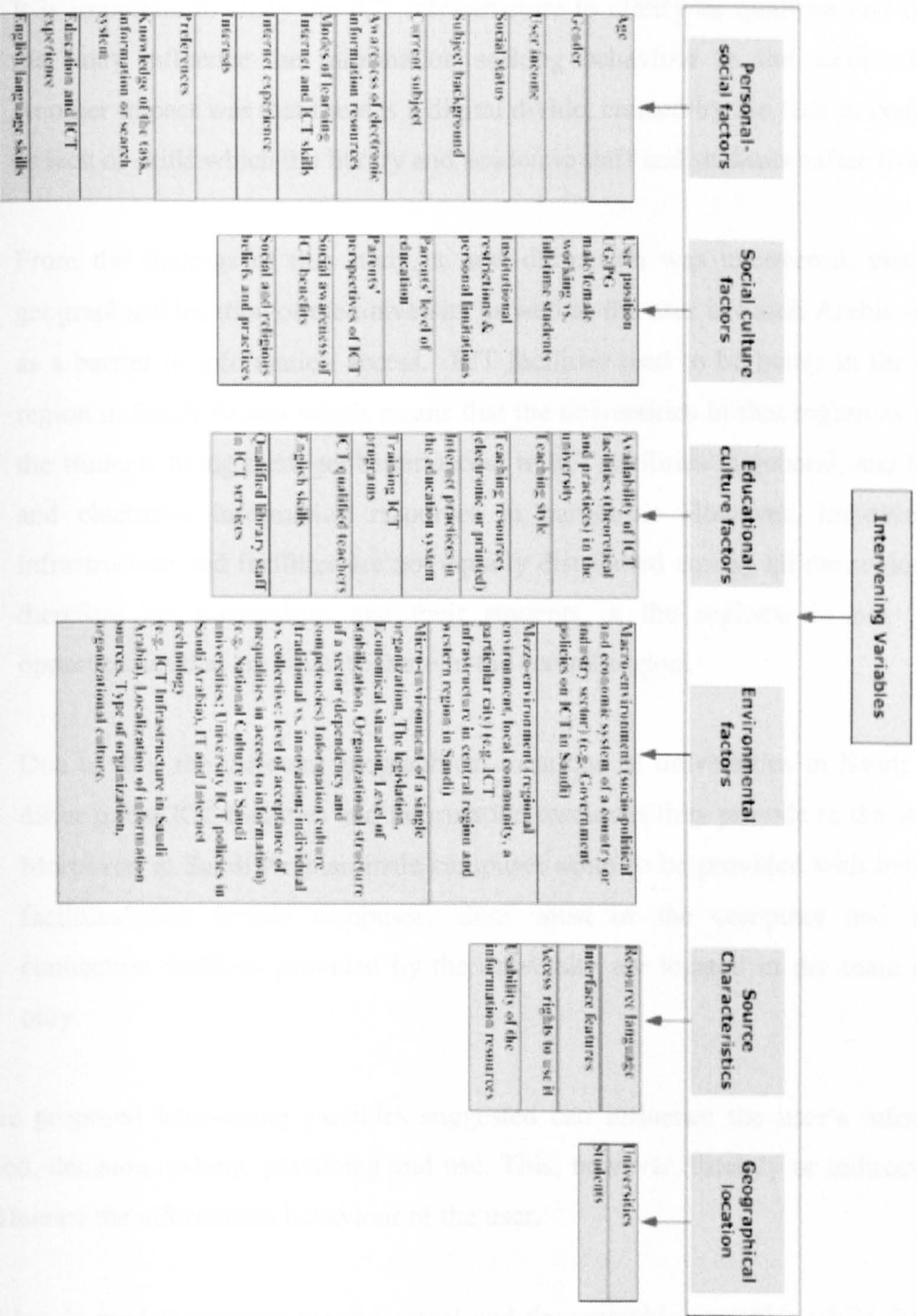
- Personal-social factors
- Social culture factors
- Educational culture factors
- Environmental factors
- Source characteristics
- Geographical location

The proposed extended Wilson's model includes the main concepts of the intervening variables of Wilson's model with the suggested improvements of Niedźwiedzka's study (2003), where some improvements of intervening variables of Wilson model can be made more consistent, and the suggested relationships among a practical application of a theoretical model to prove its adherence to reality.

The following are the extended intervening variables:

1. It proposes that the context variables (person him or herself, the roles a person plays in work and life, or the milieu) interplay on each other (Niedźwiedzka, 2003).
2. The electronic information environments impose specific requirements on information users (Savolainan, 2002); thus, it is important to insert new variables to determine information seeking behaviour of a person, which include information literacy, computer and Internet skills.
3. The language skills are also required in the use of electronic information resources, because they affect the personal and educational factors. Since most of the Saudi Arabian students are not native English speakers, they face a barrier when searching for electronic information resources, because of its availability in the English language.
4. It can be seen that the Saudi academic education system has an impact on the information behaviour of the students towards electronic resources; as a result, the model suggests the factors related to the educational culture to identify the most relevant elements prevalent in the Saudi academic environment.

Diagram 1.1.1 The Proposed Intervening Variables in Saudi Universities' context



5. It is important to study the ICT infrastructure to clarify its qualities and policies that may influence the information seeking behaviour in the electronic age. Another impact was that there is a digital divide, created by the lack in equipment or lack of skills which the library and academic staff and students suffer from.
6. From the findings of this study, a new dimension was uncovered, that is the geographical location of the university as well as the user in Saudi Arabia may act as a barrier to information access. ICT facilities tend to be better in the central region in Saudi Arabia which means that the universities in that region as well as the students living there get better access to ICT facilities in general, and Internet and electronic information resources in particular. However, improved ICT infrastructure and facilities are not equally distributed among all the regions, and therefore the universities and their students in the regions do not get the opportunities that are equal to these in the central region.

Due to this, the different geographical locations of universities in Saudi Arabia differ in the ICT facilities and information resources they provide to the students. Moreover, at Saudi Arabian male campuses seem to be provided with better ICT facilities than female campuses, since most of the computer and Internet connection facilities provided by the university are located in the male campus only.

The proposed intervening variables suggested can influence the user's information need, decision-making, practicing and use. This, however, directly or indirectly may influence the information behaviour of the user.

Wilson's model separates psychological and demographic variables while this study puts them in one category of personal-social factors.

The factors of Social and educational cultures have been discussed in the conclusion to reflect to some extent that these act as barriers in the Arabic environment. Moreover, the environmental factors that are represented in the governmental ICT policies, regulations, and limitation in the universities are not clear between male and

female campuses; thus, there are unequal ICT distributions and capabilities between the male and female students sections.

The information channels, including university library system and services, have influenced the information seeking behaviour of university users. According to the findings inadequate features of the library interface may act as barriers to information need and can significantly influence the user's behaviour.

The library systems that are used in the Saudi Arabian universities are not specifically designed for dealing with Arabic materials; these adopted systems were designed mainly for the English language. In Saudi Arabia, English language acts as a barrier for most Arabic speakers in their information seeking behaviour. This factor corroborates with the result of Ibrahim's study (2004) that English was a barrier to faculty members who had their degree from Arabic countries and teach in Arabic language.

Interface features of information retrieval systems have a key impact on the usability, because they may support or inhibit the information seeking process. Thus when creating library interfaces, the individual behaviour should be taken into account by the academic library decision makers (Chowdhury, 2004b). It can be recommended that more studies should focus on the quality of the hardware and software needed to support the university library services.

Accessibility of the information resources is influenced by a number of limitations that act as barriers to information access, such as the availability of ICT facilities and affordability of electronic information resources in Saudi universities, which is mainly related to:

1. Home: There is a limitation in the variety of ISPs that are capable of providing quality connection for cheap prices. Most students prefer accessing the Internet through modem connection from home. The time available to Saudi female students is limited, due to the social and cultural practices that decide their role in the family and society at large. Moreover, there is a lack in information literacy skills that act a barrier to electronic information resources.

2. **University:** The university libraries in Saudi Arabia do not promote the use of their electronic resources and the onus is on the users to search and find them. Moreover, there is an inequality between the male and female sections in the distribution of ICT facilities. More facilities and time are available for male students. The language barrier also hinders many of the students when accessing some resources

Information search strategies is another factor that influences using electronic information resources because the information seekers do not have sufficient language skills to reword the search queries reflecting their information needs, and this is often multiplied by the lack of information and Internet skills.

11.4 Recommendations

Based on the findings and conclusions of this study the following recommendations are made. However, there may be some individual differences among universities and among students from different disciplines. Nevertheless, these may be applicable for all Saudi universities.

This study suggests that more Internet and ICT facilities should be available for students of all the subjects offered at Saudi universities. This recommendation is made as it was noticeable throughout the study that in Saudi Arabia equal access to facilities are not provided for all categories of students.

There is a need for organizational bodies in Saudi Arabia similar to JISC in the UK, to set the best standards and guidelines for ICT services for higher and further education and for the benefit of the research community. Users can then access reliable information from the national and international communication and information environments. This study recommends that such organisations should be created in Saudi Arabia, in order to improve the quality of ICT infrastructure and promote easily and widely accessible services. Moreover, there is a need for further research to explore the requirements and remits of such organizations in Saudi Arabia. There

should be further studies to clarify the standard policies at the Saudi universities in order to enhance the students' understanding of correct behaviour regarding ICT facilities.

The administration of university libraries ought to provide specialized courses in the use of the Internet in the management of technical operations in libraries to raise the efficiency and effectiveness of staff and achieve the maximum benefit from its use. In addition, a reassessment of the ICT infrastructure in Saudi universities is required to raise its efficiency and speed, and to address the necessity to update computers for employees, and both male and female students and provide them with modern equipment. Long-term plans should be considered to increase the levels of librarians' qualifications concerning the university subjects, ICT skills and databases of electronic information resources.

This study recommends that the administrators should take into account the needs of the female section by distributing ICT equipment according to research studies that determine the ICT needs for female sections in different universities.

It is noticeable that in Saudi Arabian universities there is a lack of awareness and familiarity with ICT facilities and electronic information resources. Therefore users should be trained to make effective use of the ICT facilities and electronic information resources.

Students and teaching staff should be motivated to increase the level of benefits gained from using electronic information resources. The study reveals that some lecturers are reluctant to use electronic information resources and computer applications in certain courses, and hence students cannot benefit from the use of the Internet in certain subjects. The Academic staff should also motivate students to use computer and electronic resources because they can encourage students and instruct them to suitable resources.

Universities should provide adequate computer and Internet lab facilities that assist in gaining access to sources available mainly through the Internet, and also develop the speed of its connection, as the study reveals that the slow connection is one of the

most important barriers faced by the students. Universities should also work towards making all labs open in university colleges for longer daily and weekends hours, so that they are available at any time the student requires.

Information literacy is a necessary application, which can include generating training courses on information skills, integrating information skills within subject teaching, and training for groups of various ages and abilities (Foster, 2005). It is recommended that the university makes information literacy courses compulsory to provide knowledge about computer and Internet use for all the students who join the university in different colleges whether they are in scientific or non-scientific (arts and social science) disciplines.

It is important to improve students' information search and ICT skills for effective information-seeking behaviour. These skills can be gained and enhanced through special courses and workshops in the use of a variety of electronic information resources. The following are some suggestions for designing training courses for students:

- Define the basic computer skills that allow the users to operate computer functions.
- Define practical training skills required to obtain information from the Internet and electronic information sources.
- Define how the research strategy in specific subjects can be prepared.

Furthermore, there is a need for skills-based literacy training (Bawden, 2001; Savolainen, 2002) which raises the individual's awareness about computer and information literacy, so that they are able to gain greater knowledge about system handling and obtaining data. Another important skill that should be considered in Saudi academic environment is the language skill that makes the available information useful; thus, specialists must be the one who translate English language resources, and university students must be educated to basic proficiency in the language to be able to understand the information content.

Universities in Saudi Arabia should encourage their staff to create local information content on the Internet that would generate a culture of active contribution and would contribute greatly to altering negative perceptions of Internet content.

Saudi universities should employ professional design skills for their library websites to make them more efficient, attractive and usable. University libraries should develop appropriate online help services to help users in the IS&R process.

University libraries should increase awareness of electronic information resources by adopting appropriate marketing strategies. University libraries should also afford orientation workshops and ongoing seminars for students and academic staff to train them in using electronic information resources. University libraries should offer English translation services to students so that they can still gain knowledge from the electronic resources in foreign languages.

Given that public libraries can greatly benefit access to the Internet and information services even for the university students, further studies should be undertaken to design and structure the public library service in different locations in Saudi Arabia. This would also serve to reinforce the role of ICT and use of Internet in Saudi society.

11.4.1 Recommendation for Additional Research Studies

Based on the findings and conclusions, this research proposes the following areas for further studies:

1. The nature of every subject and discipline may have an impact on the information seeking behaviour patterns. It is recommended that further studies should be conducted to investigate the other disciplines which depend on the English language in the course work to discover the factors that may act as barriers or enablers to use electronic information resources. Further studies should be conducted to investigate the impact of the intervening variables of Wilson's model

and the expanded variables proposed in this study on the information behaviour of Saudi university students. Such studies may provide a deeper understanding of their information behaviour patterns and the barriers to information access in the electronic age. Further research may focus on the sample of the other Saudi universities not included in this study to investigate and validate the findings of this study.

2. Other studies could investigate the availability of electronic information resources in Saudi universities on the subjects that are taught there and factors that hinder access to such information.
3. Future studies could investigate the proposed new model in other Arabic countries where English is not the native language, to find out if they face the same barriers in electronic information environments.
4. Further studies should be undertaken to study information seeking and retrieval patterns of Saudi students.
5. There is a need for further study on the dynamic and effective activation of the library sites in Saudi universities to meet users' information needs and offer them information services by providing access to bibliographic databases and various databases of electronic information sources in the electronic age. Thus the university libraries in Saudi should engage in research to be able to discover ways and means for providing better and more user-centred information services in the electronic age. There is also a need to apply the research design to academic library interfaces and further studies to investigate the barriers of using adopted information systems especially in the context of information seeking and retrieval. There is also a need for further studies on the barriers caused by the usability features of the websites of Saudi academic libraries in order to overcome these barriers and to develop the features, thus effectively increasing use of information services.
6. Further investigation of the socio-cultural factors that influence and act as a barrier in the information seeking and retrieval may be needed. Such a study could

lead to considerable recommendations for changing negative perceptions of Internet use and to the improvement of Internet distribution and access in Saudi Arabia.

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Appendix A: The Study Questionnaire

Dear Student:

I am a PhD student in the department, and I am working on the following research topic: **An investigation of the barriers to information access: a study among university students**

As part of this research, I need to collect data from the users on various points. Although participation is voluntary, I would request you to participate in this research and help me by filling-in a questionnaire. If you kindly agree I shall hand-in a printed questionnaire for you to fill-in; alternatively, I may send you an electronic copy of the questionnaire, if you want it in that format.

Please note that you do not have to state your name or any other personal identification details, and that the data gathered through this questionnaire will be exclusively used for this research. Information gathered through this questionnaire cannot and will not be interpreted or used with reference to any specific individual. Also please note that although I would request you to fill-in the complete questionnaire, you may not provide responses to any specific question if you don't want to do so.

I would like to thank you in advance for your kind support.

Magdah Gharieb

Personal information:

1. Please provide your gender: Male Female

2. Please provide the age group you belong to :
 17-19 20-25 26-30 31-35 36-40
 41-45 46- over
3. a. Do you live in Hall of Residence?
 Yes No
 If yes please skip to Q. 5
3. b. Do you live in Glasgow? Yes No
 If Not then, the place you live is a town or a village
4. How long does your journey to the university take?
 10-20 minutes 25-35 35- 45 an hour More than an hour
5. If you are a non- English speaking student, do you think your language skills affect your access to and use electronic information resources in English language? (please scale from 1= does not affect, 7= badly affect)
 1 2 3 4 5 6 7
6. Please provide the marital and family status
 Single Married Living with partner/parents Other
 No. of children
7. Please specify your housing type
 Public rental
 Private rental
 House owner
 Other
8. Please specify your parents have your mother your father
 Less than ten years of education
 University educated
 Holds a college or vocational degree
 Highly educated or professional
9. How would you group your parents' or your partner's work?

	Your partner	Your mother	Your father
Professional (Doctors, Professor, Teacher, Accountant, Lawyer, Engineer, IT etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Semi-professional and Skilled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Managerial & supervisory jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Routine jobs (Secretarial, Sales and office assistant etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical (Builder, Plumber, Electrician etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agriculture & related (Farming, Fisheries etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business/Self employed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
House person / Unemployed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. You are presently: (where in full- time or part- time employment please specify job title)

- a) Full-time employment and part- time student
- b) Part-time employment and full time student
- c) Part- time student and part-time employment
- d) Unemployed and full time student
- e) Other (please specify):

11. You are a full time student, and not in employment, how do you meet the cost for your course? (tick more than one, if necessary)

- Scholarship Supporting family Bank loan Employer or Government sponsorship Other (Please specify).....

12. What is the annual income of you and your partner together or of your parents if you do not work and stay with them or of you if you stay alone?

- Less than £ 5000
- £5000-£10,000
- £11,000-£20,000
- £21,000-£30,000
- £31,000-40,000
- £41,000-50,000
- More than £50,000

13. Please specify, what was your first degree?

.....

14. Please indicate the postgraduate course you belong to

- MSc. in Information and Library Studies
- MSc. in Information Management

- MSc. in Computer and Internet Technologies
- Master of Business Administration

General ICT literacy

15. Do you have a desktop / laptop computer?

- Yes No

16. If not, where do you usually access a computer from?

(You may tick more than one option)

- Own computer
- University labs
- University library
- Public library
- Work
- Parents
- Elsewhere (please specify)

17. Have you used computers in your primary and/or high school?

- Yes No

18. How did you learn to use the computer facilities?

(You may tick more than one option)

- A course given by the high school
- A course given by the university department
- A course given by the library or the computer centre
- A course given elsewhere
- Individual instruction by library staff
- Assistance from colleagues
- Self-instruction
- Literature (manuals, computer or/and library magazines)
- Online instruction / guides and manuals on the interface itself
- Others (Please specify)

19. Do you feel confident with your basic computer skills, for example: using the keyboard and mouse, working with files (creating, opening, saving, editing, renaming, moving, copying, etc.), word-processing, and printing.

Please scale from 1= not at all confident, 7 = totally confident)

- 1 2 3 4 5 6 7

20. Have you had any formal training in information searching skills?

- Yes No

If yes, is it through any of the following: (you may tick more than one option)

- A course given by the university department
- A course given by the library or the computer centre
- A course given elsewhere
- Individual instruction by library staff
- Assistance from colleagues
- Self-instruction
- Literature (manuals, computer or/and library magazines)
- Online instruction / guides and manuals on the interface itself
- Others (Please specify).....

21. Have you ever used the library's electronic resources?

- Yes NO

22. How would you rate yourself as an ICT user?

(Please scale from 1=novice, 7=expert)

- 1 2 3 4 5 6 7

23. Identify the types of information resources that you rely most while seeking for information

(Use 1-8 in order of priority)

- Printed books
- Electronic books
- Printed journals
- Electronic journals
- Electronic databases
- Internet
- Digital libraries
- Others (Please specify).....

Internet factors:

24. What kind of Internet connection do you have?

	Home	Work	Public library
Modem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broadband	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wireless connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. How long have you been using the internet?

- More than 10 years
- 1-3 years
- 4-7 years
- 8-10 years

Less than 1 year

26. Do you usually access the Internet through: (you may tick more than one option)

University Home Work Public library Friend

Individual subscription (Private)

Other (please specify) -----

27. Do you use the internet?

Daily At least once a week 2-3 times a week

At least once a month Less than once a month

28. How much time per week do you spend using the internet for study or work?

One hour or less 12 hours – 15 hours

2 hours – 4 hours 16 hours – 18 hours

6 hours – 8 hours 19 hours – 21 hours

9 hours - 12 hours more than 22 hours

29. To find information do you usually start your search looking through?

(You may tick more than one option)

Internet at home

Internet on campus

Printed books

Electronic books

Printed journals and magazines

Electronic databases

Electronic journals

Other (please specify) -----

30. Do you feel confident about using the Internet to find information?

(Please specify the rank of your confidence 1= not at all, 7 = very confident)

1 2 3 4 5 6 7

31. Do you use the internet for? (you may tick more than one option)

To find job and career information

To do part of your work

To read general information

To read e-mail

To learn to use PC & internet

To study or do coursework

To chat with others

Online shopping

To browse web for own enjoyment

To obtain information through distance education classes

To find free software to download it

Other (Please specify).....

32. How do you rate the typical access time when you search e-resources?

a) **From home**

Very slow Slow Somewhat fast Fast Very fast

b) **On campus**

Very slow Slow Somewhat fast Fast Very fast

c) **In office**

Very slow slow somewhat fast Fast Very fast

d) **Public library**

Very slow slow somewhat fast Fast Very fast

33. How much information do you find in general when you search information resources on the Internet?

- Nothing
- Something, but not as much as you need
- Enough
- More than you need

34. To what extent do the search results justify the time spent in searching, in general?

- Results strongly justify the time spent on searching
- Results justify the time spent on searching
- Results do not justify the time spent on searching

35. How easy it is for you to use electronic resources on the Internet?

Very hard Somewhat hard Easy Somewhat easy Very easy

36. Do you face problems while using the internet?

Yes No (If your answer is Yes answer Q 34 please)

37. What kind of problems do you face when using the internet?

(You may tick more than one option)

- Slow connection
- Cutting off connection while browsing
- Expensive internet subscription
- Lack of awareness using the internet skill
- Difficulties in identifying the required web page
- Regulations controlling access to the internet

- Language barrier
- Do not have enough time to use the internet
- Lower performance of computers
- Do not trust the information on the internet
- Other (Please specify).....

38. How do you learn about the library's electronic resources? (you may tick more than one options)

- Teach myself
- From the Reference desk
- From friends
- From the library's Websites
- From workshops
- From Professors

39. Have you used library websites before?

- Yes
- No

40. What types of electronic information resources have you used?

(You may tick more than one option)

- E-Journals
- Online databases
- E-book
- OPAC
- Online reference books (dictionaries, and encyclopaedias)
- Other (please specify) -----

41. "I can find the information I need for my papers through the library's electronic resources?" What do you think about this statement?

- Strongly disagree
- Disagree
- Uncertain
- Agree
- Strongly agree

42. How motivated are you to learn how to use the library's electronic resources?

- Very motivated
- Somewhat motivated
- Not motivated

Academic library website usability:

Note: This part of the questionnaire is designed to gather information about your experience on the usability of the information services that you have used recently. I expect you to provide this information based on your experience of two recently held search sessions: one on a topic that is familiar to you, and another topic that is not so familiar. If you have recently conducted such search sessions using the Strathclyde University Library website, then please go ahead with the questionnaire; otherwise please use the library website to conduct searches on two topics, and then fill-in the rest of the questionnaire.

43. Is this part of the questionnaire :

Based on your recent experience with the library website

Or

Based on two search sessions conducted just now

44. Which kind of electronic information sources do you prefer to use?

(You may tick more than one option)

E-Journal

Online databases

E-book

OPAC

Online reference books (dictionaries, and encyclopaedias)

Internet

Others (Please specify).....

45. How did you find searching the known topic (a topic that is within your area of interest/knowledge) using electronic information resources?

Very difficult Difficult Somewhat easy Easy Very easy

46. How did you find searching for unknown topic (a topic that is completely new to you) using electronic information resources?

Very difficult Difficult Somewhat easy Easy Very easy

47. What was the length of the entire search session for:

a. The known topic

Less than 15 minutes

15 - 30 minutes

30 – 45 minutes

- 45 minutes to 1 hour
- 1- 2 hours
- 3-4 hours
- More than 5 hours

b. The unknown topic

- Less than 15 minutes
- 15 - 30 minutes
- 30 – 45 minutes
- 45 minutes to 1 hour
- 1- 2 hours
- 3-4 hours
- More than 5 hours

48. How many times did you need to rephrase your search terms before you came up with the desirable results:

a. for the known topic

- Once Twice Three times More than three

b. for the unknown topic

- Once Twice Three times More than three

49. a. How satisfied were you with the results:

(Please circle the number you feel is closer to your opinion: 1= not at all, 4= somewhat, 7= very satisfied)

a. in case of the known topic search

1 2 3 4 5 6 7

b. in case of the unknown topic search

1 2 3 4 5 6 7

50. What kind of search options do you use when searching for the bibliographic records through OPAC /or for any electronic resource?

(You may tick more than one option)

- Subject
- Author
- Title
- Date of publication
- Journal title
- Title of article
- Key word

- Use of search operators
- Truncation
- Use of available tool to word search term selection
- Others (Please specify).....

51. How did you learn about formulating your query on the system?

(You may tick more than one option)

- Colleagues
- Help facilities on the available system
- Librarian
- Academic staff
- Trial and error

52. What do you usually do when the search results are not satisfactory?

- Change Database
- Use the advanced search option
- Modify the query
- Quit search
- Other (Please specify)

53. How comfortable was the environment (the place) where you did most of your search? (Please rank 1= Not too much comfortable, 7= Very comfortable)

- 1 2 3 4 5 6 7

54. Do you feel the familiarity of the environment during a search for electronic resources is:

(Please rank 1= Extremely Unimportant, 7= Extremely Important)

- 1 2 3 4 5 6 7

55. From your experience, how easy would you describe the library web interfaces?

- Very difficult Difficult Somewhat easy Easy Very easy

56. From your point of view, do you think that the electronic library system is confusing in terms of its content and layout?

- Yes Sometimes No

Interface features

57. After using Strathclyde library website, please rate each of the following interface features of this website by ticking the appropriate box.

	Very poor	Poor	Neutral	Good	Very good
Content (coverage, quality, depth, relevance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design and layout (presentation, use of graphics, interactivity)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of use (navigation, quick to find information, use of screens or options)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Links (relevant, clearly identified, working)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Searching (easy to find and use, relevant results)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Readability (ease of understanding, clear information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Help and support (help functions, contact details)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Options for personalization (choice of a particular design, choice for the selection of channels of information, number of records per page)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

58. Do you find the way of organizing the electronic information resources satisfy your information needs?(please rank from 1=least satisfied, 7=most satisfied)

Least 1 2 3 4 5 6 7 most

59. How do you rate the value of these electronic resources on conducting your search: (1= not important at all, 7= extremely important)

(You may tick more than one option)

a) Online Databases	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
b) E-journals	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
c) Online catalogue	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
d) Online reference works	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
e) Subject gateways	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
f) Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>

g) Digital library 1 2 3 4 5 6 7

60. How familiar are you in using electronic resources?

(Please circle the number you feel is closer to your opinion)

(1=not at all, 4=somewhat, 7= very familiar)

1 2 3 4 5 6 7

Help facilities:

61. Usefulness of online help:

- Useful services, but I prefer asking a person to help me
- Useful service and easy to use
- useful service, but difficult to use
- Not useful service

62. Does the library system help you correct the errors when you using the its interface?

- Yes Sometimes No

63. Reasons for non-use of the help facility

- I do not know what online help is
- I have not felt the need for help yet
- I did not know that online help could help my search
- I know about the existence and the role of online help, but I did not know that online help exists at the specific e-source I use
- I prefer asking a person to help me
- There are no guidelines for using search term selection

64. What are the major problems that you normally face when using a library catalogue (OPAC)? (You may tick more than one option)

- Cannot search by subject heading list
- Cannot formulate the query easily
- Do not know how combine search options with Boolean operators
- Unranked search results
- Cannot limit search by date, collection and a language
- Difficult advanced search options
- Others (Please specify).....

65. What are the major problems that you normally face when using a database?

(You may tick more than one option)

- It is not easy to select a database
- Frequent access to different databases requires the user ID and password
- It takes long to revert to another database

- Information cannot be downloaded
- A subscription fee is required
- A lot of Irrelevant information is retrieved
- Frequent run-time error
- Information overload
- Multiple databases cannot be searched using a single search query
- Other (Please specify).....

66. What are the major problems that you normally face when using e-journals?

(You may tick more than one option)

- Cannot determine the choice of the appropriate search service provider for required e-journals
- It is hidden under several interfaces
- Do not understand several interfaces and search strategies to access to required e-journal
- The structure of e-journals provider is not familiar
- Cannot decide a relevant journal through all displayed journals
- Word and phrase search facilities are complex and it is difficult to differentiate among them
- Produce only abstracts
- Cannot formulate search terms easily
- Cannot mark the required article
- Irrelevant information
- Long time to get required information
- Do not know the difference between HTML and PDF
- Others (Please specify).....

Thank you for your time and help. Your response is valuable in completing the research on investigating the barriers to information access

Appendix B: Focus Groups Interviews

Introduction

I would like to thank you in advance for willing to take part in a follow up focus group interviews to the previous survey.

I am working on the following research topic: **An investigation of the barriers to information access: a study among university students**

As part of this research I need to collect data from the users on various points. Although participation is voluntary, I would request you to participate in this research and help me by answering these questions.

Please note that you do not have to state your name or any other personal identification details, and that the data gathered through this interview will be exclusively used for this research. Information gathered through meeting cannot and will not be interpreted or used with reference to any specific individual. Also please note that although I would request you to answer questions you may not provide responses to any specific question if you don't want to do so.

Magdah Gharieb

The list of topics and in-depth coverage required is elucidated below:

**1. Differences in ICT infrastructure and the role it plays as an enabler/
detractor for information access of e-resources**

Quality of ICT infrastructure in Saudi Arabia

Types of internet access- broadband, dial-up etc

Is ICT infrastructure dictated by Government regulation and what is its impact on information access?

Are education policies governed by these policies?

Do the education policies, ICT policies hamper the development of hybrid libraries within SA?

What is their perception of Western universities and their libraries? In what ways do they think the Western model needs to be adopted or is the current model sufficient for the purposes of information access of e-resources.

Is there a digital divide and how do they themselves overcoming this problem?

What are the contributing factors within the ICT infrastructure that act as a enabler/
detractor for information access and how in their view those need to be enhanced/
rectified?

**2. Differences in Personal characteristics and the role it plays as an enabler/
detractor for information access of e-resources**

What influences individuals choices/ preferences for e-resources?

What is the role of subject background in the individuals' preferences for use of e-resources?

Does previous experience, task complexity etc have any role to play?

Do preferences change and why?

General understanding of user behaviour – Recite some instances and make sense of how the information seeking behaviour varied.

What do they use the internet for, and do the way they use it differently for task as well as non-task related work?

What is the role of affective behaviour on information access, impact of training on information access, user's language ability impact on information access?

3. Role of internet competency as an enabler/ detractor for information access

What in their view is internet competence?

To what extent does internet competency affect the efficacy of the search process?

Is it tasking dependent etc.

Recite some examples to provide a deeper understanding as to how internet competency improves efficacy of the search process.

Does internet competency always produce satisfactory search results? Explore the phenomenon through some in depth examples.

4. Role of demographic factors as an enabler/ detractor for information access

Are there differences between genders (male or female students) or age differences in using electronic information recourses?

Find out the reasons for preferences and why

5. Social/ Interpersonal variables as an enabler/ detractor for information access

Explore what influences their user preferences – parents' education, cultural aspect etc.

Do you think the family culture has an impact on the Internet use?

Is there a difference in the family belief, between male or female person, when using the Internet?

6. Environmental variables as an enabler/ detractor for information access

Usability aspects – explore the various variables like design layout, search facilities, and help facility etc

Ask them to recite critical incidents of how they would search for a known topic vis-à-vis unknown topic. Examine as to how the search process resulted in a successful outcome or an unsuccessful one. Then list down barriers to information access.

I wish to thank you very much for sacrificing your valuable time

Appendix C: Interview Schedule to the Selected Saudi University Libraries Personnel

Introduction

Thank you for willing to take part in an interview to gather information on the ICT Infrastructure (the Quality and Availability), internal policies and training courses for university students. I can assure you that any information provided in the interview will be treated as very confidential and will be discarded after this research.

Overview of the study

Member of staff's name

Current position

Section one: Introduction

I hope to start by reminding you that the purpose of this research is to investigate the barriers to access information in electronic age. This information speaks about ICT infrastructure, its policies and training lessons for university students. The interview should last between thirty and forty minutes and whatever you say will be kept confidential. If you do not mind, I may use a digital recorder.

The new developments and the administrative changes as well as the titles associated to information technology have affected the Saudi Library and changed the traditional concept of library services. Did this change the concept and the work nature of the librarians at your university library to the extent that the librarian just became a data specialist? Please illustrate this.

1.1 Library Staff:

- Is there a manager for electronic services?
- Is there a manager for databases?
- Is there an assistant manager for electronic materials?
- Is there a site manager for an electronic library?
- Is there a site designer for an electronic library?
- Is there a technician for an electronic library?

- If such positions are not physically available, how does the university library conform to the associated changes and developments?

What are the positions purposely created to serve the new trends?

- As a professional member of the library staff, does the library staff (male and female) are qualified to perform the electronic services tasks?

Please describe it to me.

- Is there any policy and plan prepared for qualifying the library staff in the future? Alternatively, will new positions be created to provide better services? Please describe how this point will be achieved.

Section Two:

2.1 Internet Service:

Is Internet easily accessible in the library? To what extent this service is provided and what is the established policy for this service? How do you monitor such available information or how do you evaluate the information circulated through Internet and how do you select the necessary and useful information related to various scientific aspects?

2.2 Electronic Services Provided:

What are the electronic services provided? Is there a clear policy and plan established to provide the library with electronic services or it is just an idea assumed by the concerned parties.

(Is it possible to provide the researcher with a copy of this policy).

What are the future plans for building these services?

What is your role in users' orientation for policy application?

-Through your experience, do you think that the library web site serves the established educational and research purposes by providing electronic

information services at academic level? What does the site need in your opinion, to provide the required electronic service?

2.3 Barriers from your view:

What are the technical and functional obstacles currently facing the library? Included in this are information infrastructure, library positions and staff, furnishings, communication development (communication systems).

To what extent are the legislative and organizational parties respond to the quality shift of information and knowledge community in terms of wide range of information exchange and giving the university community access to electronic services?

Section Three: End of the interview

I wish to thank you very much for sacrificing your valuable time.

- Any other suggestions or recommendations deemed necessary and useful for the research.
- You are kindly requested to furnish me with any information which may serve this study.

Your kind cooperation is highly appreciated.

Magdah Gharieb

Scholarship Student at Strathclyde University

From King Abdul-Aziz University

Appendix D: Arabic Questionnaire

الاستبانة الخاصة بطلاب مرحلة الماجستير

عزيزي المتعاون .. أود أشكركم سلفاً على مشاركتكم وأفيدكم بأن هذه الاستبانة تخص دراسة لمرحلة الدكتوراه في تخصص علم المعلومات وتهدف لمعرفة عوائق استخدام مصادر المعلومات الالكترونية لطلاب وطالبات الجامعات السعودية. وتتطلب جمع البيانات من المستفيدين لتغطية عدة نقاط. فالرجاء مساعدتي في ملأ هذه الإستبانة علماً بأن مشاركتكم هي تطوعية ولا ضرورة لكتابة الاسم حفاظاً على الموضوعية والخصوصية . و المعلومات التي ستزودوننا بها من خلال هذا الاستبانة سوف يكون لها الأثر في مساعدتنا لاستكمال أهداف البحث.

الباحثة

ماجدة غريب

جامعة استرأثكلايد ، جلاسجو

الرجاء التكرم بالإجابة على الآتي:

المعلومات الشخصية:

1. ماهو التخصص في درجة البكالوريوس؟

.....

2. حدد تخصص الماجستير الذي تدرسه هل هو:

تخصص علوم المكتبات والمعلومات

تخصص إدارة الأعمال

تخصص الحاسب الآلي

آخر

3. الرجاء تحديد الفئة العمرية التي تنتمي لها:

19-17 20-25 26-30 31-35 36-40

41-45 46- وأكثر

4. أ. هل تسكني في سكن الجامعة ؟ نعم لا

(إذا الإجابة ب نعم فانتقلي إلى السؤال الثالث)

ب. هل تسكني مدينة جدة ؟ نعم لا

إذا كانت الإجابة ب (لا) فالمكان الذي تعيش فيه هو: مدينة أخرى أو قرية

5. ما الوقت الذي تستغرقه تقريبا لتصل إلى الجامعة من موقع سكنك؟

10 إلى 20 دقيقة 25 إلى 35 دقيقة 36 إلى 45 دقيقة ساعة أكثر من ساعة

6. الحالة الاجتماعية: أعزب متزوجة

(إذا كنت متزوجة ولديك أطفال فكم عددهم: (-----))

7. ما هو نوع السكن الذي تقطنية:

مستأجر خاص مستأجر مع مجموعة ملك خاص مع الأهل

8. المستوى التعليمي للوالدين.. الرجاء اختيار ما ينطبق على كل من الأب والأم:

الوالدة

الوالد

أقل من عشرة سنوات تعليم

تعليم دبلوم دون الجامعة

تعليم مهني / فني

تعليم جامعي

تعليم عالي

9. ماهي طبيعة العمل الذي يقوم به الوالدين؟ (الرجاء اختيار إجابة للأب وأخرى للأم)

الزوج

الأم

الأب

- متخصص مهني (طبيب / مهندس / مدرس /
 أستاذ جامعي/محاسب/ محامي/....)
 أعمال إدارية وإشرافية
 شبه متخصص (وظائف مساعدة)
 أعمال السكرتارية
 أعمال حرفية (صيد، بناء، زراعة)
 أعمال حرة وتجارة
 لا يعمل / متفرغ للمنزل

10. هل تعمل وتدرس.. حدد طبيعة العمل والدراسة بالنسبة لك من الآتي: ماهو مسمى العمل؟

- أعمل ومتفرغ جزئياً للدراسة.....
 متفرغ للدراسة وأعمل جزئياً.....
 أعمل جزئياً ومتفرغ جزئياً للدراسة.....
 متفرغ للدراسة كلياً
 أخرى (حدد).....

11. إذا كنت متفرغاً للدراسة ولا تعمل، فكيف تواجه تكاليف الدراسة؟
(يمكنك اختيار أكثر من إجابة، إذا كان ضرورياً، لما ينطبق من الآتي)

- دعم الأسرة
 مكافأة الجامعة
 أخرى (حدد).....

12. ماهو الدخل السنوي لك أو لعائلتك، إذا لم تكن تعمل؟

- أقل من 20000 ريال 21000 – 40000 ريال
 41000 - 60000 ريال 61000 - 80000 ريال
 81000- 100000 ريال أكثر من 100000 ريال في العام

معلومات عامة عن الوعي باستخدام التقنية والتواصل الإلكتروني:

13. هل لديك جهاز حاسب آلي؟ (Desktop/Laptop)

- نعم لا

14. إذا لم يكن لديك جهاز حاسب آلي، فأين تقوم بأعمالك التي تعتمد عليه: (يمكنك اختيار أكثر من إجابة)

- معمل الجامعة المكتبة الجامعية المكتبة العامة العمل
 جهاز الوالدين لدى أحد الأصدقاء أخرى (حدد).....

15. هل استخدمت الحاسب الآلي في مرحلة التعليم العام؟ نعم لا

16. كيف تعلمت استخدام الحاسب الآلي وتطبيقاته؟ (يمكنك اختيار أكثر من إجابة)

- مقرر دراسي في المرحلة الثانوية مقرر دراسي بالقسم الجامعي
 مقرر تم تقديمه بمركز الحاسب الآلي أو المكتبة أخذت مقرر في مكان آخر
 تعليمات فردية من موظفي المكتبة مساعدة من الزملاء
 التعليم ذاتي
 القراءة حول الحاسب الآلي (أدلة، مجلات متخصصة بالحاسبات آلية)
 تعليم مباشر آلي من خلال الكتيبات والإرشادات على واجهات المستفيد والممارسة
 أخرى(حدد).....

17. هل تشعر بالثقة نحو استخدام مهارات الكمبيوتر الأساسية مثل لوحة المفاتيح، والفأرة، والعمل مع الملفات (إنشاء، فتح، حفظ، إعادة تسمية، تحرير، تحريك، النسخ،....إلى آخره)، معالج الكلمات، والطباعة (المقياس هو 1= غير واثق بالكامل، وحتى 7= واثق جدا)

1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □

18. هل حصلت على أي تدريب يخص تنمية مهارات البحث عن المعلومات؟

□ نعم □ لا

إذا كانت الإجابة بنعم، فأبي من الآتي كانت: (يمكنك إختيار أكثر من إجابة)

□ مقرر معطى من قبل القسم الجامعي

□ مقرر معطى في مكان آخر

□ مقرر معطى من مركز الحاسب الآلي أو المكتبة

□ تعليمات فردية من قبل موظفي المكتبة

□ المساعدة من زملاء

□ التعليم ذاتي

□ قراءة الإصدارات المتخصصة بكيفية البحث عن المعلومات

□ التعليم الآلي المباشر عبر دروس وتدريب متوفر على الشبكة

19. هل استخدمت مصادر المكتبة الالكترونية من قبل؟ □ نعم □ لا

20. ماهي أنواع مصادر المعلومات التي تعتمد عليها غالبا عندما تبحث عن المعلومات؟ (رتبها حسب الأولوية من 1 إلى 8)

□ الكتب المطبوعة □ الكتب الالكترونية □ الدوريات المطبوعة

□ الدوريات الالكترونية □ قواعد البيانات الالكترونية □ الانترنت

□ المكتبات الرقمية □ أخرى (حدد).....

21. كيف يمكن أن تقيم نفسك كمستخدم للتقنية والتواصل الالكتروني؟ (المقياس: 1=مبتدىء ، وحتى 7=خبير)

1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □

22. هل تعتقد ان اتقان اللغة الانجليزية يؤثر على إتاحة واستخدام مصادر المعلومات الالكترونية باللغة الإنجليزية؟ (الرجاء تحديد التأثير بناء على المقياس بدء ب 1= لا تؤثر وحتى 7= لها تأثير كبير)

1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □

عوامل مؤثرة في استخدام الانترنت

23. ما نوع الاتصال بالانترنت الذي تستخدمه (اختر لكل مكان مايناسبه)

المكتبة العامة	العمل	البيت	مودم عن طريق الهاتف
□	□	□	خط مباشر بالانترنت
□	□	□	(DSL , broadband)
□	□	□	اتصال لاسلكي

24. منذ متى وأنت تستخدم الانترنت؟ (اذكر العدد بالسنة والشهر)

□ أكثر من 10 سنوات

□ من 1-3 سنوات

□ من 4-7 سنوات

□ 8-10 سنوات

□ أقل من سنة

25. كم مرة تستخدم الانترنت؟

□ الجامعة □ العمل □ المنزل □ المكتبة العامة □ الأصدقاء

□ اشتراك فردي □ أخرى (حدد).....

26. كم مرة تستخدمين الانترنت؟
 يوميا على الأقل مرة بالأسبوع 2-3 مرات في الأسبوع
 على الأقل مرة في الشهر أقل من مرة في الشهر
27. ما مقدار الوقت الذي تستغرقه أسبوعيا تقريبا لاستخدام الانترنت في الدراسة أو العمل؟
 ساعة أو أقل 12 إلى 15 ساعة
 من 2 إلى 4 ساعات 16 إلى 18 ساعة
 من 6 إلى 8 ساعات 19 إلى 21 ساعة
 من 9 إلى 12 ساعات أكثر من 22 ساعة
28. بماذا تبدأ عادة للبحث عن المعلومات بـ: (يمكنك اختيار أكثر من إجابة)
 الانترنت من المنزل الانترنت من الجامعة كتب مطبوعة
 كتب الكترونية دوريات ومجلات مطبوعة قواعد البيانات الالكترونية
 الدوريات الالكترونية أخرى (حددي).....
29. هل تشعر بالثقة عند استخدامك الانترنت لإيجاد المعلومة؟ حدد مستوى ثقتك بحيث: (1=غير واثق على الإطلاق ، وحتى 7= واثق جدا)
 1 2 3 4 5 6 7
30. لأي غرض تستخدم الانترنت؟ (يمكنك اختيار أكثر من إجابة)
 لإيجاد عمل أو معلومات تخص العمل لأداء مهمة من مهام العمل
 لمطالعة معلومات عامة لقراءة البريد الإلكتروني
 لأداء بحث يخص العمل للدراسة أو لأداء تكليف لمقرر دراسي
 لتعلم كيفية استخدام الحاسب الآلي والانترنت للتحدث مع الآخرين
 للتسوق من الانترنت لإيجاد برامج مجانية وتحميلها
 تصفح الويب للمتعة للحصول على معلومات خلال فصول التعليم عن بعد
 أخرى(حددي).....
31. ماهي المشاكل التي قد تواجهك عند استخدام الانترنت؟ (يمكنك اختيار أكثر من إجابة)
 بطء الاتصال انقطاع الاتصال أثناء التصفح
 اشتراك الانترنت غالي الثمن قلة المعرفة بمهارات استخدام الانترنت
 الصعوبات في تحديد الصفحة المطلوبة الأداء الضعيف لجهاز الحاسب الآلي
 أنظمة / قوانين الإتاحة المسيطرة على الانترنت حاجز اللغة
 ليس لدي وقت كافي لاستخدام الانترنت لا تثق بالمعلومات المتاحة على الانترنت
 أخرى(حددي).....
32. كيف يمكن أن تقيم الوقت الذي تستغرقه عندما تبحث في مصادر المعلومات الالكترونية في كلا من
المنزل: بطيء جدا بطيء إلى حد ما بطيء سريع سريع جدا
الجامعة: بطيء جدا بطيء إلى حد ما بطيء سريع سريع جدا
العمل: بطيء جدا بطيء إلى حد ما بطيء سريع سريع جدا
المكتبة العامة: بطيء جدا بطيء إلى حد ما بطيء سريع سريع جدا
33. بصفة عامة .. كيف تقيم المعلومات التي تحصل عليها عندما تبحث في الانترنت؟
 لاشيء بعض الشيء ولكن ليس كما تحتاج
 كافية أكثر مما أتوقع
34. هل ترى أن الوقت الذي تستغرقه في البحث في الانترنت يناسب النتائج التي تحصل عليها؟
 النتائج تبرر بشدة الوقت المستغرق في البحث
 النتائج تبرر الوقت المستغرق في البحث
 النتائج لا تبرر الوقت المستغرق في البحث

35. كيف ترى سهولة استخدامك للمصادر الالكترونية على الأنترنت؟
 صعبة جدا صعبة إلى حد ما سهلة سهلة إلى حد ما سهلة جدا

36. كيف عرفت عن مصادر المكتبة الالكترونية؟ (يمكنك اختيار أكثر من إجابة)
 عرفت بنفسي عبر أخصائي المراجع
 عبر الأصدقاء عبر موقع المكتبة
 عبر ورش العمل المتخصصة عبر أعضاء هيئة التدريس
 أخرى (حدد).....

37. هل استخدمت وتصفح من قبل صفحات لمكتبات الكترونية؟ نعم لا

38. ما رأيك في الجملة الآتية:
" أستطيع إيجاد المعلومات التي احتاجها لانهااء تكليفتي ومهماتي من خلال مصادر المعلومات الالكترونية"
 غير موافق بشدة عدم الموافقة غير متأكد موافق موافق بشدة

39. ما أنواع مصادر المعلومات الالكترونية التي سبق وأن استخدمتها؟ (يمكنك تحديد أكثر من إجابة)
 الدوريات والمجلات الالكترونية قواعد البيانات الالكترونية عبر الأنترنت
 الكتب الالكترونية الفهرس الآلي OPAC
 الكتب المرجعية الالكترونية مثل القواميس والموسوعات
 أخرى (حدد).....

40. كيف تصف درجة حماسك لتتعلم كيفية استخدام مصادر المعلومات الالكترونية التي تتيحها المكتبة؟
 متحمس جدا متحمس إلى حد ما غير متحمس

الاستخدام لصفحة المكتبة الجامعية على الأنترنت:

صمم هذا الجزء من الاستبيان لجمع البيانات حول خبرتك وتجربتك بشكل عام أو آخر تجاربك مع خدمات المعلومات التي يقدمها موقع مكتبة الجامعة وأتوقع إن تقدم الإجابة والمعلومات معتمدا على خبرتك باجراء بحثين: واحد في موضوع مألوف لديك والآخر في موضوع غير مألوف .. ولذلك تذكر تجربتين من تجاربك أو خبرتك باستخدام موقع المكتبة بشكل عام:

41. في هذا الجزء من الاستبيان هل:
 اعتمدت على خبرتك مع موقع جامعة الملك عبد العزيز
 أجريت البحثين المطلوبين في هذا الاستبيان
أو

42. أي نوع من مصادر المعلومات الالكترونية تفضل استخدامها؟ (يمكنك اختيار أكثر من إجابة)
 الدوريات الالكترونية قواعد المعلومات الالكترونية الكتب الالكترونية
 الفهرس الآلي المراجع الالكترونية الأنترنت
 أخرى (حدد).....

43. كيف ترى البحث في موضوع جديد وذلك باستخدام مصادر المعلومات الالكترونية؟
 صعب جدا فصعب سهل إلى حد ما سهل سهل جدا

44. كيف ترى البحث في الموضوع الذي تعرفه ضمن اهتماماتك وذلك باستخدام مصادر المعلومات الالكترونية؟
 صعب جدا صعب سهل إلى حد ما سهل سهل جدا

45. من وجهة نظرك ، هل ترى نظام المكتبة الآلي المتاح عبر صفحاتها صعب وغير مرن في محتواه وتنظيمه؟

نعم أحيانا لا

46. كم استغرق وقت بحثك للموضوع الذي تعرفه؟

أقل من 15 دقيقة 15-30 دقيقة 30-45 دقيقة 45 دقيقة إلى ساعة

ساعة - ساعتان

من خمس ساعات

47. كم استغرق وقت بحثك للموضوع الذي لا تعرفه؟

أقل من 15 دقيقة 15-30 دقيقة 30-45 دقيقة 45 دقيقة إلى ساعة

ساعة - ساعتان ثلاث- أربع ساعات أكثر من خمس ساعات

48. كم مرة حاولت إعادة كتابة مصطلحات أو كلمات البحث لتصل للنتيجة التي تريدها؟

أ. بالنسبة للموضوع الذي تعرفه

مرة مرتان ثلاث مرات أكثر من ثلاث مرات

ب. بالنسبة للموضوع الذي لا تعرفه

مرة مرتان ثلاث مرات أكثر من ثلاث مرات

49. ماذا تفعل عادة عندما تكون نتيجة البحث غير مرضية؟

أقوم بتغيير قاعدة المعلومات أقوم باستخدام امكانات البحث المتقدم

أقوم بتغيير مصطلحات البحث أتوقف عن البحث

أخرى (حدد).....

50. كيف تصف رضاك عن نتائج البحث: (حدد بالرقم رأيك حيث 1=غير راض تماما ، وحتى 7 = راض

تماما)

أ. بالنسبة للموضوع الذي تعرفه

1 2 3 4 5 6 7

ب. بالنسبة للموضوع الذي لا تعرفه

1 2 3 4 5 6 7

51. كيف تقيم مستوى الراحة في البيئة (المكان) الذي قمت باداء البحث فيها؟

(1= غير مريح جدا وحتى 7= مريح جدا)

1 2 3 4 5 6 7

52. هل تعتقد بأن الالفة للبيئة (المكان المتعارف عليه) مهمة لاداء البحث في مصادر المعلومات

الالكترونية؟ (1=غير مهم على الاطلاق ، وحتى 7= مهم جدا)

1 2 3 4 5 6 7

53. من خلال خبرتك ، كيف ترى سهولة واجهة صفحة المكتبة؟

صعب جدا صعب صعب الى حدما سهل سهل جدا

خصائص واجهة المكتبة :

54. بعد استخدامك لصفحة المكتبة على الأنترنت ، قم بتقييم خصائص الواجهة كالاتي:

سيء جدا	سيء	عادي	جيد	جيد جدا
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- المحتوى والتغطية

- التصميم والتوزيع

- سهولة الاستخدام

- الروابط

- سهولة البحث

- درجة الثقة والاعتماد (سهولة المعلومات والفهم)

- المساعدة والدعم (امكانية الاستفسار والاتصال)

- اختيارات فردية (الاختيار لتصميم معين، الاختيار

لقنوات المعلومات، عدد التسجيلات في الصفحة)

55. هل ترى أن طريقة تنظيم مصادر المعلومات الالكترونية تلبى احتياجاتك المعلوماتية؟

(حدد بحيث 1= غير مرض تماما وحتى 7= مرض تماما)

غير مرض تماما 1□ 2□ 3□ 4□ 5□ 6□ 7□ مرض تماما

56. كيف تقيم مصادر المعلومات الالكترونية الآتية بالنسبة لك؟

(1= غير مهم على الإطلاق ، وحتى 7= مهم جدا)

7□	6□	5□	4□	3□	2□	1□	• قواعد المعلومات المباشرة
7□	6□	5□	4□	3□	2□	1□	• الدوريات والمجلات الالكترونية
7□	6□	5□	4□	3□	2□	1□	• الفهرس الآلي
7□	6□	5□	4□	3□	2□	1□	• الأعمال المرجعية المباشرة
7□	6□	5□	4□	3□	2□	1□	• المنافذ الموضوعية
7□	6□	5□	4□	3□	2□	1□	• الانترنت
7□	6□	5□	4□	3□	2□	1□	• المكتبات الرقمية

57. كيف تصف درجة معرفتك، باستخدام مصادر المعلومات الالكترونية؟

(بحيث 1= لا توجد خبرة وحتى 7= خبرتي جيدة)

7□ 6□ 5□ 4□ 3□ 2□ 1□

58. كيف عرفت طرق البحث وصياغة الحاجة المعلوماتية في النظام؟ (يمكنك اختيار أكثر من إجابة)

- أصدقاء المساعدة المتوفرة في النظام أخصائي المكتبة
- أعضاء هيئة التدريس بالمحاولة والخطأ والتجريب

أدوات المساعدة المتوفرة

59. كيف ترى فائدة المساعدة المتوفرة في النظام؟

- خدمة مفيدة ولكنني أفضل سؤال المساعدة من المختص خدمة مفيدة وسهلة
- خدمة مفيدة ولكنها صعبة الاستخدام خدمة غير مفيدة

60. هل يسمح لك نظام المكتبة بتعديل الأخطاء عندما تستخدم واجهة الصفحة؟

نعم أحيانا لا

61. ماهي اسباب عدم استخدام شاشة المساعدة؟

- لا أعرف عنها شيئا لا أشعر بالحاجة لها لا أعرف إن كانت ستساعدني
- أعرف عنها وعن وجودها ولكن لا أعلم إن كانت مفيدة للمصدر المحدد الذي استخدمه
- أفضل سؤال الأفراد لا توجد حدود و إرشادات لاستخدام المصطلحات
- أخرى (حدد).....

62. ماهي امكانات البحث التي تستخدمها عند البحث في الفهرس الآلي أو القواعد أو المصادر الأخرى؟

(يمكنك اختيار أكثر من إجابة)

- الموضوع المؤلف العنوان تاريخ النشر
- عنوان الدورية عنوان المقال كلمة مفتاحيه استخدام الروابط
- استخدام أسلوب البتر (كتابة جزء من الكلمة و وضع علامة)
- استخدام الأداة المتاحة لصياغة واختيار مصطلح البحث
- أخرى (حدد).....

63. ماهي أبرز المشاكل التي تواجهها عند إستخدامك الفهرس المباشر؟ (يمكنك اختيار أكثر من إجابة)

- لا أستطيع استخدام قائمة رؤوس الموضوعات
- لا أستطيع كتابة جملة بحث سهلة
- لا أستطيع ربط أكثر من بحث
- لا أجد ترتيب النتائج جيدا
- لا أستطيع تحديد النتائج بالتاريخ او بالمجموعه أو اللغة
- هناك اختيارات متقدمة صعبة
- أخرى (حدد).....

64. ماهي المشاكل التي تواجهها عند البحث في قواعد الالكترونية؟ (يمكنك اختيار أكثر من إجابة)

- ليس سهلا اختيار قاعدة بيانات
- الحاجة لا استخدام اسم ورمز سري دائما
- احتاج لوقت لتغيير قاعدة من القواعد
- صعوبة تحميل المعلومات
- وجود مصاريف ونفقات مالية
- وجود معلومات لا علاقة لها بالبحث
- وجود أخطاء في الاتصال
- وجود معلومات كثيرة جدا
- صعوبة البحث في قواعد عدة بعملية واحدة
- أخرى (حدد).....

65. ماهي المشاكل التي تواجهك عند استخدام الدوريات الالكترونية؟ (يمكنك اختيار أكثر من إجابة)

- لا استطيع اختيار القاعدة المناسبة للدوريات المناسبة
- الدوريات الالكترونية تأتي تحت واجهات عدة
- صعوبة فهم استراتيجيات وواجهات عدة للدخول للدوريات الجديدة
- عدم وضوح وسهولة بنية الدوريات الالكترونية
- لا استطيع تحديد دورية محددة بين الدوريات المتاحة
- صعوبة أدوات البحث بالكلمة والجملة والتفريق بينها
- توفر المستخلصات فقط
- صعوبة تحديد مصطلحات البحث بسهولة
- صعوبة تحديد المقالات المطلوبة
- وجود معلومات لا تتصل بالموضوع
- وقت طويل للحصول على المعلومات
- لا أعرف الفرق بين شكل المخرجات
- أخرى (حدد).....

شكرا لكم مع تقديري لمساعدتكم

Appendix E: The Arabic Questions of Focus groups

أسئلة مقابلات مجموعات المناقشة

قائمة من الموضوعات والمتعمقة لتغطية المطلوب مشروحة كالتالي:

1_ الاختلافات في الركائز الأساسية (البنية الرئيسية التحتية) لتقنيات الاتصال والمعلومات والدور الذي تلعبه كمساعدة أو عائقه للوصول للمعلومات الالكترونية

جودة البنية التحتية الأساسية لتقنيات الاتصال والمعلومات في المملكة؟

أنواع الاتصال بالانترنت المتاحة برود باند أو دايل اب إلى آخره

هل تسيطر قوانين الدولة على تقنيات الاتصال والمعلومات وما تأثير ذلك على الوصول للمعلومات ؟

هل تتأثر سياسات التعليم بهذه القوانين؟

هل تؤثر سياسات التعليم أو قوانين وسياسات الاتصال والمعلومات سلبا أو تعتبر عائقا على وجود وتطوير

مكتبات افتراضية في المملكة؟

ماهو رأيكم بالجامعات الغربية ومكتباتها؟ والى أي حد يرى (المشاركون) أن النموذج الغربي يمكن تبنيه أو هل

النموذج الحالي السعودي كاف لأغراض الوصول للمعلومات الالكترونية؟

هل توجد فجوة رقمية يشعرون بها وكيف يتجاوزونها؟

ماهي العوامل المؤثرة في أساسيات بيئة تقنيات الاتصال والمعلومات في المملكة وتكون مشجعة أو منفرة او

عائقة للوصول للمعلومات الالكترونية ؟

ماهي العوامل التي مع أو العوامل التي تقف ضد إتاحة الوصول للمعلومات الالكترونية؟

كيف من وجهة نظركم أن نتغلب على هذه الصعوبات أو نصحح هذا الوضع القائم؟

2_ الفروقات في الخصائص الفردية والدور الذي تلعبه كمشجعه أو عائقة للوصول للمعلومات الالكترونية:

لماذا الطلاب يفضلون نوع معين من المصادر عندما يقومون بالبحث؟

ماهي المؤثرات التي تؤثر باختيارات الأفراد نحو استخدام المصادر الالكترونية؟

ماهو دور خلفيات الأفراد نحو اختياراتهم وتفضيلهم لاستخدام المصادر الالكترونية؟

هل تؤثر الخبرات السابقة أو صعوبة التكاليف وغير ذلك على الوصول للمعلومات الالكترونية؟

هل تتغير اهتمامات الأفراد؟ ولماذا؟

الفهم الواسع و العام لسلوكيات الأفراد _ يروي الأفراد بعض المواقف وحاول تتبع بعض المواقف التي يمكن أن

تقدم شرحا لكيفية اختلاف السلوكيات والتعامل مع المعلومات؟

لماذا يستخدمون الانترنت ؟

وهل تختلف أساليب وطرق استخدامهم للانترنت بحسب الأسباب والحاجة؟

ماهو دور السلوكيات الفاعلة على الوصول للمعلومات؟

ماهو تأثير التدريب على الوصول للمعلومات الالكترونية؟

ماهي العلاقة بين القدرات اللغوية والوصول للمعلومات؟ أداء البحث باللغة العربية وأداء البحث بالانجليزي ؟

3_ دور الوعي والفهم والتأهيل (القدرة على استخدامها) في مجال الانترنت كعنصر مشجع داعم أو عائقه من

الوصول للمعلومات الالكترونية؟

ما المقصود برأيهم بالوعي والفهم للانترنت؟

إلى أي درجة يكون للوعي والفهم بالانترنت تأثير على فعالية البحث وإجراءاته عملية البحث أنها تعتمد على التكلفة؟

حاول أن يروا الطالبات بعض الأمثلة توضح فهما أكبر لكيفية تأثير الوعي والفهم للانترنت بفاعلية إجراء البحث في الانترنت؟

هل تحقق الوعي والفهم للانترنت (القدرة على استخدام الانترنت) دائما نتائج بحث متميزة أو مرضية؟ ابحث هذه الظاهرة عبر نماذج متعمقة؟

4_ دور العوامل الوصفية (الديمقراطية) كعناصر مشجعة أو قد تعوق المستفيدين للوصول للمعلومات حاول التعرف على ما يفضلون من المصادر ولماذا؟

5_ العوامل الاجتماعية والشخصية كعوامل مشجعة داعمة أو عائقة من الوصول للمعلومات؟

حاول التعرف على ما يؤثر على استخداماتهم أو تفضيلهم؟ مثل تعليم الوالدين؟ عمل الوالدين أو الزوج دخل الأسرة؟ الثقافة؟

6_ عوامل بيئية كعامل مساعد أو عائق للوصول للمعلومات الالكترونية:

حاول التعرف على البيئة حول المجموعة وكيف درجة تأثيرها مثل الأجهزة والمعامل والمساعدة وغيرها أيضا عوامل الاستخدام المتغيرات المختلفة من تصميم الموقع ومظهره الخارجي والوصول إليه التسهيلات أو الإمكانيات المقدمة من خلال الموقع لأداء البحث وخدمات المساعدة إلى أي مدى يستفيدوا من هذه الخدمات؟ يعلق المشاركون بشكل انتقادي كيف يتم البحث للموضوع المعروف والموضوع غير المعروف شرح لمعرفة كيف يمكن لهذا أن يؤثر في عملية البحث تؤدي إلى نتائج ناجحة أو مثمرة أو عدم نجاحها؟

عينوا من وجهة نظركم الحواجز والعوائق التي تروا أنها تعيق الوصول للمعلومات؟

وفي الختام أود أن أشكر جميع الحضور معي لأداء هذا الحوار والمناقشة في موضوع الدراسة

Appendix F: A Formal Letter from the Head of the LIS Department at KAAU

P.O. BOX 80200 JEDDAH 21589
6952 000
☎ 6400 000
Tele: 591141 KAUNI SJ
Cable: "JAMEATABDULAZIZ"

Ref. :
Date :
Encl. :



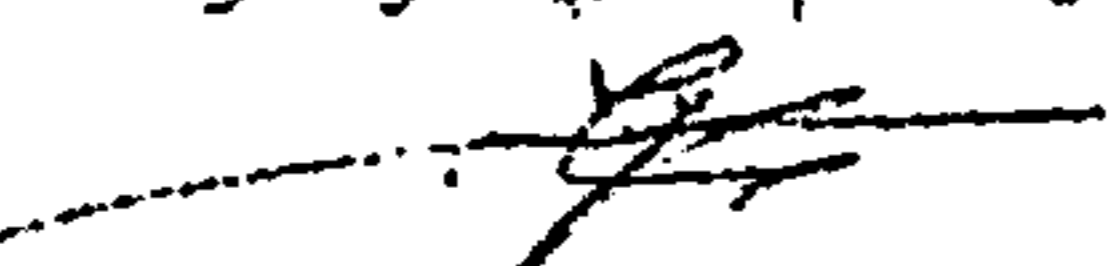
ص.ب ٨٠٢٠٠ - جدة ٢١٥٨٩
٦٤٠٠٠٠٠
٦٩٥٢٠٠٠٣
تلکس ٦٠١١٤١ كايوني اس جده
برقياً : جامعة عبد العزيز

الرقم :
التاريخ :
المرفقات :

إلى من يهمه الأمر

السلام عليكم ورحمة الله تعالى وبركاته
نرجو منكم التكرم بمساعدة الأستاذة ماجدة عزت غريب في الحصول على المعلومات التي تبحث عنها
وتسهيل كافة الإجراءات لإنجاز بحثها العلمي على أتم وجه للحصول على درجة الدكتوراه ومن ذلك توزيع
الاستبيانات والاجابة عليها في أسرع وقت ممكن .

مع بالغ الشكر والتقدير

مشرفة قسم المكتبات والمعلومات

د. سارة بنت عبد الرحيم قشقرى



المملكة العربية السعودية
 وزارة الثقافة والإعلام
 جامعة الملك عبد العزيز
 كلية الآداب والعلوم الانسانية
 قسم المكتبات

مكتب المشرقة على قسم المكتبات والمعلومات

رقم الوارد
 رقم العامة ١٨٤٤٤ / ٥ / ٢٧
 التاريخ ١ / ١ / ١٤٤٢
 التاريخ ٤ / ٢ / ١٤٤٢٧
 من مكتبة الملك عبد العزيز
 الموضوع مجموعة السمع للنبذة باصحة نزيب
 بما يتخضع لاحتياجات الأخصائين
 الاحالة لسعادة مدير مكتبة الملك عبد العزيز (لظن الاستاذة صالحة
 الانادة لرجاء العلم ومساعدة المكتبة بالخدمة
 نزيب في العمل المكتبي بالخدمة لخدمة
 جانب المكتبة جامعة الملك عبد العزيز
 تديره نزيب نزيب نزيب نزيب نزيب
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رقم الصادر ١ / ١
 التاريخ ٤ / ٢ / ١٤٢٦
 المشرقة على
 قسم المكتبات والمعلومات
 نزيب نزيب
 نزيب نزيب

P.O. BOX 80200 JEDDAH 21589
6952 000
☎ 6400 000
Tefax : 601141 KAUNI SJ
Cable : "JAMEATABDULAZIZ"

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

المملكة العربية السعودية
وزارة التعليم العالي والبحث العلمي

جامعة الملك عبد العزيز

King Abdulaziz University

كلية الآداب والعلوم الإنسانية

مكتب المشرفة على قسم المكتبات والمعلومات

ص.ب. ٨٠٢٠٠ - جدة ٢١٥٨٩
٦٤٠٠٠٠٠
٦٩٥٢٠٠٠٠٣
تلکس ٦٠١١٤١ كايوني اس جه
برفيسا : جامعة عبدالعزيز

Ref. :

Date :

Encl. :

الرقم :

التاريخ :

المرفقات :

سعادة وكييلة كلية الآداب والعلوم الإنسانية حفظها الله

السلام عليكم ورحمة الله وبركاته،،،

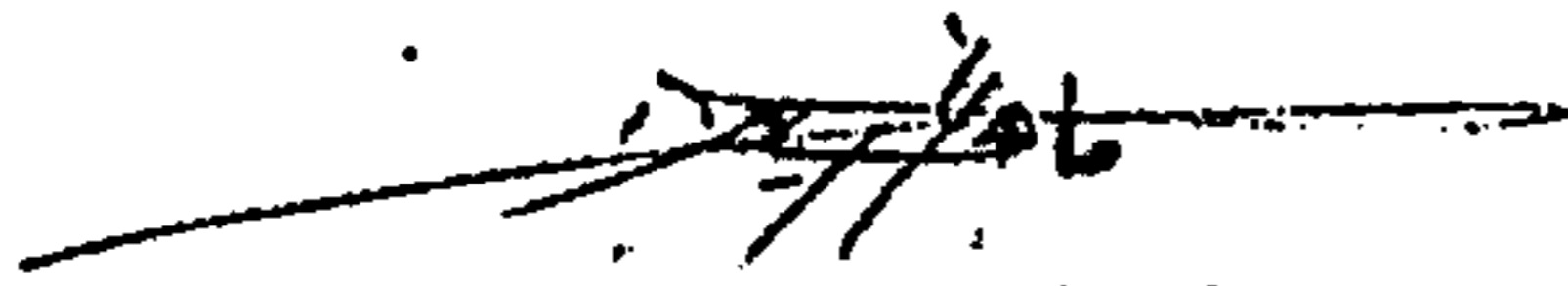
نظرا لمتطلبات الدراسة الحالية ببريطانيا ، أحيط سعادتكم علما بأنني بمرحلة الإعداد لجمع البيانات من جامعات المملكة العربية السعودية وأرغب في الحصول على قرار موافقة من جامعة الإمام محمد بن سعود الإسلامية وجامعة الملك سعود لتوزيع الاستبيان على طلاب وطالبات مرحلة البكالوريوس ومرحلة الماجستير في التخصصات التالية : المكتبات والمعلومات وإدارة الأعمال والحاسب وفي حالة تعذر توفر إحدى هذه التخصصات في إحدى الجامعات فالرجاء ترشيح التخصص (خاصة في مرحلة الماجستير) الذي يتيح فرصة القبول من تخصصات أخرى لأتمكن من توزيع الاستبيان على أفراد العينات المرشحة ، وهذا لمحدودية فترة التطبيق .

لذا آمل من سعادتكم اتخاذ ما ترونه مناسب لتسهيل عملية التوزيع وجمع

البيانات .

وتفضلوا بقبول فائق الشكر والتقدير

المتبعتة من قبل قسم المكتبات والمعلومات


ماحدة غريب

Appendix G: The Selected Universities' Library Home Pages

Figure 1 SU Library Home Page

<http://www.lib.strath.ac.uk/>

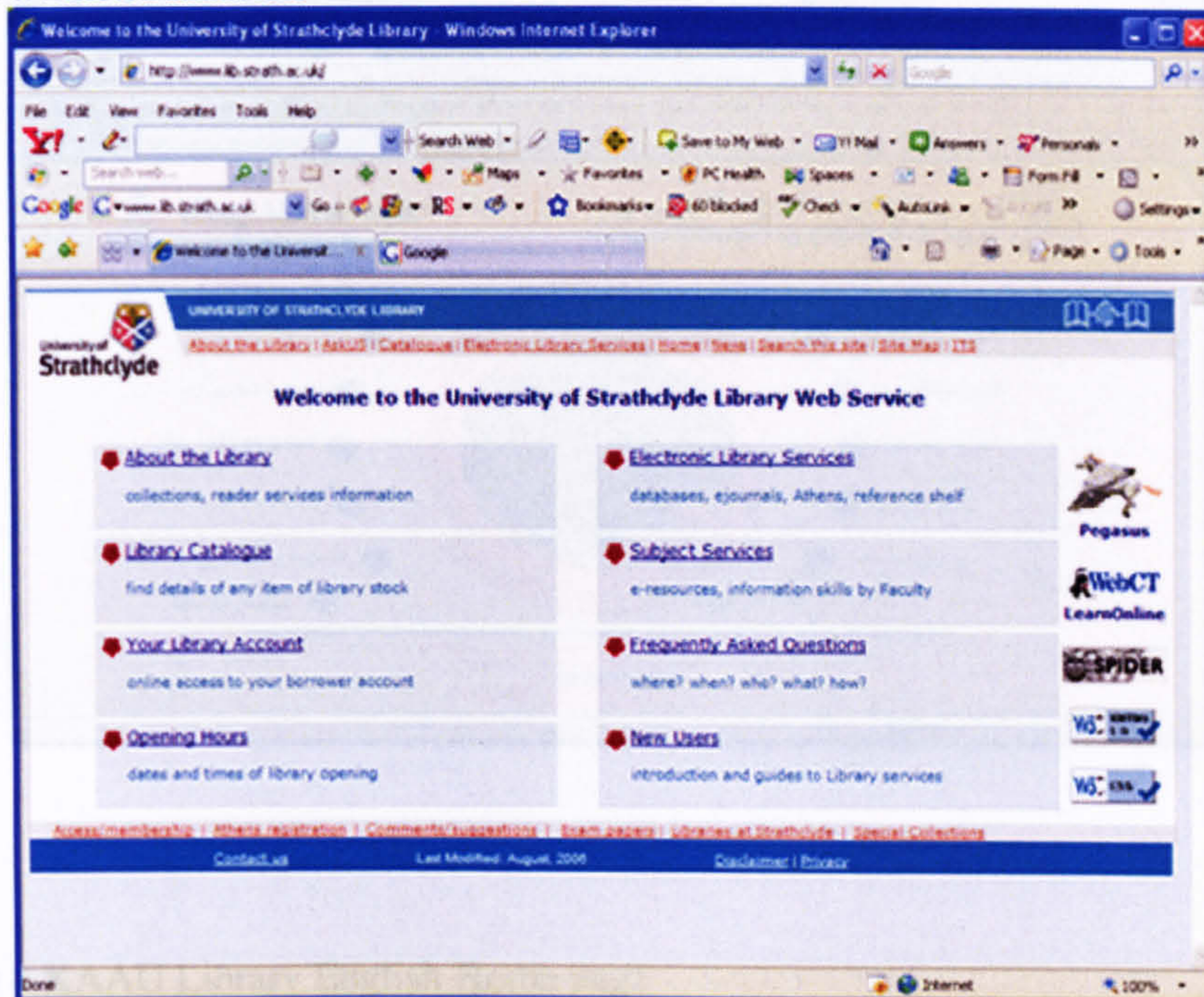


Figure 2 Electronic Library services at SU

<http://www.lib.strath.ac.uk/els.htm>

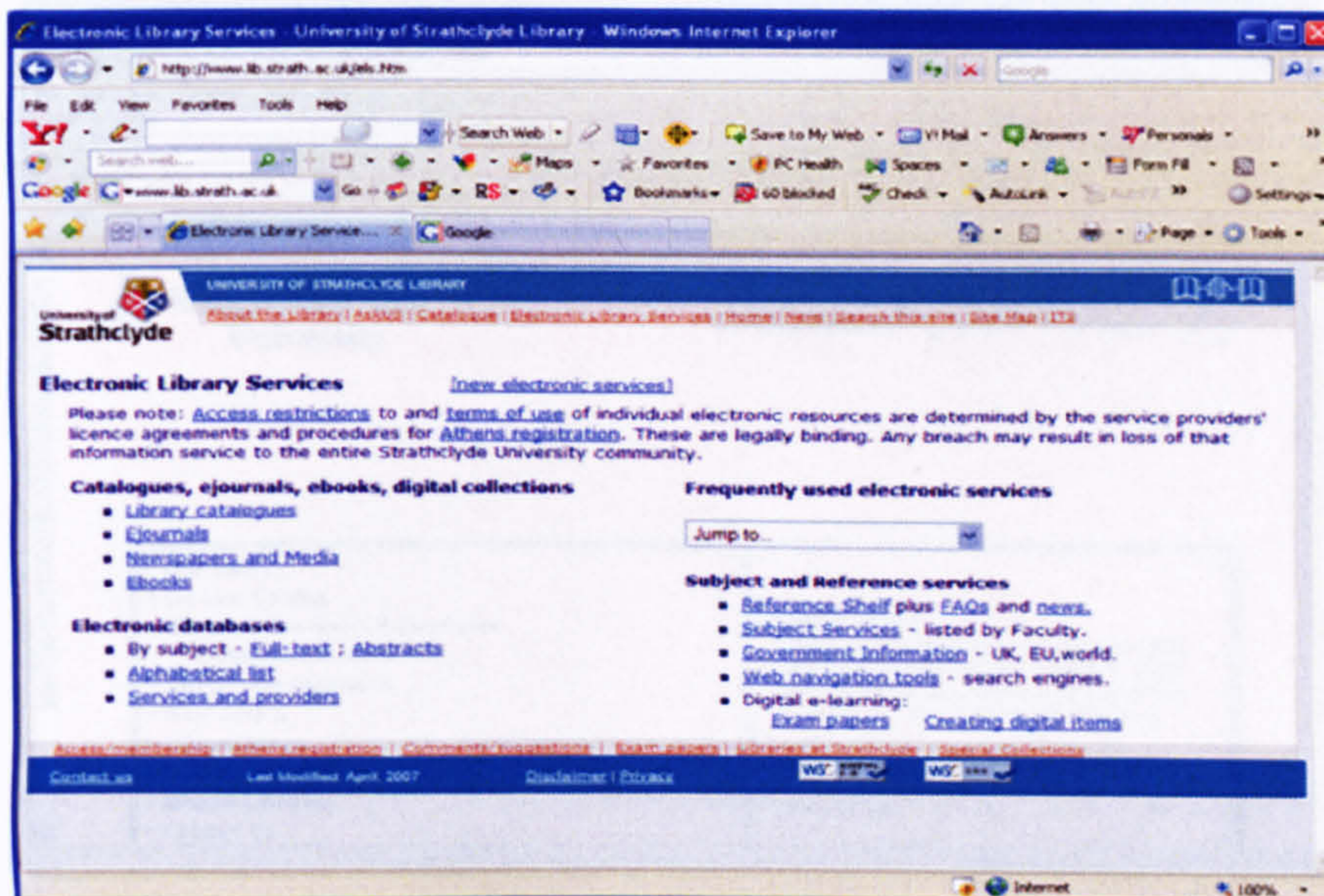


Figure 3 KAAU Library Arabic Home page
<http://www.kaau.edu.sa/libraries/index.html>



Figure 4 KAAU Library English Home page
http://www.kaau.edu.sa/libraries/index_e.html



Appendix H: Descriptive Data Tables

Figure 5 KSU Library Home Page (PSCL's Home Page)
<http://library.ksu.edu.sa/>



Figure 6 IMBSIU Library Home Page

<http://library.imamu.edu.sa/>



Appendix H: Descriptive Data Tables

- University of Strathclyde N=54
-User profile

		SU	
		Frequency	%
Gender	Male	25	46.3
	Female	29	53.7
Total		54	100
Age	20-25	27	50.0
	26-30	13	24.1
	31-35	7	13.0
	36-45	6	11.2
	46-over	1	1.9
Total		54	100
status	Single	39	72.2
	Married	8	14.8
	Living with a partner/parents	5	9.3
	Other	2	3.7
Total		54	100

Q 4 Time of the journey to the university

Time of the journey	Frequency	%
No answer	8	14.8
10-20 minutes	23	42.6
25-35 minutes	11	20.4
35-45 minutes	6	11.1
An hour	2	3.7
More an hour	4	7.4
Total	54	100.0

Q 5 Language skills affect access o electronic resources

English impact	1		2		3		4		5		6		7		Option not used	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%		%
SU	4	7.4	6	11.1	5	9.3	0	0	1	1.9	0	0	2	3.7	36	66.7

Q 8 Level of education to the students' parents

Parents' education	Mothers' education		Fathers' education	
	Frequency	%	Frequency	%
Educational Less than ten years	21	38.9	12	22.2
University educated	15	27.8	17	31.5
Holds a college degree Vocational degree	7	13.0	10	18.5
Highly educated	7	13.0	12	22.2

Q 10 Students' status

Student's status	SU	
	Frequency	%
Unemployed and full-time student	36	66.6
Full-time employment and part-time student	1	1.9
Part-time employment and full-time student	14	25.9
Other	3	5.6
Total	54	100

Q 12 Annual income of students

The annual income	Frequency	%
less than £5000	17	31.5
£5000-£10000	6	11.1
£11000-£20000	5	9.3
£21000-£30000	7	13.0
£31000-£40000	8	14.8
£41000-£50000	4	7.4
more than £50000	3	5.6
Option not used	4	7.4
Total	54	100

- **General ICT literacy**

Q 15 Owning a computer

	Frequency	%
Yes	48	88.9
No	6	11.1
Total	54	100

Q 18 Methods to learn using the computer facilities

Learning computer facilities through:	Frequency	%
A course given by the high school	23	43
A course given by the university department	24	44.4
A course given by the library or the computer centre	1	1.9
A course given elsewhere	10	19
Individual instruction by library staff	10	19
Assistance from colleagues	13	24.1
Self - instruction	39	72.2
Literature (manuals, computer or/and library magazines)	11	20.4
Online instruction /guides and manuals on the interface itself	11	20.4
Others	2	3.8

Q 19 The distribution of students' scaling confidence of basic computer skills

Scaling confidence	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
SU	0	0	2	3.7	0	0	1	1.9	3	5.6	16	29.6	32	59.3

Q 20 Distribution of formal training in information searching skills

Ways of training in information searching skills	Frequency	%
A course given by the university department	16	30.0
A course given by the library or the computer centre	2	3.7
A course given elsewhere	3	6.0
Individual instruction by library staff	1	1.9
Assistance from colleagues	2	3.7
Self - instruction	6	11.11
Literature (manuals, computer or/and library magazines)	4	7.4
Online instruction /guides and manuals on the interface itself	3	6.0
Others	2	3.7

Q 21 Experience with using the library's electronic resources

	Frequency	%
Yes	48	88.9
No	6	11.1
Total	54	100

Q 22 Distribution of students' rate of ICT skills

Scaling expertise	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
From 1= novice To 7= expert	3	5.6	1	1.9	3	5.6	8	14.8	18	33.3	13	24.1	8	14.8

Q 23 The priority of different information resources

Types of inf. resources	1-2		3-4		5-6		7-8	
Printed books	23	42.6	18	33.3	9	16.7	4	7.4
Electronic books	7	13.0	9	16.7	23	42.6	15	27.8
Printed journal	1	1.9	19	35.2	30	55.6	4	7.4
Electronic journals	31	57.4	15	27.8	8	14.9	0	0
Electronic databases	15	27.8	23	42.6	14	26.0	2	3.7
Internet	29	53.7	11	20.4	12	22.3	2	3.7
Digital libraries	3	5.6	13	24.1	9	16.7	29	53.7

- **Internet factor**

Q 24 Internet connection

Type of connection	Home		Work		Public library	
	Frequency	%	Frequency	%	Frequency	%
Modem	15	27.7	12	22.2	0	0
Broadband	34	63.0	8	14.8	18	33.3
Wireless	0	0	0	0	2	3.7
Option not used	5	9.3	34	63.0	34	63.0

Q 25 How long have been used the Internet

The experience of Internet use	SU	
	Frequency	%
1-3 years	1	1.9
4-7 years	35	64.8
8-10 years	12	22.2
Less than 1 year	1	1.9
More than 10 years	5	9.3
Total	54	100

Q 26 Access the Internet through

Internet access through	SU	
	Frequency	%
University	47	87.0
Home	42	77.8
Work	9	16.7
Public library	7	13.0
Friends	4	7.4
Individual subscription	4	7.4

Q 27 Frequent use of the Internet

The rates of Internet use	SU	
	Frequency	%
Daily	49	90.7
2-3 times a week	5	9.3
Total	54	100

Q 28 Amount of time spent using the internet per week

Spent time per week	SU	
	Frequency	%
One hour or less	2	3.7
2 hours - 4 hours	8	14.8
6hours - 8 hours	14	25.9
9 hours - 12hours	4	7.4
13 hours - 15hours	5	9.3
16 hours- 18hours	6	11.1
19 hours-21 hours	3	5.6
More than 22 hours	12	22.2
Total	54	100

Q 30 Distribution of students' scaling confidence of using the Internet

Scaling confidence	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
From 1= not at all To 7= very confident	1	1.9	0	00	2	3.7	5	9.3	15	27.8	19	35.2	12	22.2

Q 32 Students' rate of accessing time

The rate access time	Very slow		Slow		Somewhat fast		Fast		Very fast	
	F	%	F	%	F	%	F	%	F	%
From home	4	7.4	14	25.9	9	16.7	21	38.9	3	5.9
On campus	0	00	4	7.4	12	22.2	28	51.9	10	18.5
In office	0	00	2	3.7	4	7.4	8	14.8	3	5.6
Public library	4	7.4	6	11.1	7	13.0	11	20.4	4	7.4

Q 33 Received information on the Internet

Information on the Internet	Frequency	%
Something, but not as much as you need	20	37.0
Enough	19	35.2
More than you need	15	27.8
Total	54	100.0

Q 34 The distribution of students' Internet results

Internet results	Frequency	%
Results strongly justify the time spent on searching	10	18.5
Results justify the time spent on searching	31	57.4
Results do not justify the time spent on searching	13	24.1
Total	54	100.0

Q 35 The ease of using the Internet

The rate of using electronic resources on the Internet	Frequency	%
Very hard	0	00
Somewhat hard	8	14.8
Easy	24	44.4
Somewhat easy	10	18.5
Very easy	12	22.2
Total	54	100

Q 38 Learning about the library's electronic resources

Learning about the library's electronic resources through:	Frequency	%
Teaching myself	36	66.7
From the library's websites	30	55.6
From professors	18	33.3
From friends	12	22.2
From the reference desk	11	20.4
From workshops	3	5.6

Q 39 Have you been used library websites

	Frequency	%
Yes	40	74.1
No	14	25.9
Total	54	100

Q 40 The electronic information resources have been used

Electronic information resources	Frequency	%
E- journal	47	87.0
Online databases	42	77.8
Online reference books	29	53.7
OPAC	24	44.4
E-books	20	37.0
Search group	1	1.9

Q 41 The efficiency of required information on the library's electronic resources

The information finding	Strongly disagree		Disagree		Uncertain		Agree		Strongly agree	
	F	%	F	%	F	%	F	%	F	%
	2	3.7	7	13.0	15	27.8	28	51.9	2	3.7

F. Frequency

Q 42 Students' motivation to learn using library's electronic resources

The rate of motivation	Frequency	%
Very motivated	23	42.6
Somewhat motivated	24	44.4
Not motivated	7	13.0
Total	54	100.0

Q 43 The distribution of students' experience of library interfaces

	Frequency	%
Based on their experience with the Strathclyde University library	42	77.8
Based on two search sessions conducted now	12	22.2
Total	54	100

Q 44 Preferences of library electronic information resources

Library electronic information resources	Frequency	%
E-journal	39	72.2
Online databases	31	57.4
E-books	10	18.5
OPAC	9	16.7
Online reference books	10	18.5
Internet	37	68.5
Company website	1	1.9

Q 45 Ease of finding information for a known topic

Known topic search	Frequency	%
Very difficult	0	00
Difficult	3	5.6
Somewhat easy	17	31.5
Easy	21	38.9
Very easy	13	24.1
Total	54	100

Q 46 Ease of finding information for an unknown topic

Unknown topic search	Frequency	%
Very difficult	2	3.7
Difficult	22	40.7
Somewhat easy	19	35.2
Easy	10	18.5
Very easy	1	1.9
Total	54	100

Q 47 a. Amount of time spent searching a known topic

SU	Frequency	%
Less than 15 minutes	4	7.4
15- 30 minutes	21	38.9
30- 45 minutes	8	14.8
45 minutes to one hour	10	18.5
1- 2 hours	9	16.7
More than 5 hours	2	3.7
Total	54	100

b. Amount of time spent searching an unknown topic

	Frequency	%
Less than 15 minutes	1	1.9
15- 30 minutes	9	16.7
30- 45 minutes	6	11.1
45 minutes to one hour	13	24.1
1- 2 hours	14	25.9
3- 4 hours	9	16.7
More than 5 hours	2	3.7
Total	54	100

Q 48 a. The number of times to rephrase known topic search terms

	Frequency	%
Once	11	20.4
Twice	21	38.9
Three times	13	24.1
More than three	9	16.7
Total	54	100

b. The number of times to rephrase unknown topic search terms

	Frequency	%
Once	3	5.6
Twice	6	11.1
Three times	7	13.0
More than three	38	70.4
Total	54	100

Q 49 a. The satisfaction rating of the known topic results

	Not at all				somewhat						Very satisfied			
	1	2	3	4	5	6	7							
Satisfied user with results	F	%	F	%	F	%	F	%	F	%	F	%		
	0	00	1	1.9	3	5.6	8	14.8	20	37.0	15	27.8	7	13.0

b. The satisfaction rating of the unknown topic results

	Not at all						Somewhat						Very satisfied	
Satisfied user with results	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
	0	00	5	9.3	19	35.2	10	18.5	12	22.2	7	13.0	1	1.9

Q 54 The familiarity rating of the user's searching environment

	Extremely unimportant												Extremely important	
Familiar environment	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
	4	7.4	4	7.4	6	11.1	10	18.5	10	18.5	13	24.1	7	13.0

Q 55 The ease of using library web interfaces

The ease of using library web interfaces	Frequency	%
Very difficult	1	1.9
Difficult	10	18.5
Somewhat easy	25	46.3
Easy	15	27.8
Very easy	3	5.6
Total	54	100.0

Q 56 The e-library system is confusing in terms of its content and layout

	Frequency	%
Yes	9	16.7
Sometimes	28	51.9
No	17	31.5
Total	54	100

Q 57 Library interface features

Interfaces feature	Very poor		Poor		Neutral		Good		Very good	
	F	%	F	%	F	%	F	%	F	%
Content	0	00	1	1.9	12	22.2	35	64.8	5	9.3
Design and layout	3	5.6	7	13.0	17	31.5	23	42.6	3	5.6
Ease of use	2	3.7	11	20.4	13	24.1	23	42.6	4	7.4
Links	0	00	5	9.3	19	35.2	24	44.4	5	9.3
Searching	1	1.9	11	20.4	13	24.1	25	46.3	3	5.6
Readability	0	00	5	9.3	14	25.9	28	51.9	6	11.1
Help and support	2	3.7	10	18.5	14	25.9	23	42.6	4	7.4
Options for personalization	6	11.1	19	35.2	11	20.4	14	25.9	3	5.6

Q 58 Overall satisfaction with information needs and the way of organizing e-resources

	Least satisfied												Most satisfied	
Satisfaction rate	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Frequency/ percent	1	1.9	3	5.6	7	13.0	16	29.6	20	37.0	6	11.1	1	1.9

Q 59 The distribution of the importance of electronic information resources

	Not important at all												Extremely important	
The value of electronic resources	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
E-databases	3	5.6	3	5.6	3	5.6	6	11.1	10	18.5	17	31.5	12	22.2
E-journals	2	3.7	2	3.7	1	1.9	1	1.9	16	29.6	17	31.5	15	27.8
OPAC	0	00	3	5.6	4	7.4	9	16.7	16	29.6	11	20.4	11	20.4
Online reference works	1	1.9	3	5.6	7	13.0	7	13.0	17	31.5	11	20.4	5	9.3
Subject gateways	1	1.9	4	7.4	8	14.8	11	20.4	14	25.9	10	18.5	3	5.6
Internet	2	3.7	1	1.9	2	3.7	6	11.1	3	5.6	16	29.6	23	42.6
Digital library	6	11.1	2	3.7	6	11.1	16	29.6	7	13.0	10	18.5	5	9.3

Q 60 User familiarity of using electronic information resources

	Not at all						Somewhat						Very familiar	
Familiarity of using them	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
	0	00	0	00	2	3.7	13	24.1	10	18.5	19	35.2	9	16.7

- Saudi Universities (KAAU and KSU)

-User profile

KAAU N=136

KSU N=75

		KAAU		KSU	
		Frequency	%	Frequency	%
Gender	Male	53	39.0	47	62.7
	Female	83	61.0	28	37.3
Total		136	100	75	100
Age	20-25	43	31.6	22	29.3
	26-30	65	47.8	35	46.6
	31-35	25	18.4	14	18.6
	36-45	3	2.2	4	5.5
Total		136	100.0	75	100
status	Single	77	56.6	35	46.6
	Married	59	43.4	40	53.4
Total		136	100	75	100

Q 4 Time of the journey to the university

Time of the journey	KAAU		KSU	
	Frequency	%	Frequency	%
10-20 minutes	36	26.5	25	33.3
25-35 minutes	51	37.5	38	50.7
36-45 minutes	35	25.7	12	16.0
An hour	10	7.4	0	0
More an hour	4	2.9	0	0
Total	136	100.0	75	100

Q 5 Language skills affect access o electronic resources

English impact	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAAU	0	0	1	.7	0	0	10	7.4	18	13.2	25	18.4	82	60.3
KSU	0	0	0	0	0	0	0	0	14	18.7	12	16.0	49	63.3

Q 8 Level of education to the KAAU students' parents

Parents' education at KAAU	Mothers' education		Fathers' education	
	Frequency	%	Frequency	%
Educational Less than ten years	84	61.8	45	33.1
University educated	20	14.7	62	45.6
Holds a college degree Vocational degree	32	23.5	22	16.1
Highly educated	0	0	7	5.1

Q 8 Level of education to the KSU students' parents

Parents' education at KSU	Mothers' education		Fathers' education	
	Frequency	%	Frequency	%
Educational Less than ten years	54	72.0	24	32.0
University educated	16	21.3	32	42.7
Holds a college degree Vocational degree	5	6.7	9	12.0
Highly educated	0	0	10	13.3
Total	75	100	75	100

Q 10 Undergraduate students' status at KAAU and KSU

Student's status	KAAU		KSU	
	Frequency	%	Frequency	%
Unemployed and full-time student	88	64.7	28	37.3
Full-time employment and part-time student	27	19.9	37	49.3
Part-time employment and full-time student	10	7.4	5	6.7
Part-time student and part-time employment	11	8.1	3	4.0
Other full time student and employment	0	0	2	2.7
Total	136	100.0	75	100

Q 12 Annual income of students at KAAU & KSU

The annual income	KAAU		KSU	
	Frequency	%	Frequency	%
Less than 20,000 R.S	19	14.0	3	4.0
21,000- 40,000R.S.	18	13.2	1	1.3
41,000- 60,000 R.S.	16	11.8	3	4.0
61,000-80,000 R.S.	51	37.5	20	26.7
81,000- 100,000R.S.	15	11.0	33	44.0
More than 100,000	17	12.5	15	20.0
Total	136	100	75	100

- **General ICT literacy**

Q 15 Owning a computer

	KAAU		KSU	
	Frequency	%	Frequency	%
Yes	127	93.4	75	100
No	9	6.6	0	0
Total	136	100	75	100

Q 18 Methods to learn using the computer facilities

Learning computer facilities through:	KAAU		KSU	
	Frequency	%	Frequency	%
A course given by the high school	17	12.5	31	41.3
A course given by the university department	98	72.0	66	88.
A course given by the library or the computer centre	13	9.5	3	4.
A course given elsewhere	29	21.3	22	29.3
Individual instruction by library staff	17	12.5	7	9.3
Assistance from colleagues	64	47.0	64	85.3
Self - instruction	108	79.4	74	98.6
Literature (manuals, computer or/and library magazines)	64	47.0	48	64.
Online instruction /guides and manuals on the interface itself	57	41.9	53	70.6
Others	0	0	0	0

Q 19 The distribution of students' scaling confidence of basic computer skills

Scaling confidence	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAAU	6	4.4	0	.0	7	5.1	14	10.3	20	14.7	17	12.5	72	52.9
KSU	0	0	0	0	0	0	0	0	10	13.3	9	12.0	56	74.7

Q 20 The methods of learning information skills

KAAU Students	MBA students		CS students		LIS students	
	F	%	F	%	F	%
Ways of training in information searching skills						
A course given by the university department	19	47.5	20	31.7	33	100.
A course given by the library or the computer centre	6	9.5	1	2.5	3	9.1
course given elsewhere	12	19.0	4	10.0	0	00
Individual instruction by library staff	9	14.3	0	.0	4	12.1
Assistance from colleagues	23	36.5	20	50.0	8	24.2
Self - instruction	24	38.1	23	57.5	14	42.4
Literature (manuals, computer or/and library magazines)	26	41.3	14	35.0	15	45.5
Online instruction /guides and manuals on the interface itself	20	31.7	21	52.5	7	21.2
Others	0	.0	0	.0	0	.0

F. Frequency

The number of Business students is 63

The number of computer students is 40

The number of library and information science is 33

Q 20 The methods of learning information skills

KSU Students	MBA Students		CS students	
	F	%	F	%
Ways of training in information searching skills				
A course given by the university department	12	42.9	7	14.9
A course given by the library or the computer centre	0	0	1	3.6
course given elsewhere	0	0	2	7.1
Individual instruction by library staff	1	3.6	0	0
Assistance from colleagues	14	50.0	6	12.8
Self – instruction	8	17.0	10	35.7
Literature (manuals, computer or/and library magazines)	3	6.4	8	28.6
Online instruction /guides and manuals on the interface itself	0	0	9	19.1
Others	0	0	0	0

The number of computer students is 47

The number of Business students is 28

Q 21 Experience with using the library's electronic resources

	KAAU		KSU	
	Frequency	%	Frequency	%
Yes	108	79.4	48	64.0
No	28	20.6	27	36.0
Total	136	100	75	100

Q 22 Distribution of students' rate of ICT skills

Scaling expertise	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
From 1= novice To 7= expert														
KAAU	8	5.9	5	3.7	5	3.7	23	16.9	40	29.4	31	22.8	24	17.6
KSU	0	0	0	0	1	1.3	5	6.7	25	33.3	26	34.7	18	24.0

1= novice; 2=very little knowledge; 3= little knowledge; 4= some knowledge

5 = good knowledge; 6= very good knowledge; 7= experts

Q 23 The priority of different information resources at KAAU

Types of inf. resources	1-2		3-4		5-6		7-8	
Printed books	85	62.5	30	22.1	17	12.5	4	2.9
Electronic books	11	8.1	24	17.6	79	65.4	8	5.9
Printed journal	44	32.3	44	32.3	38	28.	9	6.6
Electronic journals	10	7.3	77	56.6	45	33.1	0	0
Electronic databases	36	26.6	54	39.7	40	29.4	3	2.2
Internet	89	65.5	37	27.2	8	5.9	2	1.5
Digital libraries	1	.7	6	4.4	23	17.	100	73.5

Q 23 The priority of different information resources at KSU

Types of inf. resources	1-2		3-4		5-6		7-8	
	F	%	F	%	F	%	F	%
Printed books	18	24.0	14	18.7	40	53.3	3	4.0
Electronic books	19	25.3	28	37.3	27	33.4	3	4.0
Printed journal	10	13.3	18	24.	10	13.3	37	49.3
Electronic journals	10	13.3	41	54.7	24	32.	0	0
Electronic databases	27	36.0	22	29.3	22	29.3	4	5.3
Internet	62	82.6	12	16.0	1	1.3	0	0
Digital libraries	2	2.7	20	26.7	26	34.7	27	36.0

• Internet factor

Q 24 Internet connection

Type of connection		Home		Work		Public library	
		F	%	F	%	F	%
Modem	KAU	106	77.9	10	7.4	0	0
	KSU	59	78.7			0	0
Broadband	KAU	25	18.4	15	11.0	0	0
	KSU	16	21.3	45	60.0	6	8.0
Wireless	KAU	0	0	0	0	0	0
	KSU	0	0	0	0	0	0

Q 25 How long have been used the Internet

The experience of Internet use	KAU		KSU	
	Frequency	%	Frequency	%
1-3 years	41	30.1	2	2.7
4-7 years	68	50.0	53	70.7
8-10 years	13	9.6	10	24.0
Less than 1 year	2	1.5	0	0
More than 10 years	12	8.8	2	2.7
Total	136	100	75	100

Q 26 Access the Internet through

Internet access through	KAU		KSU	
	Frequency	%	Frequency	%
University	24	17.6	5	6.7
Home	125	91.9	71	94.7
Work	17	12.5	43	57.3
Public library	0	.0	0	0
Friends	21	15.4	8	10.7
Individual subscription	6	4.4	4	5.3

Q 27 Frequent use of the Internet at KAAU and KSU

The rates of Internet use	KAAU		KSU	
	Frequency	%	Frequency	%
Daily	86	63.2	66	88.0
2-3 times a week	36	26.5	8	10.7
At least once a week	5	3.7	1	1.3
At least once a month	6	4.4	0	0
Less than once a month	3	2.2	0	0
Total	136	100		

Q28 Amount of time spent using the internet per week

Spent time per week	KAAU		KSU	
	Frequency	%	Frequency	%
One hour or less	8	5.9	0	0
2 hours - 4 hours	30	22.1	12	16.0
6 hours - 8 hours	22	16.2	13	17.3
9 hours - 12hours	22	16.2	14	18.7
13 hours - 15hours	15	11.0	15	20.0
16 hours- 18hours	8	5.9	5	6.7
19 hours-21 hours	22	16.2	6	8.0
More than 22 hours	9	6.6	10	13.3
Total	136	100	75	100

Q 30 Distribution of students' scaling confidence of using the Internet

Scaling confidence	1		2		3		4		5		6		7	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
From 1= not at all To 7= very confident														
KAAU	4	2.9	0	0	10	7.4	26	19.1	30	22.1	36	26.5	30	22.1
KSU	0	0	0	0	2	2.7	11	14.7	25	33.3	27	36.0	10	13.3

Q 32 Students' rate of accessing time

The rate access time		Very slow		Slow		Somewhat fast		Fast		Very fast	
		F	%	F	%	F	%	F	%	F	%
From home	KAAU	8	5.9	93	68.4	3	2.2	23	16.9	0	.0
	KSU	9	12.	55	73.3	7	9.3	4	5.3	0	0
On campus	KAAU	38	27.9	60	44.1	8	5.9	23	16.9	6	4.4
	KSU	2	2.7	6	8.0	11	14.7	7	9.3	0	0
In office	KAAU	1	.7	10	7.4	1	.7	9	6.6	5	3.7
	KSU	0	0	0	0	0	0	26	34.7	18	24.0
Public library	KAAU	0	.0	0	.0	0	.0	0	.0	0	.0
	KSU	12	16.0	2	2.7	5	6.7	2	2.7	2	2.7

Q 33 Received information on the Internet

Information on the Internet	KAAU		KSU	
	Frequency	%	Frequency	%
Something, but not as much as you need	79	58.1	27	36.0
Enough	50	36.8	39	52.0
More than you need	7	5.1	9	12.0
Total	136	100	75	100

Q 34 The distribution of students' Internet results

Internet results	KAAU		KSU	
	Frequency	%	Frequency	%
Results strongly justify the time spent on searching	2	1.5	5	6.7
Results justify the time spent on searching	92	67.6	44	58.7
Results do not justify the time spent on searching	42	30.9	26	34.7
Total	136	100	75	100

Q 35 The ease of using the Internet

The rate of using electronic resources on the Internet	KAAU		KSU	
	Frequency	%	Frequency	%
Very hard	4	2.9	0	0
Somewhat hard	34	25.0	21	28.7
Easy	79	58.1	29	38.7
Somewhat easy	16	11.8	18	24.0
Very easy	3	2.2	7	9.3
Total	136	100	75	100

Q 38 Learning about the library's electronic resources

Learning about the library's electronic resources through:	KAAU		KSU	
	Frequency	%	Frequency	%
Teaching myself	68	50.0	58	77.2
From the library's websites	22	16.2	0	0
From professors	68	50.0	47	62.7
From friends	67	49.3	51	68.0
From the reference desk	13	9.6	0	0
From workshops	4	2.9	0	0

Q 39 Have you been used library websites

	KAAU		KSU	
	Frequency	%	Frequency	%
Yes	87	64.0	44	58.7
No	49	36.0	31	41.3
Total	136	100	75	100

Q 40 The electronic information resources have been used

Electronic information resources	KAAU		KSU	
	Frequency	%	Frequency	%
Online databases	94	69.1	59	78.7
E-journals	79	58.1	33	44.0
E-books	39	28.7	37	49.3
OPAC	80	58.8	10	13.3
Online reference books	23	16.9	17	22.7
Internet	0	0	14	18.7

Q 41 The efficiency of required information on the library's electronic resources

The information finding	Strongly disagree		Disagree		Uncertain		Agree		Strongly agree	
	F	%	F	%	F	%	F	%	F	%
KAAU	5	3.7	10	7.4	57	41.9	55	40.4	9	6.6
KSU	1	1.3	3	4.0	26	34.7	40	53.3	5	6.7

F. Frequency

Q 42 Students' motivation to learn using library's electronic resources

The rate of motivation	KAAU		KSU	
	Frequency	%	Frequency	%
Very motivated	81	59.6	20	26.7
Somewhat motivated	46	33.8	49	65.3
Not motivated	9	6.6	6	8.0
Total	136	100	75	100

- Academic library website usability

Q 43 The distribution of students' experience of library interfaces

	KAAU		KSU	
	Frequency	%	Frequency	%
Based on their experience with the Strathclyde University library	52	38.2	28	37.3
Based on two search sessions conducted now	84	61.8	47	62.7
Total	136	100	75	100

Q 44 Preferences of library electronic information resources

Library electronic information resources	KAAU		KSU	
	Frequency	%	Frequency	%
E-journal	42	30.9	15	20.0
Online databases	73	53.7	57	76.0
E-books	14	10.3	26	34.7
OPAC	43	31.6	22	29.3
Online reference books	33	24.3	10	13.3
Internet	123	90.4	46	61.3

Q 45 Ease of finding information for a known topic

Known topic search	KAAU		KSU	
	Frequency	%	Frequency	%
Very difficult	0	0	0	0
Difficult	12	8.8	6	8.0
Somewhat easy	40	29.4	40	53.3
Easy	76	55.9	20	26.7
Very easy	8	5.9	9	12.0
Total	136	100	75	100

Q 46 Ease of finding information for an unknown topic

Unknown topic search	KAAU		KSU	
	Frequency	%	Frequency	%
Very difficult	4	2.9	2	2.7
Difficult	51	37.5	35	46.7
Somewhat easy	57	41.9	33	44.0
Easy	24	17.6	5	6.7
Very easy	0	0	0	0
Total	136	100	75	100

Q 47 a. Amount of time spent searching a known topic

	KAAU		KSU	
	Frequency	%	Frequency	%
Less than 15 minutes	15	11.0	6	8.0
15- 30 minutes	62	45.6	28	37.3
30- 45 minutes	37	27.2	14	18.7
45 minutes to one hour	9	6.6	15	20.0
1- 2 hours	8	5.9	5	6.7
More than 5 hours	5	3.7	7	9.3
Total	136	100	75	100

b. Amount of time spent searching an unknown topic

	KAAU		KSU	
	Frequency	%	Frequency	%
Less than 15 minutes	1	.7	0	0
15- 30 minutes	9	6.6	11	14.7
30- 45 minutes	26	19.1	17	22.7
45 minutes to one hour	39	28.7	0	0
1- 2 hours	37	27.2	23	30.7
3- 4 hours	16	11.8	16	21.3
More than 5 hours	8	5.9	8	10.7
Total	136	100	75	100

Q 48 a. The number of times to rephrase known topic search terms

	KAAU		KSU	
	Frequency	%	Frequency	%
Once	6	4.4	0	0
Twice	46	33.8	14	18.7
Three times	72	52.9	55	73.3
More than three	12	8.8	36	8.0
Total	136	100	75	100

b. The number of times to rephrase unknown topic search terms

	KAAU		KSU	
	Frequency	%	Frequency	%
Once	2	1.5	0	0
Twice	7	5.1	0	0
Three times	21	15.4	16	21.3
More than three	106	77.9	59	78.7
Total			75	100

Q 49 a. The satisfaction rating of the known topic results

	Not at all						somewhat						Very satisfied	
	1		2		3		4		5		6		7	
Satisfied user with results	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAUU	0	0	2	1.5	3	2.2	30	22.1	40	29.4	51	37.5	10	7.4
KSU	0	0	0	0	4	5.3	6	8.0	24	32.0	39	52.0	2	2.7

b. The satisfaction rating of the unknown topic results

	Not at all						Somewhat						Very satisfied	
	1		2		3		4		5		6		7	
Satisfied user with results	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAUU	2	1.5	6	4.4	37	27.2	53	39.0	30	22.1	8	5.9	0	0
KSU	2	2.7	5	6.7	12	16.0	39	52.0	10	13.3	7	9.3	0	0

Q 54. The familiarity rating of the user's searching environment

	Extremely unimportant												Extremely important	
	1		2		3		4		5		6		7	
Familiar environment														
KAUU	0	0	5	3.7	4	2.9	27	19.9	24	17.6	40	29.4	36	26.5
KSU	0	0	7	9.3	0	0	11	14.7	22	29.3	21	28.0	14	18.7

Q 55 The ease of using library web interfaces

The ease of using library web interfaces	KAUU		KSU	
	Frequency	%	Frequency	%
Very difficult	5	3.7	5	6.7
Difficult	30	22.1	20	26.7
Somewhat easy	60	44.1	36	48.0
Easy	39	28.7	14	18.7
Very easy	2	1.5	0	0
Total			75	100

Q 56 The e-library system is confusing in terms of its content and layout

	KAUU		KSU	
	Frequency	%	Frequency	%
Yes	10	7.4	0	0
Sometimes	44	32.4	14	18.7
No	82	60.3	61	81.3
Total	136	100	75	100.0

Q 57 Library interface features at KAAU

Interfaces feature	Very poor		Poor		Neutral		Good		Very good	
	F	%	F	%	F	%	F	%	F	%
Content	10	7.4	41	30.1	49	36.0	31	22.8	3	2.2
Design and layout	13	9.6	39	28.7	61	44.9	17	12.5	6	4.4
Ease of use	12	8.8	34	25.0	55	40.4	25	18.4	10	7.4
Links	17	12.5	33	24.3	53	39.0	29	21.3	4	2.9
Searching	13	9.6	38	27.9	45	33.1	31	22.8	9	6.6
Readability	13	9.6	13	9.6	65	47.8	43	31.6	2	1.5
Help and support	48	35.3	39	28.7	33	24.3	16	11.8	0	.0
Options for personalization	10	7.4	41	30.1	49	36.0	31	22.8	3	2.2

Q 57 Library interface features at KSU

Interfaces feature	Very poor		Poor		Neutral		Good		Very good	
	F	%	F	%	F	%	F	%	F	%
Content	3	4.0	40	53.3	27	36.0	5	6.7	0	0
Design and layout	0	0	36	48.0	33	44.0	6	8.0	0	0
Ease of use	2	2.7	48	64.0	20	26.7	5	6.7	0	0
Links	2	2.7	42	56.0	22	29.3	9	12.0	0	0
Searching	2	2.7	52	69.3	14	18.7	7	9.3	0	0
Readability	2	2.7	39	52.0	25	33.3	9	12.0	0	0
Help and support	8	10.7	66	88.0					1	1.3
Options for personalization	15	20.0	59	78.7	1	1.3	0	0	0	0

Q 58 Overall satisfaction with information needs and the way of organizing e-resources

Satisfaction rate	Least satisfied		2		3		4		5		6		Most satisfied	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAAU	5	3.7	6	4.4	24	17.6	51	37.5	40	29.4	9	6.6	1	.7
KSU	0	0	7	9.3	22	29.3	18	24.0	18	24.0	10	13.3	0	0

Q 59 The distribution of the importance of electronic information resources at KAAU

The value of electronic resources	Not important at all		2		3		4		5		6		Extremely important	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
E-databases	0	.0	3	2.2	10	7.4	21	15.4	29	21.3	42	30.9	31	22.8
E-journals	4	2.9	6	4.4	22	16.2	26	19.1	30	22.1	16	11.8	32	23.5
OPAC	6	4.4	6	4.4	31	22.8	35	25.7	28	20.6	12	8.8	18	13.2
Online reference works	4	2.9	1	.7	38	27.9	33	24.3	32	23.5	15	11.0	13	9.6
Subject gateways	7	5.1	11	8.1	41	30.1	45	33.1	13	9.6	12	8.8	7	5.1
Internet	1	.7	0	.0	5	3.7	5	3.7	20	14.7	24	17.6	81	59.6
Digital library	8	5.9	14	10.3	46	33.8	19	14.0	16	11.8	20	14.7	13	9.6

Q 59 The distribution of the importance of electronic information resources at KSU

	Not important at all												Extremely important	
	1		2		3		4		5		6		7	
The value of electronic resources	F	%	F	%	F	%	F	%	F	%	F	%	F	%
E-databases	0	.0	3	2.2	10	7.4	21	15.4	29	21.3	42	30.9	31	22.8
E-journals	4	2.9	6	4.4	22	16.2	26	19.1	30	22.1	16	11.8	32	23.5
OPAC	6	4.4	6	4.4	31	22.8	35	25.7	28	20.6	12	8.8	18	13.2
Online reference works	4	2.9	1	.7	38	27.9	33	24.3	32	23.5	15	11.0	13	9.6
Subject gateways	7	5.1	11	8.1	41	30.1	45	33.1	13	9.6	12	8.8	7	5.1
Internet	1	.7	0	.0	5	3.7	5	3.7	20	14.7	24	17.6	81	59.6
Digital library	8	5.9	14	10.3	46	33.8	19	14.0	16	11.8	20	14.7	13	9.6

Q 60 User familiarity of using electronic information resources

	Not at all						Somewhat						Very familiar	
	1		2		3		4		5		6		7	
Familiarity of using them	F	%	F	%	F	%	F	%	F	%	F	%	F	%
KAAU	7	5.1	1	.7	25	18.4	39	28.7	43	31.6	15	11.0	6	6.6
KSU	0	0	2	2.7	6	8.0	16	21.3	33	44.0	13	17.3	5	6.7