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Information-Seeking Behaviour at Kuwait University

By

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A Doctoral Thesis

**Submitted in partial fulfilment of the requirement for the award of
Doctor of Philosophy**

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Abstract

Information technology is constantly changing, and if academic users are to make best use of these resources, they must sustain efficient information-seeking behaviour. This study explores the information-seeking behaviour of graduate students at Kuwait University, and investigates the factors influencing that behaviour. The population also includes faculty members engaged in teaching and supervising graduate students, and academic librarians. Adopting Wilson's information-seeking model (1999) as the theoretical framework, the study identifies factors influencing graduate students' information behaviour and formulates hypotheses that illustrate the relationship between the different variables. The use of this model provides useful insights into determinants of the information-seeking behaviour patterns of students in a multi-disciplinary graduate context.

The research uses a mixed method approach, comprising questionnaire survey, focus groups and semi-structured interviews. Application of the Critical Incident Technique method provided in-depth data about the patterns of information-seeking behaviour of both graduate students and faculty members. Logistic regression revealed that significant factors related to library awareness, information literacy, organisational and environmental issues, source characteristics, and demographics act as determinants of the patterns of students' information-seeking behaviour. Uneasiness on the part of graduate students towards using the library and consulting its personnel reflects a broader negative perception of the role of the library in shaping students' information-searching patterns.

The clearest finding that emerged from the analysis of the students' information literacy dimension was that the majority of graduate students still face difficulties in finding the appropriate information resources, particularly when using resources that need advanced search strategies. Both quantitative and qualitative analyses revealed a heavy reliance on the information resources that require least effort (search engines, Internet websites, and personal contacts). Further, results revealed that graduate students are overwhelmed by an information overload, which leads them to become anxious about finding the appropriate information resources. Based on the results of the research, recommendations are made to further explore the information-seeking behaviour patterns of graduate students in order to enhance their information literacy skills. Improving information-seeking behaviour and enhancing the information literacy of students require interventions on various fronts: faculty members, academic librarians, the university administration, and graduate students themselves.

Key words: information-seeking behaviour – information literacy – library anxiety - graduate students – electronic information resources - logistic regression – Kuwait.

Dedication

I dedicate this work to my father *Abdel-Kareem Murad Al-Muomen*, who has always been the greatest source of motivation for me to pursue my doctoral studies, and to my loving mother *Asmaa Al-Hassan*, who never stopped blessing me with her prayers. I also dedicate this work to my husband Sulaiman Arti, without his support, I would not be able to get this thesis completed.

This thesis is also dedicated to my two beloved sons, *Dawoud and Ali*, who were too young to appreciate my work and thus were my biggest distraction as well as my greatest motivation; for them I shall provide all the support they need for the rest of my life.

Acknowledgments

This part is to acknowledge those who helped me in conducting this research and in making my dream to pursue PhD degree a reality. First, sincere thanks go to my supervisors Professor Anne Morris and Dr Sally Maynard, who through their constant guidance led me to the completion of this thesis. Their initial consultation and guidance helped me to accomplish the task. They were also a great source of emotional support throughout all the difficulties I experienced. They were always there to help, from the earliest stages to the end. I also extend my gratitude to Dr Adrienne Muir, my Research Director, for her constructive guidance and support throughout.

I am grateful to my sponsor, Kuwait University, for funding my scholarship and providing me with all the facilities that helped me pursue my doctoral studies. I also thank those who facilitated the collection of data at Kuwait College of Graduate Studies. Very special thanks go to Professor Sajjad U-Rehman from the Social Sciences and Information Science at Kuwait University for their continuous support and belief that I will be able to write up this thesis done.

I would like to extend my thanks to Claire Creaser, director of LISU, Loughborough University, who provided consultation in analyzing the data whenever needed. Special thanks also go to my colleague Dr Michael Norris, who was always a role model of how knowledge should be shared. He was always there to help. I also thank Maha Said Ali for her continuous emotional support. I thank Ann-Marie as well for her help in proof-reading the thesis.

My deepest thanks go to my family: to my husband for his continuous support even though he was going through the same ordeal, and to my parents who never stopped encouraging and praying for me. Without their blessings, I would never have been able to complete this thesis.

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CHAPTER ONE - INTRODUCTION

1.1 Background

The constant stream of developments in the current information age means that patterns of searching, locating and identifying information resources will continue to change. Therefore, information-seeking behaviour will always warrant further research. Within the information environment, human information behaviour comprises two main aspects: interactions with information systems; and information processing and use. Exploring such behaviour can contribute to efficient information use in academic and scientific contexts, and to the design of new systems and tools for knowledge organisation (Steinerova & Susol 2005, p.139). Such in-depth understanding assists in the recommendation and implementation of policies that contribute to best practices in educational programmes.

Educators at all levels (primary, secondary, tertiary and professional) have been exerting efforts to enhance information literacy among all ages by developing strategies and policies that enable efficient use of Information and Communication Technologies (ICTs), which in turn would make learners experience more effective information practices (Bruce 2004). In order to ensure the success of any strategy or initiative, it is important for the academic institution and information professionals concerned to identify and recognise the factors influencing the information-seeking behaviour of their user groups. According to Catts & Lau (2008, p.16), users need a combination of “cognitive and technical” skills in order to use information available via digital technology and electronic databases. On that basis, it can be inferred that the areas of information-seeking behaviour, information literacy and information use are interconnected. Users develop information literacy through using information, and they come to use information more effectively as their information literacy develops.

There have been a number of studies related to graduate students' information behaviour and use of online information resources, many of them conducted in Europe (e.g. Foster 2004; Steinerova & Susol 2005), the United States (e.g. George *et al.* 2006; Sadler & Given 2007), Australia (Hughes & Bruce 2006), and the Far East (e.g. Chu & Law 2008). However, few studies have adopted a holistic approach to

information behaviour and information literacy and the factors influencing these aspects. Further, it was identified from the literature that no studies have yet been conducted in the Middle East, particularly Kuwait, to explore in-depth the information-seeking behaviour of graduate students in relation to online information resources. This research was conducted to fill that gap and to add to the knowledge in the areas of information-seeking behaviour and information literacy in higher education.

The focus of this multi-disciplinary research combining two areas: information-seeking behaviour and information literacy was to explore how graduate students and academics engage with the sources of information available to them. In particular, the main purpose was to examine the information-seeking behaviour of graduate students in the context of electronic information resources such as search engines and databases, upon which they heavily rely. The research also aimed to explore information literacy skills and barriers to access and use. In order to achieve its aims and objectives, the research adopted a mixed method approach to explore the significant factors influencing the way graduate students satisfy their academic information needs. In other words, this research investigates the association between information literacy skills and the information-seeking behaviour of graduate students. Differences between the two terms are explained below.

1.2 Definition of Terms

Certain terms will often be used in this thesis. They are defined below for clarity and consistency.

Information-seeking Behaviour: Case (2007, p.5) defines information-seeking behaviour as “a conscious effort to acquire information in response to a need or gap in one's knowledge”. For the purpose of this research, information-seeking behaviour can be defined as “those activities a person may engage in when identifying his or her needs for information, searching for such information in any way, and using or transferring that information” (Wilson 1999, p.249).

Information Literacy: CILIP (the Chartered Institute of Library and Information Professionals) defines information literacy as “knowing when and why you need information, where to find it and how to evaluate, use and communicate it in an ethical manner” (CILIP 2007). For the purpose of this research, information literacy is defined as: “a set of abilities requiring individuals to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (Association of College and Research Libraries ACRL 2000).

Information Need: For this research, information need is defined as the “recognition that one's knowledge is inadequate to satisfy a goal that he or she has” (Case 2007, p.5). This study focuses on academic information needs related to satisfying coursework and for the purpose of general research.

Graduate Students: Those students who are studying for degrees beyond the bachelor stage (MA, PhD, and higher diploma).

Use of Information: For the purpose of this research, use of information is consistent with the definition by Hughes (2005, p.3): “a multifaceted experience involving users’ context, needs, actions (behaviours, information seeking), responses and influences (cognitive, affective, cultural, and linguistic) and outcomes (insight, knowledge construction)”.

Electronic Information Resources: For this research, these resources encompass the learning resources and research data that are available in electronic format from online sources such as the World Wide Web, journal databases, library catalogues, and course material databases. In the context of this study they include:

- **World Wide Web:** “A hypermedia information service on the Internet, which has been in place since 1991” (Feather & Sturges 2002, p.659). The World Wide Web is also referred to as “the web”. This research is mainly concerned with the extent to which graduate students rely on the web as a source of information to meet their information needs.
- **Search Engines:** These are computer programmes that allow users to search the Internet and find particular terms or phrases; the software allows the search to be made at very high speed. There are three main

types: single search engines, metasearch engines and subject indexes (Feather & Sturges 2002, p.569). For this study, there is special focus on Google Scholar.

- ***E-Journals:*** “A journal that is available in electronic form through an online host” (Feather & Sturges 2002, p.176). This research explores the extent to which graduate students from various disciplines refer to e-journals in comparison with other information resources.
- ***OPACS:*** “An OPAC (Online Public-Access Catalogue) is a database of bibliographic records describing the holdings usually of one particular library. It allows searching by name, title and subject, and offers online access through public terminals” (Feather & Sturges 2002, p.466).
- ***Databases:*** “Information collections, sharing common characteristics such as subject discipline or type, which are published electronically by public- or private sector database producers and made available to a large public for interactive searching and information retrieval” (Feather & Sturges 2002, p.127).
- ***Online Databases:*** These are accessed through wide-area network links to remote online host services that normally offer many different databases (Feather & Sturges 2002, p.127).

1.3 Aims and Objectives

1.3.1 Aims

The aims of the research were:

To investigate the information-seeking behaviour of graduate students within the context of Kuwait, and to explore, in particular, the factors influencing the patterns of such information-seeking.

1.3.2 Objectives

The objectives involved in achieving the aim were as follows:

1. To identify the information needs of graduate students necessary to fulfil their academic purposes (for example, coursework, projects, theses, dissertations).

2. To explore graduate students' awareness and knowledge of the range of available information resources, particularly those online.
3. To identify graduate students' perceptions of their information literacy skills.
4. To explore graduate students' awareness of the library, and their comfort with using the library for their tasks.
5. To investigate the factors (both barriers and facilitators) influencing the means by which graduate students seek information to satisfy their coursework and research needs.
6. To explore the influence of faculty members and academic librarians on students' information-seeking behaviour.
7. To provide recommendations for: enhancing the information-seeking behaviour of graduate students, and for improving the information environment as well.

1.4 Research Questions

1. What are the characteristics of the information-seeking behaviour patterns, in an academic context, of graduate students enrolled in various fields?
2. How do graduate students describe their needs for using information resources?
3. To what extent are graduate students aware of the current range of online information resources available to their fields?
4. What significant factors influence the information-seeking behaviour of graduate students (role-related, psychological, demographics, environmental)?
5. What impact do faculty members have on the information-seeking behaviour of graduate students?

1.5 Significance of the Study

Although during the last decade many research studies have been conducted in the area of information-seeking behaviour in various disciplines, most notably Psychology and Information Science, there are areas remaining in the literature that require further research:

- There is a need for more multi-disciplinary studies that links information behaviour and information literacy to achieve greater understanding of the factors influencing the information-seeking behaviour of graduate students, and not just the process itself. Kuhlthau (2008, p.66) emphasises the importance of this type of studies:

“Innovative approaches to interaction between people and information are needed to bridge the divide between information behaviour, information literacy and impact of information in order to address the issues of the twenty-first century.”

- This empirical research adopts a holistic approach to investigating the relationship between a range of variables and the information-seeking behaviour of these students. Cultural aspects related to teaching and learning style, English language proficiency, and educational background are among the factors that need more exploration in specific contexts. In his paper on user studies and information needs, Wilson urged that research should specifically consider the organisational and cultural environment in which work roles are performed as a motivating factor in information seeking (Wilson 2006).
- Electronic information resources are becoming the dominant environment within which information seeking takes place in the context of higher education. Consequently, the current relationship between the information seeker and digital resources is likely to continue (Wilson 2006, p.683). In the current digital age, academics and researchers are exposed to an enormous body of literature, and to make the best use of the various information resources available to them, they are expected to have the appropriate information literacy skills. Graduate students engage in an intensive research-oriented environment which requires keeping up-to-date with the latest developments in access to information resources. However, compared to studies related to undergraduate students, fewer have so far been investigated. This will be explored in greater details in the literature review (Chapter 3).

- In Kuwait, graduate students are involved in a greater number of information retrieval activities than are undergraduate students, and are therefore more likely to be affected by advances in information technology. This study is the first in Kuwait or in a developing country which explores the factors influencing the information-seeking behaviour of graduate students. The study also discusses the impact of faculty members on those students' information skills. This research acts as a case study to represent a model for the information-seeking behaviour of graduate students in other Gulf Cooperation Council (GCC) countries which share a similar culture (context) with Kuwait.
- The current research adopts a mixed-method approach to explore information-seeking behaviour, as discussed in Chapter 5. It incorporates various data collection techniques, including surveys of students and faculty incorporating the Critical Incident Technique, semi-structured interviews, and focus groups with graduate students. This research triangulates both qualitative and quantitative approaches to overcome the shortcomings of each single technique and to obtain a more holistic picture of the information-seeking behaviour of graduate students in various disciplines. In addition, the study has adopted a model illustrating the factors influencing the information-seeking behaviour of graduate students. The model is based on Wilson's (1999) revised model of information-seeking behaviour, as explained in Chapter 2. It also draws heavily on a recent theoretical model developed by Urquhart & Rowley (2007) and Rowley & Urquhart (2007), as explained in the same chapter.

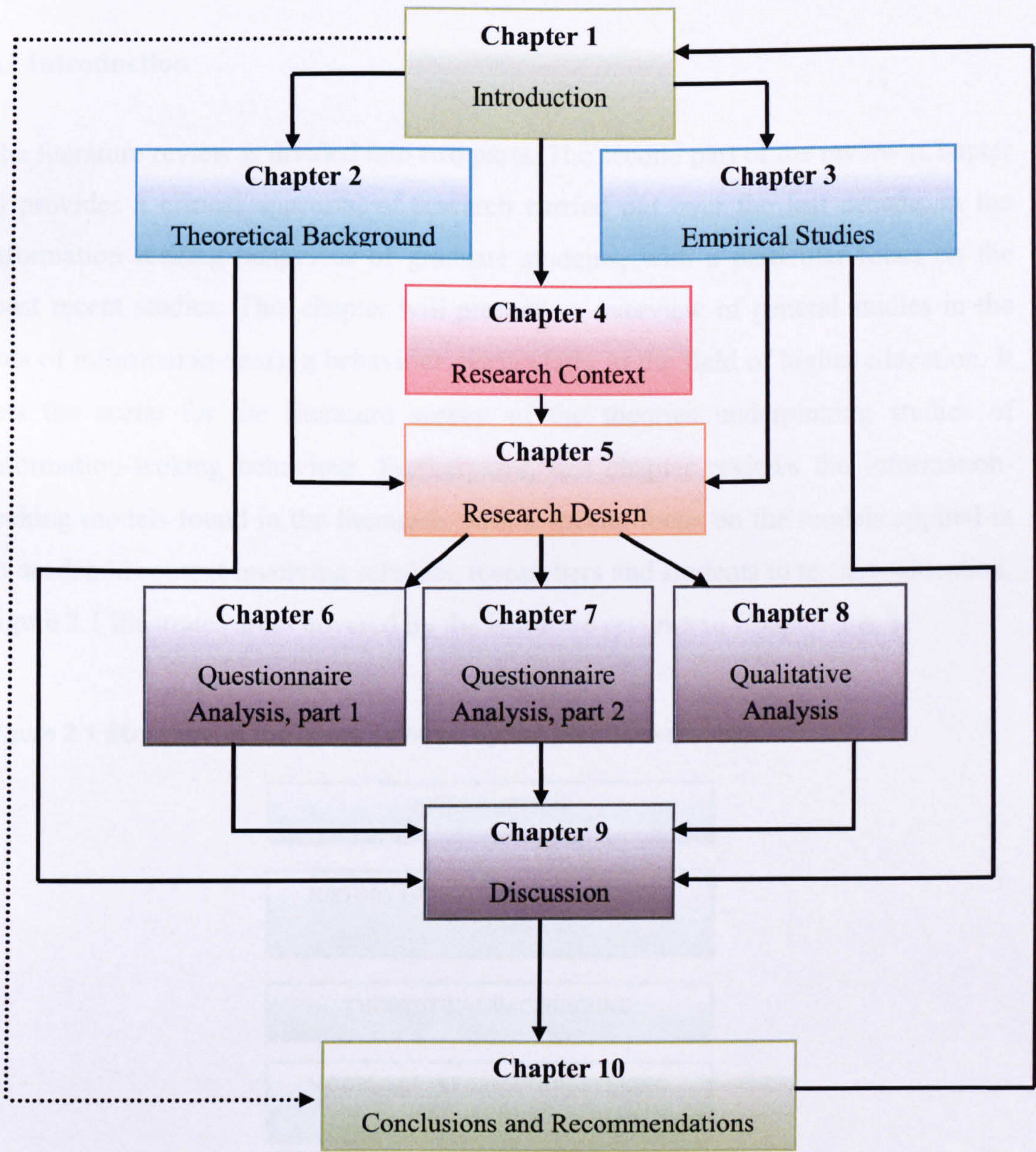
A review of the studies in the literature relating to information behaviour has not revealed any other study with these characteristics. That is, there has been no recent holistic study on the information-seeking behaviour of graduate students in Kuwait.

1.6 Structure of the Thesis

Chapter 1 provides a general introduction to the research and its aims and objectives, in addition to its significance. Chapter 2 reviews the theoretical and philosophical background underlying the field of information-seeking behaviour and discusses the

key models of information-seeking behaviour in order to place the current research within its broader context. Chapter 3 is the second part of the literature review, and provides a critical appraisal of research conducted during the last decade on the information-seeking behaviour of graduate students. This time period was chosen in view of the focus here on students' information-seeking behaviour with regard to the use of electronic information resources. Chapter 4 presents a brief overview of Kuwait as this is the place in which the research is conducted. Chapter 5 describes the research design and explains the various methods used in the study, discussing both their advantages and disadvantages, and justifies their adoption in the research. The chapter also discusses sampling techniques, and displays the variables used in the questionnaire and the issues covered through interviews. Subsequent chapters cover the analysis. Chapter 6 presents the quantitative data analysis of the graduate students' questionnaires, while Chapter 7 reports the results of the faculty members' questionnaires. The qualitative analysis is presented in Chapter 8, which provides a thematic analysis of the outcomes of the transcribed focus group discussions with students and the semi-structured interviews with faculty members and academic librarians. Chapter 9 presents the discussion of the quantitative and the qualitative data analysis, while conclusions and recommendations are presented in Chapter 10. Figure 1.1 below illustrates the outline of the thesis.

Figure 1.1 The Thesis Outline



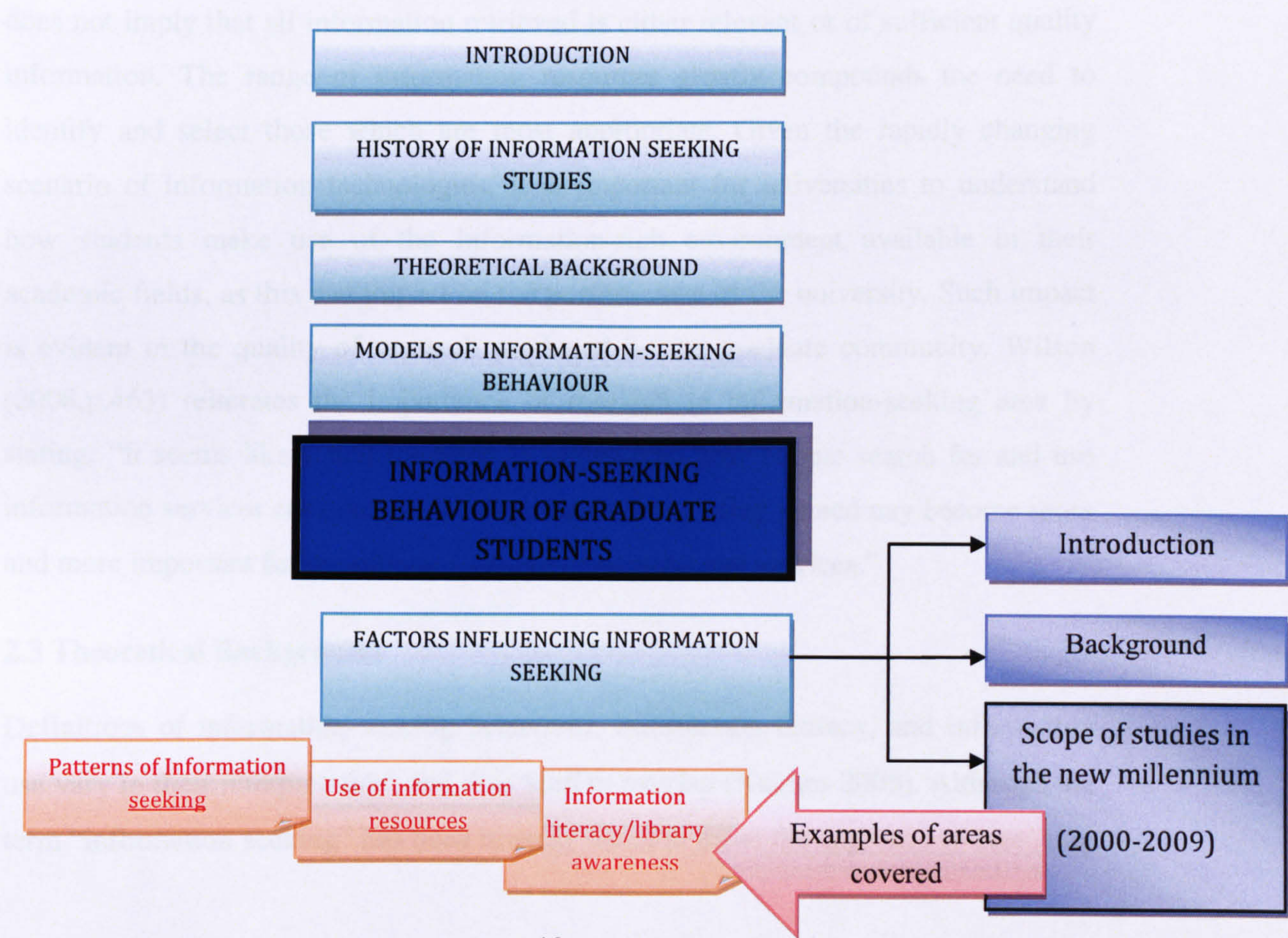
CHAPTER TWO - INFORMATION-SEEKING BEHAVIOUR

Background, Theories and Models

2.1 Introduction

The literature review is divided into two parts. The second part of the review (Chapter 3) provides a critical appraisal of research carried out over the last decade on the information-seeking behaviour of graduate students, with a particular focus on the most recent studies. This chapter will present an overview of general studies in the area of information-seeking behaviour, particularly in the field of higher education. It sets the scene for the literature survey of the theories underpinning studies of information-seeking behaviour. Furthermore, this chapter reviews the information-seeking models found in the literature, with a special focus on the models applied in an academic context involving scholars, researchers and students in tertiary education. Figure 2.1 illustrates areas covered by the literature reviews in Chapter 2 & 3.

Figure 2.1 Structure of the areas covered by the literature review



2.2 Historical Background of Studies on Information Seeking

The history of research in information seeking can be divided into three main periods each with its different focus: the sixties to the mid eighties, the mid eighties to the mid nineties, and the period from the mid nineties until now (Feather & Sturges 2002, p.301). In the first period, the focus was on information service provision and quality; the second period was rich in empirical studies and activity models of information-seeking processes, while the most recent period has been characterised by attempts to design comprehensive models integrating information seeking and information retrieval (Feather & Sturges 2002).

With the beginning of the second millennium, the increasingly technology-based academic workplace began to offer scholars and other stakeholders in higher academia a dynamic and interactive digital environment facilitating constant and instant connectivity via the networked computers at their university workstations. Consequently, students in higher education today have a choice of new information delivery systems and a wide array of information sources and channels, and are also able to obtain information at anytime and anywhere. However, such ease of access does not imply that all information retrieved is either relevant or of sufficient quality information. The range of information resources greatly compounds the need to identify and select those which are most appropriate. Given the rapidly changing scenario of information technologies, it is important for universities to understand how students make use of the information-rich environment available in their academic fields, as this can impact on the performance of the university. Such impact is evident in the quality of research produced by the graduate community. Wilson (2008,p.463) reiterates the importance of research in information-seeking area by stating: “It seems likely that the need to understand how people search for and use information services continue to develop, the understanding gained may become more and more important for the effective design of systems and services.”

2.3 Theoretical Background

Definitions of information-seeking behaviour, information literacy, and information use vary in their interpretation, and thus tend to overlap (Hughes 2006). Although the term “information seeking” has been broadly taken to mean the approach to searching

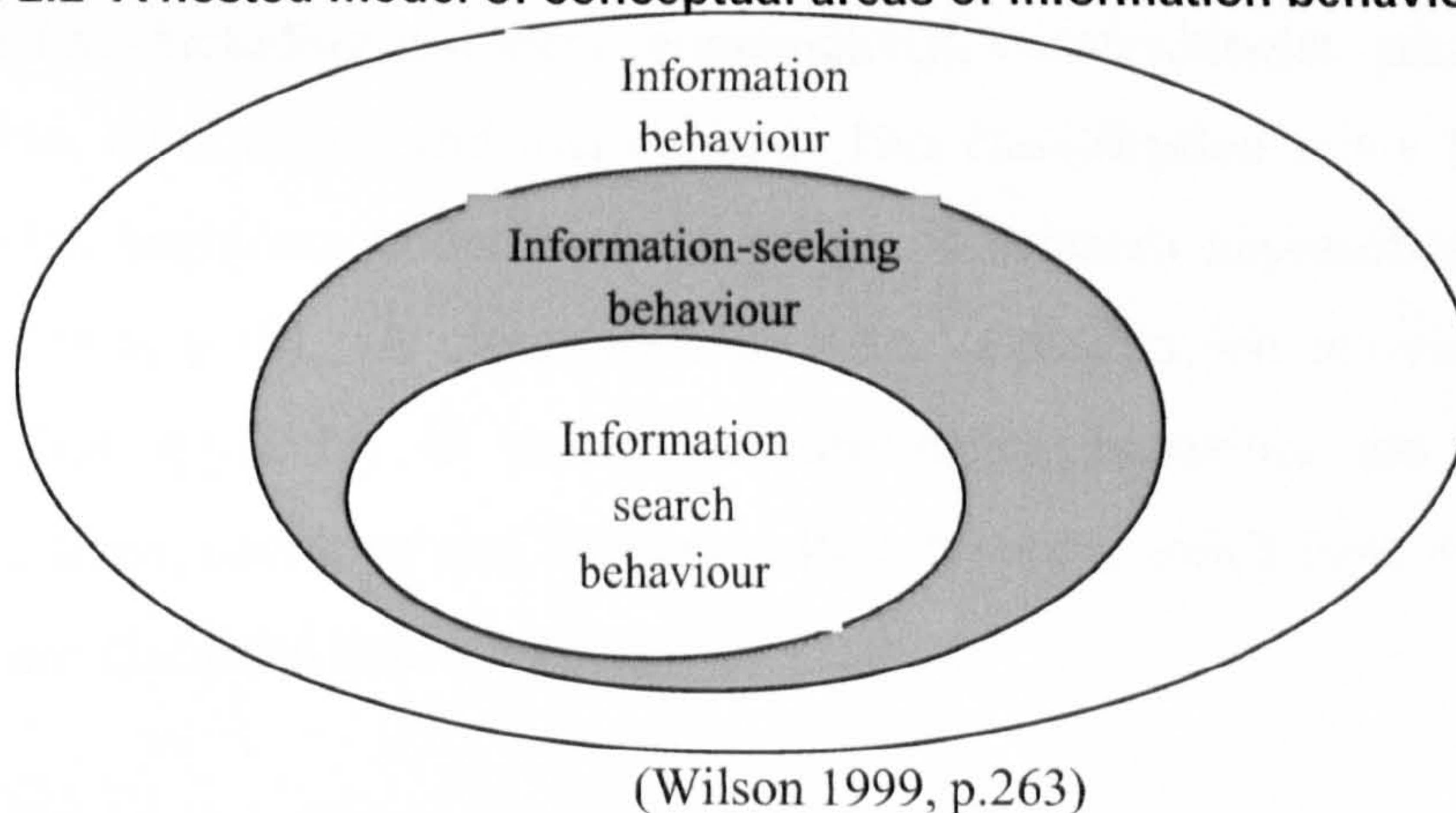
for information to satisfy research needs, there have been various attempts to define the term more specifically.

Case (2007, p.5) has briefly defined the interrelated concepts of “information need”, “information seeking” and “information behaviour” as follows:

- *An information need* - is recognition that your knowledge is inadequate to satisfy a goal that you have;
- *Information seeking* - is a conscious effort to acquire information in response to a need or a gap in your *knowledge*;
- *Information behaviour* encompasses information seeking as well as the totality of other unintentional or passive behaviours (such as glimpsing or encountering information by chance), as well as purposive behaviours that do not involve seeking, such as actively avoiding information.

The definitions provided by Case are interconnected, with information behaviour being the broadest term, encompassing any information-seeking behaviour that leads to satisfying a specific need. These terms resemble Wilson's nested model of information behaviour (Wilson 1999, p.263). According to this model, information behaviour is the broader area that encompasses information-seeking behaviour, which is seen as a sub-set of the field, particularly concerned with the variety of methods users employ to discover and gain access to information resources (see Figure 2.2: the green area refers to the field in which this research belongs). The most specific area is the information search behaviour, which focuses on the interactions between information users and computer-based information systems.

Figure 2.2 A nested model of conceptual areas of information behaviour



The most commonly discussed of these concepts is information-seeking behaviour (Case 2007, p.5) which indicates the importance of this subject area in light of the evolving information technologies. A synthesis of studies in the area of information-seeking behaviour, information literacy and information use reveal some common phenomena. Most information-seeking related studies reflect key elements of a certain model, or are influenced by specific aspects of several models, or are based entirely on a particular theoretical dimension (cognitive, social, cultural, and so on.).

In an attempt to set the current research in context, it is important first to look at the broad theories underpinning research in the multidisciplinary field of Library and Information Science (LIS), in order to identify the broad theoretical context of research in information seeking (Bates 2005, p.2). In order to grasp how models are constructed in accordance with theories, it is essential that the researcher understands the distinction between the terms “metatheories”, “theories”, and “models” (Bates 2005), which Bates defines as follows:

- *Metatheory*: a theory concerned with the investigation, analysis, or description of theory itself;
 - *Theory*: the body of generalisations and principles developed in association with practice in the field of activity; A system of assumptions, accepted principles, and rules of procedure devised to analyse, predict, or explain the nature of behaviour of a specified set of phenomena;
 - *Model*: a tentative ideational structure used as a testing device.
- (Bates 2005, p.2).

Bates (2005) classified the approaches to research in the area of Information Science in accordance with the related domain knowledge. His classification included several approaches, including historical, constructivist, constructionist, ethnographic, socio-cognitive, bibliometric and user-centred. This classification sets a broad framework that helps beginners understand the range of research approaches applied in LIS (Bates 2005, p.10). A closer look at Bates’ classification reveals that theoretical approaches applicable to studies of information behaviour are those related to constructivist, cognitive and socio-cognitive theories, which have distinctive aspects which are discussed below.

2.3.1 Constructionism/Constructivism

Social Science researchers often cite the theories of constructionism and constructivism, treating them either as one, or as two different concepts. For his part, Bryman (2004, p.17) treats both constructionism and constructivism as referring to “an ontological position that asserts that social phenomena and their meanings are continually being accomplished by social actors. It implies that social phenomena and categories are not only produced through social interaction but that they are in constant state of revision”. From this definition it can be inferred that constructionism/constructivism is often associated with interest in how a social phenomenon is being presented. In their analysis and discussion of paradigms and perspectives in qualitative research, Denzin & Lincoln (2000, p.158) focus on constructivism as one of the major paradigms that structure and organise qualitative research. The authors state that in this theoretical realm, users are oriented to produce reconstructed understandings of the social world, in other words, constructivism is often more associated with the means by which understandings are made.

Case (2007) points out that within information behaviour research, constructivism has been associated with works related to the sense-making of Brenda Dervin and Carol Kuhlthau, with the emphasis being on the means by which individuals construct understanding of their world. On the other hand, Case discusses constructionism as a theory of knowledge formation with the emphasis on analysing human discourse to show how meanings are formed, in their talking and writing (Case 2007, 160). This suggests that studies in information research might be more influenced by constructivism, with the focus on how people make sense of their environment, in other words on the process they engage in order to understand how they search for information and the problems associated with the process. Based on the work of Jan Piaget and Lev Vygotsky, constructivism has major ramifications for the goals that teachers set for the learners with whom they work, and for the instructional strategies teachers employ in working toward these goals (Fosnot & Perry 2005, p.8). This would be expected to influence studies that focus on improving information literacy skills.

2.3.2 Critical Theory

Critical theory explains “a social order in such a way that it becomes itself the catalyst which leads to the transformation of that social order” (Fay 1993, p.33). Thus, studies under the banner of this paradigm tend to place more emphasis on criticising the environment, in order to cause a change in the setting. As shown in Table 2.1, Lincoln & Guba (2000, p.164) distinguish between critical theory and constructivism in terms of inquiry aim, nature of knowledge, and the way knowledge is accumulated.

Table 2.1 Distinction between the paradigms of critical theory and constructivism

The paradigm	Critical Theory	Constructivism
Inquiry aim	Critique and transformation; restitution and emancipation	Understanding; reconstruction
Nature of knowledge	Structural/historical insights	Individual reconstructions coalescing around consensus
Knowledge accumulation	Historical revisionism; generalisation by similarity	More informed and sophisticated reconstructions; vicarious experience

Adapted from Lincoln & Guba (2000, p.166).

Wikgren (2005) argues that critical theory can be the foundation of studies in information science, particularly those concerned with many levels of information seeking, creation and use. Critical theory, or realism, stipulates that reality is stratified and that the researcher should endeavour to reveal the underlying causes and relations governing a complex phenomenon, and not be confined to just explaining information seeking on an empirical level (Wikgren 2005). Based on this notion, studies within the realm of critical theory can be expected to emphasise how users understand information and how such knowledge develops.

2.3.3 Paradigms in Information-seeking Research

In addition to the metatheories already discussed, the last decade has seen the emergence of many paradigms which inform the area of information behaviour. However, for the purpose of the current research, only those most relevant to the studies covered in the literature review will be discussed. These include sense-

making, Zipf's Principle of Least Effort, and the domain analytic approach to scholars' information practices, which are discussed below.

2.3.3.1 Sense-making

Developed by Brenda Dervin, Sense-Making is proposed as an approach to investigating human sense making and sense unmaking in its variant forms. Information seeking and use has been a primary substantive focus (Dervin 2005, p.26). Sense-Making methodology focuses on a series of terms, which include: time, space, horizon, gap, bridge, movement, power, constancy, and change. Sense-Making asserts that "communicating be conceptualized as gap-bridging – not in the purposive, problem solving sense but in the sense of gap-bridging as a mandate of the human condition" (Dervin 2005, p.27). Sense-Making has been applied in various settings, such as libraries and information and media systems (Dervin's website 2009). As a methodological frame, Sense-Making proposes to provide means for dealing with studies of information seeking use. In Library and Information Science, sense-making methodology is associated with a shift in research emphasis from information sources to information users (Tidline 2005, p.113).

2.3.3.2 Zipf's Principle of Least Effort

This principle stipulates that each individual tends to adopt a course of action that will involve the expenditure of Least Effort (Case 2007, p.151). Zipf supports his theory of Least Effort with evidence from different aspects of human behaviour, most of it based on studies of language use. Zipf notes that the importance of his principle lies in its universality with regard to human behaviour: "Over the long haul, humans tend toward a surprising efficiency in their allocation of effort." This tendency has enormous implications for studying the use of information (Case 2007, p.145), because the Principle of Least Effort predicts that seekers will minimise the effort required to obtain information, even if this means accepting lower quality or quantity of information. This is an important paradigm which relates to information users' tendencies to resort to easily accessible information, instead of making efforts to find specialised information resources. This is a phenomenon often found in the area of higher education, where students tend to rely heavily on Internet resources and search engines in attempting to find the required information, as they require the least effort.

2.3.3.3 Domain analytic approach

Due to the fact that the domain analytic approach is still being developed, there seems to be no firm consensus on the definition of what constitutes a domain (Jamali 2008). According to Hjørland (2004), a domain can be a scientific discipline or a scholarly field. The term “domain analysis” was introduced by Hjørland and Albrechtsen (1995) who argue that it is more fruitful to view disciplines and specialities as basic units of analysis rather than to focus on “users” in a generalised and context-independent manner” (Talja 2005, p.123). Talja explains that the development of a more systematic domain analytic approach to explain scholars' information practices is “still in infancy”. The author also indicates that despite the fact that a number of studies have revealed discipline-specific differences in scholars' information practices, and that such differences are likely to persist in the electronic age, few studies have attempted to develop a comprehensive understanding of the factors that influence these differences as the present study attempts to do. Despite Talja's views, it should be noted that a plethora of research which focused on a particular occupation such as Scientists (for example, Hemminger *et al.* 2007, Brazzeal & Fowler 2005), Social Scientists (for example, Ellis 1989; Meho & Tibbo 2003), Physicians (for example, Urquhart *et al.* 2003; Gorman 1995), Lawyers (for example, Leckie, Pettigrew & Sylvain 1996, Engineers (for example, Kerins, Madden & Fulton 2004) and Humanities (for example, Foster 2004).

Following the discussion on theories and paradigms underpinning research in the area of information seeking, and prior to reviewing studies on the information seeking of graduate students in particular, the following section discusses significant models of information-seeking behaviour relating to higher education.

2.4 Models of Information-seeking Behaviour

In order to provide a theoretical background for the current study, this section of the review presents a number of selected information seeking models. Of models developed during the 1990s, the review focuses on Kulthau's model (Kulthau 2004), Ellis's information-seeking model (Ellis 1989), Leckie *et al.*'s general model of the information seeking of professionals (Leckie, Pettigrew & Sylvain 1996), and Wilson's information-seeking model (Wilson 1999). In addition, the review considers

various models that have emerged since the start of the new millennium, including Foster's non-linear information-seeking behaviour model (Foster 2004), the model of learning-related information behaviour (Ford 2004), and Urquhart & Rowley's information behaviour model (Urquhart & Rowley 2007). These models have been chosen for discussion for several reasons. First, they adopt a user-centred rather than a system-based approach, consistent with the approach of the current study. Then, these are the studies most often cited in information seeking studies in the higher education sector, and some have been developed out of research conducted with postgraduate students (e.g. Foster 2004; Ellis 1989). It should be noted that the sample in Foster's study was drawn from academic and postgraduate students at the University of Sheffield, England. Finally, these models explain factors or variables associated with the information-seeking behaviour process, which is consistent with the objectives of the current research. The models are discussed below.

2.4.1 Kuhlthau's Information Search Process

Over the last two decades Kuhlthau has enriched the LIS literature with studies and models of information-seeking. The author's most recent model, the "Information Search Process", or "ISP" (Kuhlthau 2004), addresses intellectual access to information and ideas, and the process of seeking meaning, rather than the physical location of sources. Kuhlthau's ISP model provides a holistic view of the search process and depicts information seeking as a process of construction, which is made up of six stages:

1. Initiation: becoming aware of a lack of knowledge or understanding.
2. Selection: identifying a problem and getting ready to begin the search.
3. Exploration: encountering uncertainty and confusion towards "incompatible information".
4. Formulation: forming a focused perspective as confidence begins to increase.
5. Collection: gathering information pertinent to the focused perspective.
6. Presentation: completing the search, with a new understanding of the topic.

(Kuhlthau 2005, pp.230-234)

2.4.2 Ellis's Model of Information-Seeking Behaviour

In 1989, Ellis developed a behavioural approach to information retrieval, proposing the following six patterns of information-seeking behaviour:

- *Starting* – activities of the initial search for information;
 - *Chaining* – following footnotes and citations or other forms of referencing connections;
 - *Browsing* – semi-directed searching in the area of potential interest;
 - *Differentiating* – using differences between sources as a filter on the nature and quality of material examined;
 - *Monitoring* – keeping aware of current services;
 - *Extracting* – working through a particular source to locate material of interest.
- (Ellis 2005, p.138).

This behavioural model has been applied in a number of grounded-theory researches, investigating for example the information-seeking patterns of researchers in Physical and Social Sciences (Ellis, Cox & Hall 1993) and the information-seeking behaviour of engineers and research scientists (Ellis & Haugan 1997). In addition, Ellis has investigated the information-seeking behaviour of English Literature researchers in the Internet age (Ellis & Oldman 2005). The model has also been tested and modified in subsequent studies. For example, Bronstein (2007) applied the model to the information-seeking behaviour of Jewish studies scholars, and found a strong relationship between the information activities used and the stage of research the scholar had reached. Therefore, Bronstein proposed a revision to Ellis's original model to include elements related to the stages of research: monitoring activities (awareness of current services); monitoring electronic and printed materials; networking; citation tracking, and a final stage related to preparing papers for publications.

Based on Ellis's model, Meho & Tibbo (2003) used e-mail interviews with 60 Social Science faculty members from 14 different countries to describe and analyse their information-seeking behaviour. Although the study's findings confirmed elements of Ellis's model, Meho & Tibbo enhanced the model by adding the following features: accessing, networking, verifying and information managing. Their findings were consistent with a subsequent MA study by Ge (2005), who applied Ellis's model to the

information-seeking behaviour of Social Science and Humanities faculty members and Doctoral students in the Internet age. Ge proposed extending Ellis's model by the addition of three further elements to the information process: preparation, planning and information management. It is worth noting that all of the studies that have applied Ellis's model have been qualitative and followed a grounded theory approach. This implies the need to integrate more methods in exploring the information-seeking behaviour of scholars. For example, Meho & Tibbo (2003) recommended that to enhance research outcomes, future research in this area should consider adopting triangulation of research methods for data collection, particularly surveys and face-to-face interviews.

2.4.3 Leckie *et al.*'s General Model of the Information Seeking of Professionals

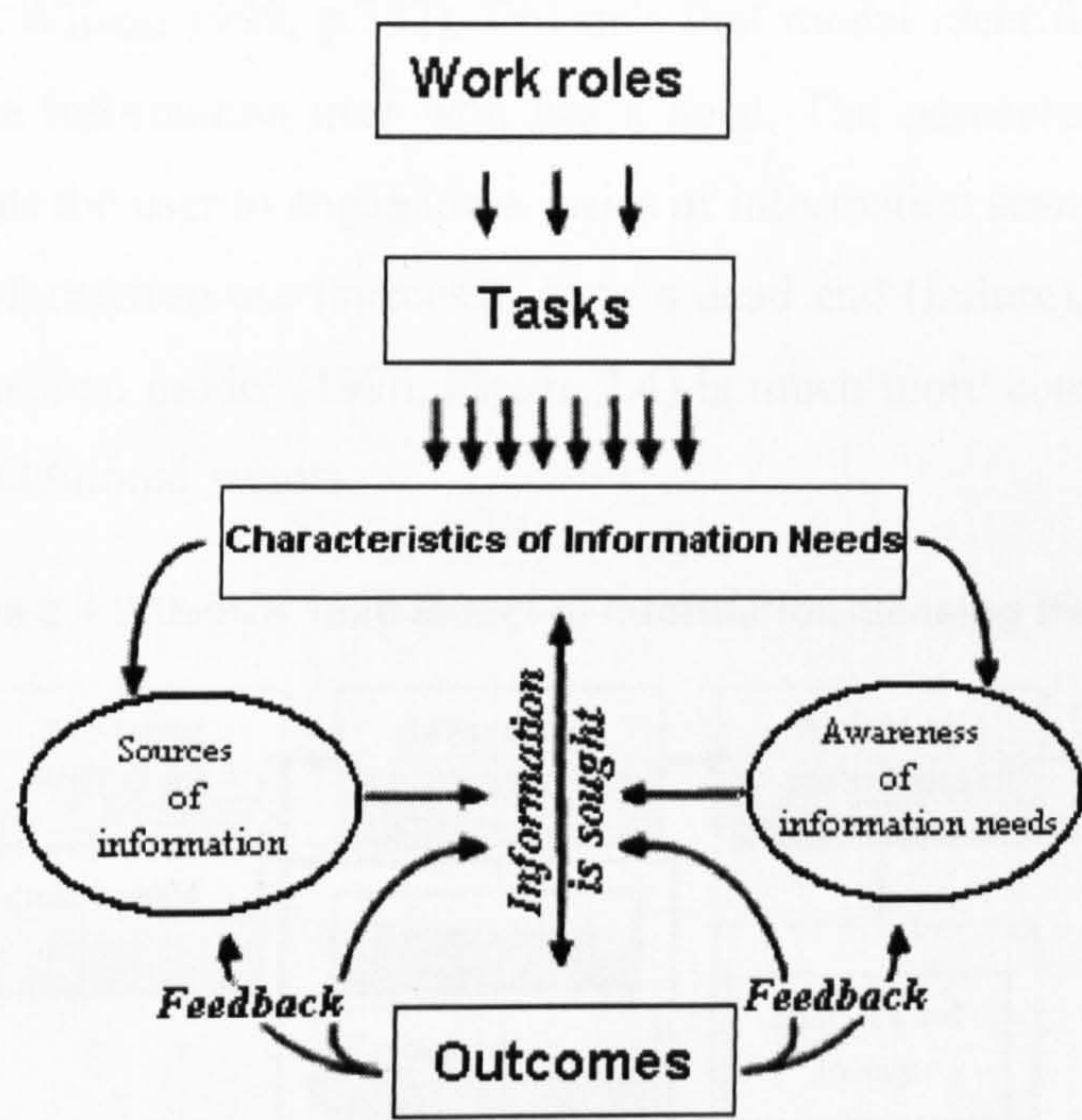
There has been a growing interest in studying the information needs of scholars in the fields of Humanities, Sciences and Social Sciences (Leckie 2005, p.158). Key findings emerging from research carried out by Leckie, Pettigrew & Sylvain (1996) include the following five issues:

1. Professionals often assume a number of complex roles as part of their work.
2. These roles have other related tasks.
3. Tasks required in each role are likely to prompt information needs or seeking.
4. There are intervening factors that may either facilitate or inhibit the use of information.
5. It often takes more than one attempt to find the appropriate information.

The general model of the information-seeking behaviour of professionals was derived from research on engineers, health care professionals and lawyers. Leckie, Pettigrew & Sylvain (1996, p.162) define the term "professions" as "service-oriented occupations having a theoretical knowledge base". In order to keep the model general enough to cover diverse professions and types of work, the components were kept slightly non-specific (Leckie 2005, p.161). The authors found that information-seeking practices were more similar across various professions than had been previously thought. In their model, they suggest that individuals' information needs are shaped by factors such as status in the organisation, years of experience and area of specialisation.

The authors believe these characteristics act as a filter in the information-seeking process. Once this process starts, other factors become important to its eventual success, including sources of information, the individual’s knowledge of information, and the likely usefulness of the sources (Leckie 2005). The end result of the information seeking is “outcome”, which either moves the work forward (provision of service or production of a report), or requires further information seeking for greater clarification (feedback loop).

Figure 2.3 Model of the Information-Seeking Behaviour of Professionals



(Leckie, Pettigrew & Sylvain 1996)

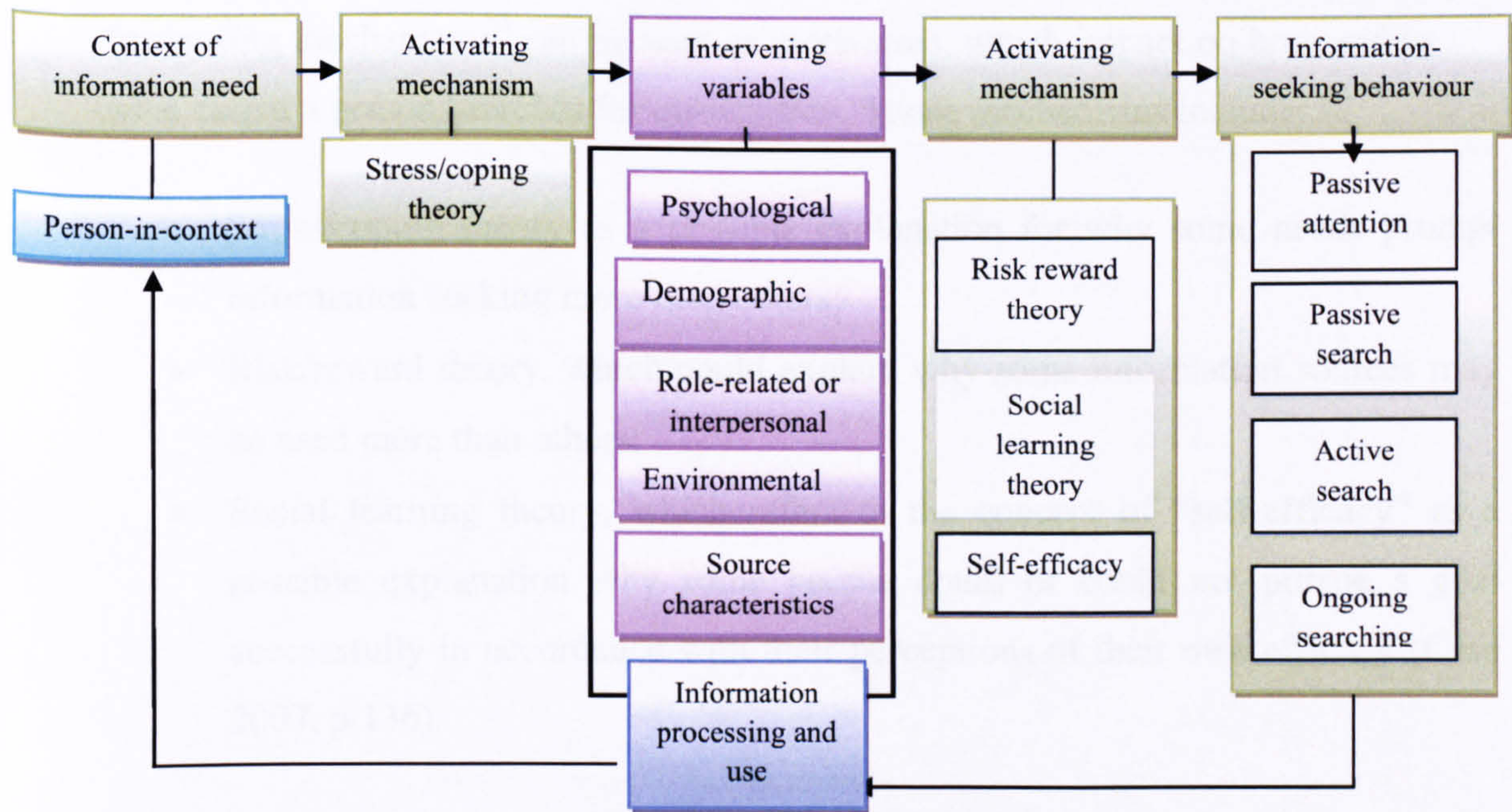
The basic assumption of the model, depicted in Figure 2.2, is that the tasks undertaken by professionals in the course of daily practice prompt particular information needs, which in turn lead to an information-seeking process. However, this process is greatly influenced by a number of interacting variables, which can affect the outcome (Leckie, Pettigrew & Sylvain 1996, p.180). These variables represent sources of information and awareness of information needs. As revealed in Figure 2.3, knowledge of various information sources, such as online databases, plays an essential role in the overall information-seeking process. Thus the individual's general

awareness about information sources and/or content can determine the path that information seeking will pursue (Leckie, Pettigrew & Sylvain 1996, p.185).

2.4.4 Wilson's Information-Seeking Behaviour Model

Wilson has developed a series of models reflecting trends in the theory and practice of research in the area of information seeking in 1981, 1996 and in 1999 (Wilson 2005, p.31). Wilson's first model was based on two main propositions: first, that information need arises out of needs of a more basic kind; and second, that in the effort to discover information to satisfy a particular need, the enquirer is likely to face barriers of different kinds (Wilson 1999, p.252). Wilson's first model identifies 12 components, starting with the information user who has a need. The perceived need, as Wilson suggests, prompts the user to engage in a series of information search activities. These lead either to information use (success), or to a dead end (failure), with no feedback loop. Wilson's second model (1996, Figure 2.4) is much more complex than the first and introduces additional factors.

Figure 2.4 Wilson's 1996 Model of Information-Seeking Behaviour



(Wilson 1999, p.257)

Wilson's general model provides a basis for understanding information-seeking behaviour, and explains how information needs arise and are satisfied:

Wilson's model is a very general model and is not only hospitable to theory that might help to explain the more fundamental aspects of human behaviour, but also to various approaches to information-seeking behaviour and information searching. (Wilson 2005, p.34)

Wilson's general model drew upon research from a variety of fields other than Information Science, including decision making, psychology, innovation, health communication and consumer research (Wilson 1999). Such diversity, according to Wilson, makes the model a richer source of hypotheses than his earlier models. In addition, the significance of a model of this kind lies in making the researcher realise the totality of information behaviour and showing how a specific piece of research may contribute to an understanding of the whole (Wilson 2005, p.35). The model explains the reasons why some resources are used more than others and why people may or may not pursue a goal successfully based on their perceptions of their own efficacy (Case 2007, p.136). Case notes that Wilson's "activating mechanisms" can be seen as motivators, which impact on how and to what extent a person searches for information. Those mechanisms include:

- Stress/coping theory as a possible explanation for why some needs prompt information seeking more than others;
- Risk/reward theory, which could explain why some information sources may be used more than others;
- Social learning theory, which refers to the concept of "self-efficacy" as a possible explanation why some people could or could not pursue a goal successfully in accordance with their perceptions of their own efficacy (Case 2007, p.136).

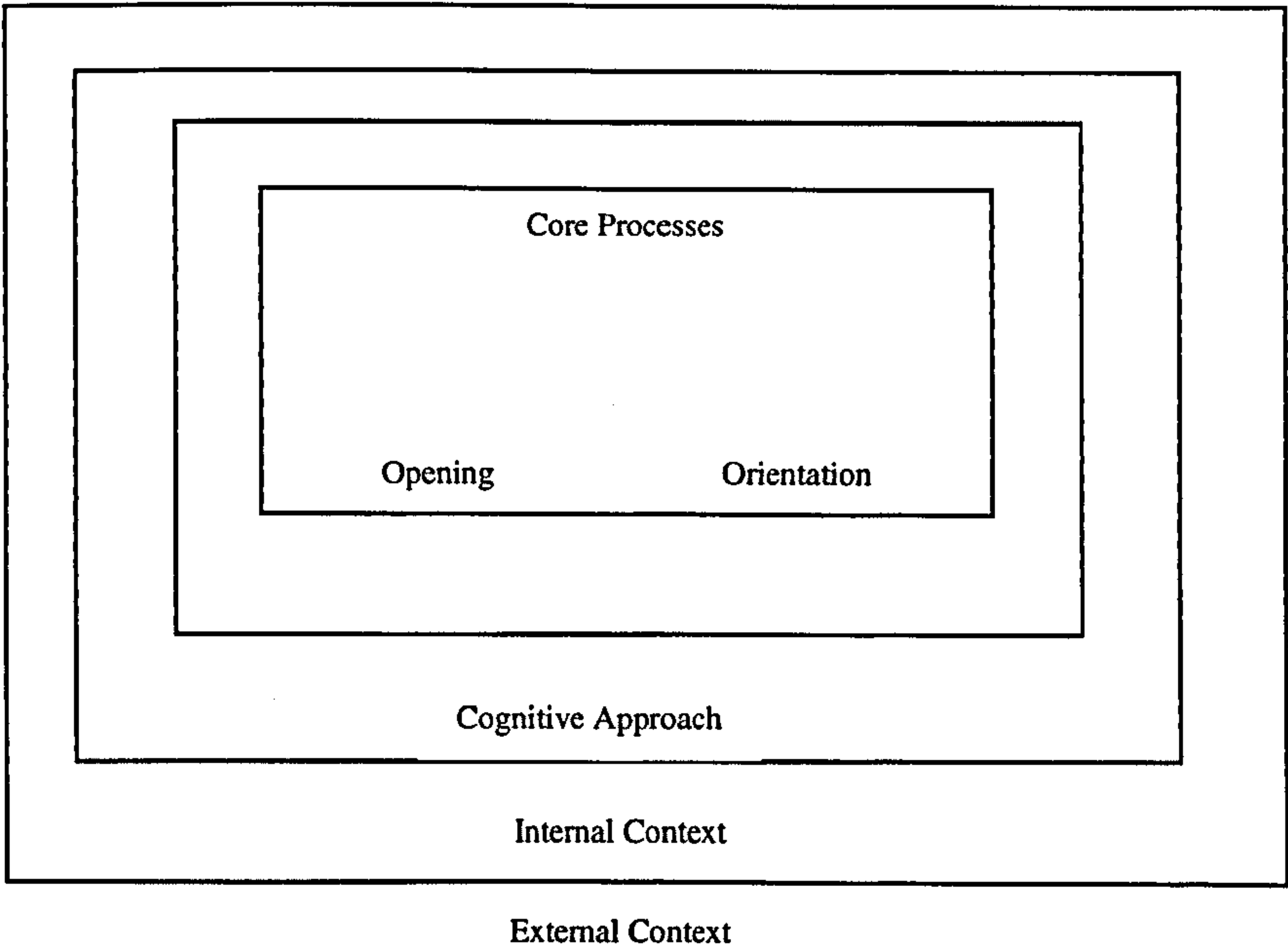
Wilson proposes in his model that the above mechanisms might be affected by intervening variables of five types: (1) psychological, (2) demographic background, (3) factors related to social role, (4) environmental variables (e.g. resources available), and (5) the characteristics of sources (e.g. accessibility and credibility). The current research adopts Wilson's model as its theoretical framework from which hypotheses are generated, especially with regard to the intervening variables. The justification for

using this model is provided in Chapter 5 (Research Design). A number of key authors have referred to Wilson’s model, among them Belkin, Borgman, Choo, Cole, Dervin, Ellis, Erdelez, Fidel, Ford, Ingwersen, Kuhlthau, Nilan, Pettigrew, Savolainen, Sonnenwald, Spink, Vakkari, and Wersig (Wilson 2005, p.35). As the author states : “It seems likely that the Model will continue to evolve as more and more researchers use it as a basis for thinking about the problems of human information behaviour.” (Wilson 2005, p.36).

2.4.5 Foster's Non-linear Information-Seeking Behaviour Model

Foster's non-linear model of information-seeking behaviour (Foster 2004) represents a shift towards a new understanding of this subject area (Foster 2005). The model is based on the findings of an interview-based naturalistic inquiry on the information-seeking behaviour of a sample of 45 academics and postgraduate researchers representing many disciplines (Foster 2004). It comprises three core processes: Opening, Orientation and Consolidation; in addition to three levels of contextual interaction: Cognitive, Internal and External (Foster 2005). Processes of Opening include breadth exploration, networking, keyword searching, browsing, monitoring, chaining and serendipity, as shown in Figure 2.5. The Orientation process consists of defining a problem, building a picture and identifying the shape of existing research. Consolidation refers to knowing enough, refining, and incorporation, verifying and finishing (Foster 2004). See Figure 2.4 for more information.

Figure 2.5 Non-linear model of information-seeking behaviour (Foster 2004, p. 232)



According to Foster (2004), the model's external influences are categorised as social and organisational, time, the project, and accessibility of resources. Foster also found the social networking aspect of interdisciplinary experience to be one of the most significant factors influencing access to information resources. By internal influences, Foster refers to prior knowledge on the part of the information seeker, in addition to self-perception and self-efficacy.

The cognitive approach, according to Foster, describes the participants' willingness to identify and use information that might be relevant to an interdisciplinary problem. One practical implication of the model is that it suggests a need to revise the teaching of information literacy and library skills, with a move towards a holistic skills programme, including curriculum development and training design (Foster 2005). As the author states:

The new model offers the basis of a framework for educators and library professionals to teach both academic and non-academic and expert and non-expert information users in a manner that reflects actual behaviours and real-world solutions rather than the artificial conceptualization of stages (Foster 2004, p.235).

Despite Foster's presentation of information-seeking behaviour as a "dynamic holistic process", and its insightful implications for teaching information skills, Foster indicates that further research is planned to make the study suitable for generalisation by adopting a mixed methodology, incorporating both quantitative and qualitative approaches (Foster 2004). This triangulation was used in the current research which uses a triangulation of data collection methods, this in turn proved the validity of the approach.

2.4.6 Model of Learning-Related Information Behaviour

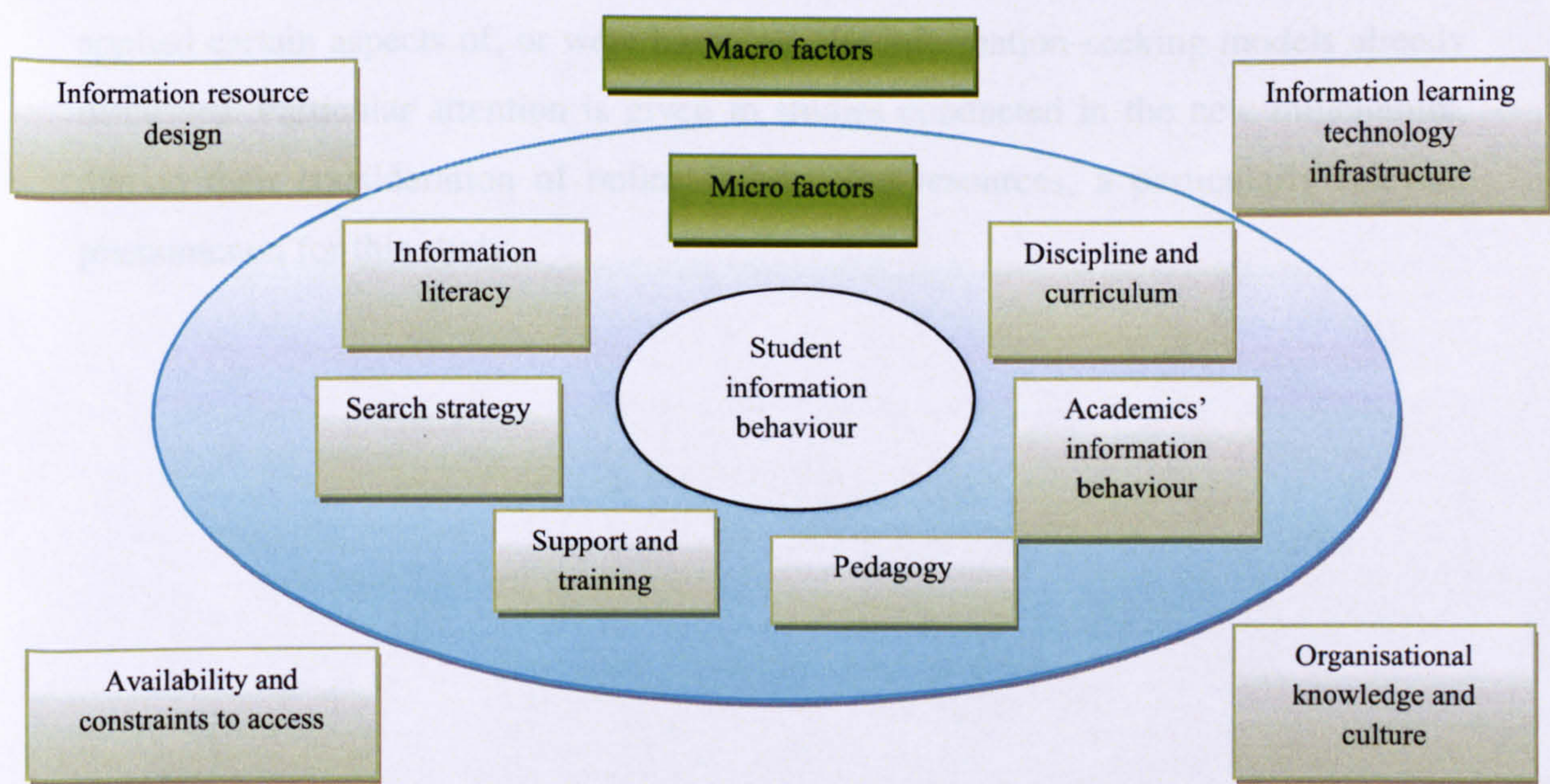
Ford (2004) developed a model which details components of learning-related information behaviour, including basic information processes, information processing types and information processing approaches; and factors affecting information behaviour related to educational environments (in particular, learning objectives), and mental (including cognitive and affective) states. The model provides a broad theoretical framework onto which the results and research questions of empirical studies can be mapped in order to suggest areas that warrant further investigation

(Ford 2004). Components of the model include educational context (educational philosophies, models of learning and pedagogic approaches, learning objectives and associated tasks), and information behavioural responses to learning tasks (cognitive styles, learning strategies, study approaches, critical thinking, levels of prior knowledge and experience).

2.4.7 Urquhart & Rowley's Information Behaviour Model

A recent information seeking study carried out in the UK by Urquhart & Rowley (2007) to understand students' information behaviour in relation to electronic information resources, has resulted in the development of a non-sequential model (see Figure 2.6). According to the authors, this model can be used to identify and define the scope of subsequent studies in terms of factors that can be used as a set of variables for such future research to consider (Urquhart & Rowley 2007, p.1196). The advantage of this model is that it is a general and comprehensive one that brings together macro and micro factors influencing information-seeking behaviour in an academic context. However, the model is still in its early stages and so far no study has tested it empirically.

Figure 2.6 The Information Behaviour Model



(Reproduced from Urquhart & Rowley 2007, p.1190)

Urquhart & Rowley (2007) note that future research might investigate the relationship between discipline, student level (undergraduate and postgraduate) and information behaviour, or the impact of different levels of convenience in relation to accessing digital information resources. In this research, the information-seeking model of Wilson (1999) provides the theoretical framework; however, the model by Urquhart & Rowley complements Wilson's model by identifying the factors influencing the information-seeking behaviour of graduate students. A detailed explanation of the adoption of Wilson's model and the use of Urquhart and Rowley's factors is provided in Chapter 5 (Research Design, Figure 5.1 The theoretical framework) and in Chapter 9 (Discussion, Figure 9.2 An extended framework of Information Behavioural model).

2.5 Summary

This chapter has provided an overview of the historical and theoretical background of information-seeking studies. It has also reviewed the important conceptual models of information behaviour that have influenced studies in the field. Leading on from the above, the next section of the review (Chapter 3) analyses studies conducted on the information-seeking behaviour of graduate students in particular, most of which have applied certain aspects of, or were based on, the information-seeking models already discussed. Particular attention is given to studies conducted in the new millennium, due to their consideration of online information resources, a particularly relevant phenomenon for this study.

CHAPTER THREE - GRADUATE STUDENTS' INFORMATION-SEEKING BEHAVIOUR

Studies of the last decade

3.1 Introduction

This part of the literature review critically appraises studies on the information-seeking behaviour of graduate students, in order to set these into the wider context of information behaviour research. For the purposes of this research, graduate students' information-seeking behaviour is defined as their approach to seeking information to fulfil their academic tasks. This chapter focuses on studies conducted over the last decade, particularly those dealing with the use of online information resources. The chapter also discusses the studies that have investigated the factors associated with students' information-seeking behaviour: for example information literacy, disciplinary area, and the role of academics and the impact of accessibility of various types of information resources, mainly electronic ones.

3.2 The Information-seeking Behaviour of Graduate Students

The literature on the information-seeking behaviour of graduate students has been growing recently, as an increasing number of scholars have been paying attention to the subject (e.g., Bruce 2008; Chu & Law 2008; Rempel & Davidson 2008; Hoffmann *et al.* 2008). This is an indication of the increasing importance of this area and implies that librarians and information professionals have realised how critical it is to understand graduate students' information-seeking behaviour, because these students are likely to be the researchers and academics of the future:

Graduate students are required to carry out exhaustive research within their field, yet they are often inadequately supported by faculty or library instructional programmes in learning about the research process, these students are the future faculty and professionals within their disciplines (Rempel & Davidson, 2008).

A recent report by the Research Information Network (RIN) focused on information skills for young researchers at postgraduate and postdoctoral level (RIN 2008). The report noted the importance of releasing that the training needs of academics “have tended to be neglected and that in research-active universities, new lecturers are often assumed to have all the skills and knowledge they need” (RIN 2008, p.5). Bruce (2008, p. 148) states that one of the purposes of a higher degree is to “bring neophyte researchers into significant communities of practice in their field and to enable them to experience research and information use in the research process as their more experienced counterparts might do”. These statements reinforce the value and timeliness of the current research, especially in today’s ever-changing electronic information environment. This part of the review provides a literature survey of the studies in this area, discussing their scope, the data collection techniques they have employed and their major findings, in addition to identifying gaps in the literature and making suggestions for further research.

A synthesis of the literature shows that studies on the information-seeking behaviour of graduate students can be classified into three broad approaches:

- Information-literacy approach (e.g. Hoffmann *et al.* 2008; Rempel & Davidson 2008; Chu & Law 2008; Hooks & Corbett 2005; Lightman & Reingold 2005;);
- Use-of resources approach, which focuses on how users deal with electronic information resources in terms of searching behaviour and interactions with either the web or with a specific database (e.g. Fidzani 1998; Ellis *et al.* 2002; Hiller 2002; Tenopir *et al.* 2003; Ford, Miller & Moss 2005; George *et al.* 2006; Jankowska, Hertel & Young 2006; Hemminger *et al.* 2007; Mansourian & Ford 2007; Urquhart & Rowley 2007);

- Theoretical approach, which deals with information seeking in terms of models and theories (e.g. Foster & Ford 2003; Foster 2004; Fry 2006; Sadler & Given 2007).

These are discussed in detail and suggestions are made concerning areas which merit further research.

3.2.1 Information Literacy Approach

Most of the studies mentioned above have implications for enhancing the information literacy skills of graduate students and for fostering their use of various types of information resources. However, there have been studies exclusively dedicated to exploring information literacy in relation to information-seeking behaviour. These have focused on means of enhancing the information literacy of graduate students through the integration of literacy programmes or workshops, either in the curriculum or as a separate module or course. Prior to reviewing these studies, the next section defines information literacy in the context of higher education.

3.2.1.1 Definitions of information literacy

The Chartered Institute of Library and Information Professionals (CILIP) defines information literacy as “knowing when and why you need information, where to find it and how to evaluate, use and communicate it in an ethical manner” (CILIP 2007). However, the most cited definition of information literacy is provided by the Association of College and Research Libraries (ACRL), which defines the term as “a set of abilities requiring individuals to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ACRL 2000). Despite the potential benefits of having various definitions for the term, Owusu-Anash (2005, p. 366) has expressed concern over what he sees as a lack of “definitional consensus” on information literacy. The author argues that the time allocated for debating definitions of information literacy could be better invested in improving students' information skills and in exploring the extent to which the library can participate in the education of its users (Owusu-Anash 2005, p. 373).

3.2.1.2 Information literacy models

Over the last decade, interest in information literacy in higher education has increased, leading to a growing literature on the subject (for example, Andretta, Pope & Walton 2008, Andretta 2006, 2005; Bruce 2004; Bundy 2004; Webber & Johnston 2003; Hepworth & Wema 2006; Hughes 2006). These studies have investigated aspects relating to information literacy in various contexts and different countries (Australia, UK, and USA). However, while they have examined the issue of information literacy in higher education in general, there are few studies investigating the development of standards of information literacy at the graduate level, particularly in relation to electronic information resources.

In addition to the above studies, during the last decade various models of information literacy have been put forward. Models have been developed by the Society of College, National and University Libraries (SCONUL) in the UK (SCONUL 1999); the Association of College and Research Libraries (ACRL) in the USA (ACRL 2000); and by the Australian and New Zealand Institute for Information Literacy (ANZIIL) (Bundy 2004); and by David Streatfield (Markless & Streatfield 2007, p.28). In addition, Bruce (2008, pp. 148-149) has formulated a model based on the Seven Faces of Informed Learning. While these are distinct models, they share certain similarities.

SCONUL

SCONUL defines seven skills related to library and information technology. The skills are based on two main strands of information literacy in higher education: the first strand relates to skills students need to have while studying at a higher education level; the second strand is concerned with ensuring that students are equipped with sufficient information skills upon finishing higher education (SCONUL, p.5). Therefore, SCONUL's seven pillar model offers different levels of information literacy standards in accordance with the stage which best describes the academic's or student's status. The model places undergraduate students on the "novice" side of the pillar, whilst postgraduates and research students are expected to aspire to the "expert" side, which manifests the ability to synthesise and build upon existing information.

ACRL

The ACRL model is based on five main standards, which state that an information literate student should be able to:

- Assess the information needed effectively and efficiently;
- Evaluate information and its sources critically and incorporate selected information into their knowledge base and value system;
- Use information effectively to accomplish a specific purpose, whether individually or in groups; and,
- Access and use information ethically and legally (ACRL 2000).

ANZILL

Derived from the ACRL's information literacy competency standards, ANZILL stipulates six attributes, describing the information literate person as:

- Recognising the need for information;
- Finding the needed information efficiently;
- Evaluating the information critically;
- Managing the information collected;
- Applying prior and new information to construct new concepts; and,
- Using information ethically with an acknowledgement of the associated cultural, ethical, economic and legal issues (Bundy 2004, p.3).

Common to the three models is the overall process of information literacy, which involves acknowledging the need for information, followed by developing competencies in locating, evaluating and using information effectively (Andretta 2005, p.53). SCONUL's model is notable because it offers different levels of information literacy standards in accordance with the stage which best describes the academic's or student's status, in a progression from novice to expert. The model can distinguish between various levels of information literacy and acknowledges the fact that users are different in their information literacy skills.

The Six Frames for information literacy education

This model was proposed by Christine Bruce, Sylvia Edwards and Mandy Lupton in 2006. The model is considered as a conceptual framework composed of various frames, to help stakeholders in information literacy education to reflect on, and

analyse the theoretical influences on their contexts (Bruce, Edwards and Lupton 2006). Each frame has a particular view of information literacy, information, learning and teaching (Table 3.1). These frames are:

- The content frame;
- The competency frame;
- The learning to learn frame;
- The personal relevance frame;
- The social impact frame; and the
- Relational frame.

Table 3.1 The Six Frames for Information Literacy Education

The Frame	View of information literacy
Content	Information literacy is knowledge about the world of information
Competency frame	IL is a set of competencies or skills
Learning to learn frame	IL is a way of learning
Personal relevance frame	IL is learned in context and is different for different people/groups
Social impact	IL issues are important to society
Relational frame	IL is a complex of different ways of interacting with information

In terms of practice, the frames can be used by academics, librarians and instructional designers in assisting information literacy education. As indicated by Bruce, Edwards and Lupton (2006, p.14), “the frames may serve as an analytical tool for understanding the discourses and differences in opinion about how IL education might be best progressed.” Andretta, Pope and Walton 2008 drew statements for their research from from the Six Frames of Information Literacy to be included in statements used in posters displayed in workshops ran during a conference.

Seven Faces of Information literacy

The seven faces of information literacy is a relational model is a map or a picture of the different ways in which information literacy is experienced and each “face” comprises elements of information use, information technology and a unique element (Bruce 2003). The seven main faces refer to Information technology, information sources, information process, information control, and information use (critical thinking and intuition and values).

Bruce (2008, pp 148-149) has adapted the Seven Faces of Informed Literacy to produce a model of Informed learning that set a criteria for expected level of information literacy from research students. Table 3.2 below illustrates the seven faces of information literacy and the adapted faces of informed learning.

Table 3.2 Research Students' Roles within the Seven Faces of Informed Learning

The Face of Informed Learning	Elements (information use, IT, unique element)	Meaning for Research Students
Information Awareness and Communication	IT used for information awareness; IT helps users stay informed/communicate; a social experience –not individual; dependent on expertise within a group	Establishing themselves in relevant research forums.
Information Sources	Bibliographic; Human; Organisational; assistance of intermediaries emphasised; Personal skills also valued	Becoming familiar with the range of information sources and spaces available to them, which give them access to relevant resources.
Information Processes	Linked to problem-solving, decision-making; requires personal heuristics; a creative art	Enhancing their personal references and strategies for working with information.
Information Control	Recognising relevant information; managing that information; making connections between information, projects, people; interconnectedness between information and parts of projects	Gaining an increasing appreciation of the dimensions of their work in order to establish the relationships and connections between various information artefacts or ideas and their emerging position.
Knowledge Construction	Emphasis on learning; Developing a personal perspective with knowledge gained; dependent on critical thinking	The need to understand their relevant research bases and be able to think critically about the disciplines and territories that are bound by their research intentions and processes.
Knowledge Extension	Personal knowledge + experience + creative insight/intuition; mysterious experience; develops new knowledge/approaches to tasks/novel solutions	The need to be aware of themselves and their engagement with others as “catalysts of innovation”.
Wisdom	Personal quality; values and ethics combined with knowledge; information used for the benefits of others	The need to be aware of the social implications of their work, and the need to make appropriate use of information ..

The information provided in Table 3.1 reflects the view of Bruce (2008) that information use comprises a broad set of processes or orientations that are implemented or adopted in many information practices: “Researchers from all disciplines engage with a range of information practices that are likely to need

developing and polishing as research students embark on their journey of learning to research” (Bruce 2008, p.149).

The above information literacy models set out clear-cut criteria for what constitutes an information-literate academic society. However, important questions remain: What attributes are specifically needed for using and accessing electronic information resources in the twenty-first century? What influence does information literacy have on information-seeking behaviour? As indicated by Urquhart & Rowley (2007), information literacy initiatives tend to be preoccupied with the development of generic information skills, even though individual differences such as the motivation to learn, personality type, the type of learning task, teaching and learning styles, and the ways of thinking in different disciplines are seen as critical factors affecting information behaviour. Since the current research focuses upon graduate students, the following section discusses information literacy in relation to this specific user group, especially in relation to the electronic environment.

Due to increased access to various information resources, the 21st century is characterised as being “information-intensive”; thus requiring sophisticated levels of information literacy (Bundy 2004). As Kavulya (2003, p. 216) states: “Information literacy is increasingly important in the present context of the information explosion and concomitant uncertainties about its authenticity, validity, and reliability”. Martin and Williamson (2003, p. 144) support this view by stating that students need to become critical “consumers” of information in order to develop new intellectual skills for managing information effectively. Regardless of which discipline they belong to, students are in constant need of information literacy skills that enable them to proceed with their investigations while remaining “self-reliant and having a sense of being in control of their learning” (Kavulya 2003, p. 217). For his part, Owusu-Ansah (2003) claims that all the concepts describing information literacy share an underlying assumption that students lack an adequate awareness of the information universe in which they work and, even more critically, of the electronic environment.

The above part of the literature review implies that partnership and collaborative efforts between the key personnel responsible for advocating information literacy - teachers, information professionals and students - are essential in order to achieve an

adequate level of information literacy in education (Bruce 2004). These information literacy skills are essential in order to use information effectively and efficiently. At this point, an important question arises: How has the research in this field dealt with information literacy in relation to the information-seeking behaviour of graduate students? The next part of the review provides a critical appraisal of studies that have related information seeking specifically to the information literacy of graduate students.

3.2.1.3 Studies on the information-seeking behaviour of graduate students

At the beginning of the year 2000, studies on information literacy at the graduate level were predominantly focused on theoretical aspects related to standards of information literacy in association with the ACRL standards (for example, Grant & Berg 2003). In a later section of this review, there will be a detailed account of the studies that have reported on information literacy standards. During the last five years, however, the literature on information seeking has been enriched with more empirical studies related to information literacy skills or library research skills of graduate students in particular (for example, Hoffmann *et al.* 2008; Chu & Law 2008; Rempel & Davidson 2008; Eskola 2005; Kerins, Madden & Fulton 2004). These studies in addition to others are discussed below.

Hoffmann *et al.* (2008) conducted a needs assessment study via focus groups and an online survey to investigate graduate students' perceptions of their library research needs, and the appropriateness of using a common instruction programme for students in the disciplines of Science, Engineering, Health and Medicine. The study found that graduate students wanted to learn about strategies for finding information, bibliographic management tools such as Refworks, and tools for keeping up-to-date with scholarly literature. It emerged from the study that faculty often assume that when students enter graduate school, they already know how to conduct library research; however Hoffman *et al.*'s findings indicate that this is not necessarily true. Students in all faculties identified challenges in finding information related to difficulties with developing keywords and search strategies, and with knowing where to look for the information they need.

The primary tool for determining graduate students' perceived information literacy needs was a list of proposed topics for workshops covering issues related to scholarly communication processes, search strategies, conducting literature review, keeping up-to-date with scholarly literature, writing research papers, and using the Refworks citation tool. Overall, the study found a generally positive attitude among graduate students towards the usefulness of the workshops, each of which was rated "very" or "somewhat" useful by between 67% and 83% of respondents. In general, the findings of the study revealed that students prefer to learn about library research by receiving information via email; both students and faculty members suggested offering workshops at varying levels (basic and advanced); and there was a demand for a common instruction programme that should include relevant discipline-specific instructions from subject librarians.

Rempel & Davidson (2008) took a more practical approach to exploring the information literacy needs of graduate students in America. The authors conducted a pre-assessment survey to explore students' perceptions about proposed literature review workshops, and then conducted these workshops with Masters and PhD students from various disciplines. The aim of the workshops was to provide students with instructions on how to conduct reviews. It was found that graduate students were not always as up-to-date with library tools and new technologies as might be assumed.

The findings of Rempel & Davidson's study largely confirm the findings of Hoffmann *et al.* (2008): many students were unfamiliar with tools such as citation databases, and the authors suggested enhancing literature review workshops by offering classes for different skill levels from beginner to advance. The study also found that few students were familiar with Web 2.0 tools. The significant difference from Hoffmann *et al.* (2008) was in the practical aspect: Rempel & Davidson offered the workshops twice in the same week, once in the morning and once in the afternoon, to accommodate both full-time and part-time students. They used a conference-style approach in which students were encouraged to participate. The strength of this study is evident in the insights the authors gained, both practically and theoretically, from the combined results of the pre-assessment survey and evaluations from the two terms of workshops offered. Another important aspect was that the authors went so far as to suggest that such workshops might be enhanced by involving faculty members from

various disciplines to bring their perceptions and expectations to bear on carrying out effective literature reviews. The study would have been strengthened if another survey had been conducted at the end of the workshop so that a comparison could be made with the pre-assessment survey.

Chu & Law 2008 (pp.165-177) adopted a wider longitudinal approach in investigating the development of information search expertise among 12 students beginning PhD research (six from education and six from engineering). The study focused on students from two specific disciplines, Education and Engineering, and examined the factors contributing to their progress from one stage of expertise to another. It explored how students develop (1) their knowledge of databases/sources, and (2) their information search skills. In common with the other studies discussed above, it was found that research students had problems in finding relevant information sources and that they needed to achieve at least a competent level of expertise in order to effectively locate information. The strength of this study is in the multi-method approach adopted to collect data: surveys, direct observations, verbalisation of the students' own thinking and interviews. Systematic training aimed at helping students become competent users of information was provided during five meetings over a period of about one year, and it was found that as students received more training on search strategies, their information needs changed from general to specific and current. The main conclusions of the study are that information search training is still essential at the postgraduate level, and that the training provided to students should include specific search skills such as truncation and proximity search.

Andretta, Pope & Walton (2008) proposed a strategy to ensure the integration of information literacy as a part of the curriculum in UK academic institutions. The authors wrote a paper in which they have reflected on perspectives of information literacy by library staff, faculty members, and students. The authors pointed out to the need to promote teaching and learning strategies that emphasize independent learning through the integration of information literacy in the curriculum. In a qualitative study exploring the information literacy of medical students, Eskola (2005) found that the development of information literacy is prompted by real information needs such as finding information for a thesis.

Studies on the information seeking of graduate students are not limited to the community of traditional students, who progress to their higher degrees immediately or soon after gaining their Bachelor degrees. Bellard (2007, pp. 494-505) examined the perceptions of different groups of graduate students towards a required information literacy workshop developed for a Masters degree in Social Science. The author was particularly interested in non-traditional graduate students, those who had been away from academia for a long period. The findings of the study, derived from the results of a pre/post-questionnaire and classroom observation, suggested that there was a significant need for additional training and that graduate students recognise the need for information literacy instruction throughout their Masters course.

Kerins, Madden & Fulton (2004) investigated the information seeking of 12 graduate students from Engineering and Law who planned to become professionals. They used semi-structured interviews adopting the Critical Incident Technique. Like the later studies, the authors found that postgraduates have particular information needs and require information skills education. Through conducting brief problem-solving exercises, the study also found that students often did not consult librarians and academic staff when adopting information-seeking strategies.

It is noticeable that the majority of the reviewed studies on the information-seeking behaviour of graduate students were conducted in the developed world, whereas studies in developing countries remain scarce, especially those of an empirical nature (for example, Al-Saleh 2004, Hepworth & Wema 2006). In an overview of information literacy and programme development at King Fahad University of Petroleum and Minerals (KFUPM), Ashoor (2005) describes the KFUPM experience in developing information literacy initiatives. The author points out those developing countries considering information literacy initiatives face problems posed by the traditional educational system, the low literacy rate and the low level of publishing.

In their empirical study, Hepworth & Wema (2006) designed and implemented a one-week training course for Education Masters students in Tanzania. The purpose of the course was to integrate elements of information literacy, educational theory and information behaviour research. The strength of the study is that trainees' knowledge was evaluated both before and after the course in order to trace changes. The authors indicated that the programme proved successful in terms of knowledge transfer. They

also suggested that, “this training programme provides an opportunity for other developing countries to adopt it by implementing it in a wider context”. In the Arab Gulf region, Al-Saleh (2004) investigated graduate students’ information needs from electronic information resources in Saudi Arabia. The author utilised a quantitative survey on a sample of 500 graduate students in three Saudi universities. Overall, the study indicated that the majority of electronic information resources of Saudi university library were under-utilized as they were not found to meet the information needs of graduate students. The majority of graduate students were reluctant to use electronic resources due to some barriers. The main barrier to student information actions was related to insufficient instructions and not enough librarians to help in using the library’s electronic resources.

3.2.2 Information Resources Approach

In this approach, research has focused on the technical aspect of how graduate students interact with electronic information resources in terms of searching behaviour and interactions with the web or other databases. Studies carried out during the last decade have primarily focused on web-search strategies and information retrieval, the effect of the Internet on students’ searching for information, students’ interaction with academic resources and Google, and searching in specific databases.

The Online Computer Library Centre (OCLC) and Ohio State University (OSU) were involved in a four-stage project entitled “Sense-making the Information Confluence (IMLS)”. The main aim of the project was to investigate the reasons why and means by which college and university users satisfy their information needs. It sought to offer useful findings for librarians and researchers in Library and Information Science, providing portraits of users’ specific information-seeking behaviours which are grounded in specific situations (Sense-Making website). The project adopted a mixed method approach including online and phone surveys, interviews, focus groups and semi-structured interviews. Graduate students (at both Master’s and Doctoral levels) were among the study sample, which also included university and college faculty and undergraduates in 44 higher education institutions in Ohio, Columbus (Dervin, Connaway & Prabha 2003). It was found that situation was the best predictor across all information seeking and use measures. The major finding in relation to

graduate students was that they were more likely to blame inadequacies in information for preventing them from getting help in situations involving research, scholarship and use of electronic resources (Dervin & Reinhard 2007). In addition, graduate students and faculty members were more likely than undergraduates to report library use, especially in extended research situations. Despite this use of traditional library services, however, faculty and graduate students criticized the services and suggested future modifications. Generally, the participants (whether faculty, graduate, or undergraduate) revealed a heavy reliance on search engines and Google. The study found that the reasons for participants' preference for the internet as a major information source were related to familiarity, convenience and currency.

In a joint project for scholars from the United Kingdom and America, Ellis *et al.* (2002) conducted a five-part research to investigate academic researchers' information-seeking behaviour and mediated searching in an information retrieval system using the Dialog Information Service. The authors employed observational, longitudinal data collection methods and used questionnaires and interviews, in addition to mediated online search sessions which were recorded and taped. The 25 participants were at different stages of the information search process. The longitudinal study found that the driving forces behind the on-line search interaction were determining keywords and search strategies, review and relevance. It was found that using an intermediary helped users to identify their search terms more clearly and focus on the references they obtained and, in most cases, the users and intermediaries considered the communication process between them very effective.

Ford, Miller and Moss (2005), in a series of articles, reported the results of an exploratory study that investigated the web-search strategies of 68 Masters students. They aimed to discover the effects on search strategy of individual human differences such as study approaches, cognitive and demographic features, and preferred approaches to web-based information seeking. The students used AltaVista to search for information on three assigned search topics graded in terms of complexity. Factor analysis and regression analyses were used to identify relationships between the individual difference variables and Boolean and best-match search strategies. It was found that as the complexity of the task increased, strategic shifts were observed on the part of searchers having particular combinations of characteristics.

In addition to the above mentioned studies which focused on the web, other studies have investigated the information-seeking behaviour of researchers when dealing with a wider range of information resources. Some recent studies have looked specifically at graduate students' use of a particular database (e.g. Tenopir *et.al.* 2008), while others have explored certain aspects of students' use of general and specific resources (for example Gardiner, McMeremy & Chowdhury 2006; George *et al.* 2006; Liao, Finn and Lu 2007; Heminger *et al.* 2007; Jamali & Nicholas 2008; Saiti & Prokopiadou 2008; Vezzosi 2009). In general, a synthesis of these studies reveals that the major themes emerging from them are related to developments in electronic information resources, and to the means by which students keep up-to-date with developments and new resources in their field. A common and noticeable finding from the studies that have focused on students' use of various information seeking resources is the choice of the Internet as their primary information source.

Vezzosi (2009) conducted an in-depth semi-structured interview with doctoral students in Biology to explore which information sources and research strategies they use, the role they adopt in their information seeking process, and their attitude towards library services. The study found that nearly all the doctoral students reported that the Internet was their first and favourite point of access for any type of information, both for their everyday life and for their research work. In addition, even when students reported being familiar with databases, catalogues and online journals, almost all named Google as a crucial information tool and as their starting point for information searches. Consistent with findings by Barrett (2005) and Sadler & Given (2007), Vezzosi's study also revealed that a similar informal tutoring role is played by peers in helping students with their search process.

A study by Saiti & Prokopiadou (2008) also found a preference for the Internet as the primary search source. The researchers administered questionnaires to 211 Education postgraduate students to investigate whether they chose information technology or other resources to complete their coursework or expand their knowledge. The study found that graduate students chose the Internet, mainly because it provides a means of information retrieval that is fast and easy.

Tenopir *et al.* (2008) reported on a research project funded by the NSF-National Science Digital Library Project, which observed how academic users interact with the

ScienceDirect information retrieval system for course-related assignments. The authors used a pre and post-search questionnaire and think-aloud protocol with 41 academic searchers including faculty members, graduates and undergraduates, and science librarians. The participants in the observations represented various disciplines including Physics, Chemistry, and Engineering. The goals of the project were (1) to find ways to improve Science and Engineering students' use of science e-journals, and (2) to develop methods to measure user interaction behaviour. The study found that learning style is an important factor in influencing the information behaviour of Engineering graduate students.

Liao, Finn & Lu (2007) adopted another approach to the investigation of the information-seeking behaviour of graduate students, looking into the influence of ethnicity on the way international graduate students search for information. The study compared international graduate students with American graduate students, utilising a web-based survey to (1) compare the information needs and information-seeking behaviour of international graduate students compared with American graduate students, (2) investigate the relationship between the English language proficiency of international graduate students and their information-seeking behaviour, and (3) investigate the relationship between length of stay in America and information-seeking behaviour. Graduate students came from 27 countries from (Asia, Europe, Middle East, Africa, North/South/Central America, Arctic Region and Oceania). Out of 362 responses, 315 valid surveys were obtained from 224 Americans (71.1%) and 91 (28.9%) international students (Liao, Finn & Lu 2007, p.8). Results indicated both similarities and differences between international and American students. Findings showed that international students use libraries much more actively and more often than American students. Language difficulties and cultural differences were obstacles for some international students, but such difficulties were less severe than those found in previous studies.

Despite differences in purpose and focus, it is noticeable that studies on the information-seeking behaviour of graduate students have mostly been characterised by a domain-specific approach in which a particular academic field is investigated. This approach can be classified into the following categories:

- *Subject-specific studies*, such as English Literature (Ellis & Oldman 2005), Biology (Mansourian & Ford 2007; Vezzosi 2009), Physics and Astronomy (Jamali & Nicholas 2008), Molecular Medicine (Roos *et al.* 2008), Forestry (Brazzeal & Fowler 2005);
- *Domain-specific studies* such as Sciences (Hemminger *et al.* 2007), Social Sciences (Sadler & Given 2007), Humanities (Barret 2005);
- *Multi-disciplinary studies* such as: Arts, Humanities, Social Sciences and Medicine (Foster & Ford 2003), Physical Science, Applied Science, Social Science, Arts and Humanities (Fry 2006), Economics, Psychology and Mathematics (Junni 2007), Education and Engineering (Chu and Law 2008).

Each of the studies mentioned above has focused on different aspects of students' information-seeking behaviour. For example, Jamali & Nicholas (2008) used a questionnaire survey with PhD physicists and astronomers to investigate the methods used for keeping-up-to-date with information in their fields, and their strategies for finding articles. The study showed differences among subfields of Physics and Astronomy, and highlighted the need to look at narrower subject areas for a deeper understanding of the information-seeking behaviour of scientists.

Roos *et al.* (2008) explored the characteristics of the information environment of researchers in molecular medicine. Their qualitative case-study with researchers, PhD students, undergraduates and senior researchers used semi-structured interviews which included the Critical Incident Technique. Participants reported substantial use of portals and the central role of some of their heavily used online databases, such as PubMed. Students also reported using Google to locate general web pages, research groups, methods and tools.

In an earlier study, carried out in the UK, Gardiner, McMenemy & Chowdhury (2006, pp. 341-359) compared the behaviour of academics (staff and research students) in Computer and Information Science, Business/Management, and English Literature. Their quantitative study, using a web-based questionnaire survey, revealed that 65% of the English academics made greater use of printed resources; whereas 57% of students from Computer and Information Science made the greatest use of electronic-based information resources and the least use of print-based information resources,

while those from Business/Management fell somewhere in between these two disciplines. Respondents reported certain problems affecting the usability of electronic information resources, including costs, access and retrieval, information overload, reliability and authenticity. According to the authors, these factors related to usability should be considered when designing the next generation of information resources and digital libraries. Despite the in-depth information provided by this snapshot study, Gardiner, McMenemy & Chowdhury stressed that the results of the study are indicative and can only represent the views of the academics who took the time to respond at that point in time.

3.2.3 Theoretical Approach

Other studies on the information-seeking behaviour of graduate students have focused on the cognitive aspect of information behaviour in academia, using theories from disciplines such as Psychology to analyse information seeking from another perspective. Heinstrom (2003) used a 70-item self-assessment questionnaire to investigate the impact of personality type on the information-seeking behaviour of Masters and Doctoral students. Results showed that each individual has a unique way of seeking information, depending on their personality traits. Foster & Ford (2003, pp.321-340) carried out an empirical study to explore the relation between information seeking and serendipity and creativity. From interviews that neither focused on nor anticipated it, serendipity emerged as an important aspect of how researchers encounter information and generate new ideas.

Sadler & Given (2007, pp.115-141) investigated the information behaviour of PhD and Masters' students from the Social Science field within the framework of a "psychological theoretical Ecological framework". James Gibson, the founder of this school of thought, stipulates that individuals' behaviour (including information behaviour) cannot be studied in isolation from their environment. Central to this view is the concept of affordance, which refers to how individuals perceive what is being offered to them. For the purpose of Sadler & Given's study, the affordances referred to services provided by the library, including information literacy instruction, technology and information resources. The study used an in-depth qualitative interview and task-based computer explorations to investigate the extent to which the affordances experienced by graduate students differed from the affordances librarians

were attempting to provide. The results revealed a disparity between the expectations of graduate students and their experiences of the library, indicating that this community of students was an “underserved population” in terms of the library’s efforts to serve academic users.

A study by Steinerova (2008) aimed to collect empirical evidence to understand “relevance behaviour” in academic information use in an electronic environment. The study used semi-structured interviews in a phenomonographic investigation with 21 doctoral students from Social Science, of whom a majority had a Library and Information Science degree. The study’s questions covered the perceptions of relevance among PhD students from various disciplines, and the manifestations of relevance in the electronic information environment. The meaning of relevance that emerged from an analysis of participants’ discourse was categorised into value, utility and importance of information. Value of information refers to its internal integrity, validity and reliability. Utility of information relates to topic, problem solving and time. As Steinerova indicates, these findings have implications for the design of library information systems and services and for information literacy; that is, knowledge of behaviour patterns can be applied to information literacy and models of information use in the academic electronic library.

The growing body of research, both theoretical and empirical, concentrating on the information-seeking behaviour of graduate students, indicates that practitioners in educational informatics have what seems to be a growing interest in exploring the information-seeking behaviour of graduate students amid the range of information resources available to them. Further, research in the area of information-seeking has also focused on the factors that might be influential on the behaviour of graduate students. The following section provides a general review of studies that have looked into the factors that might influence the information-seeking behaviour of students in academia.

3.3 Factors Influencing the Information Seeking of Students in Higher Education

According to Urquhart & Rowley (2007), the factors which influence the information-seeking behaviour of students can be separated into two main categories: micro

factors and macro factors. For the purpose of this research, factors that warrant further analysis and discussion, in addition to the information literacy already discussed, comprise:

1. Discipline.
2. Academics' Information Behaviour.
3. Support and Training.
4. Culture.
5. Information resources and accessibility issues.

These are discussed in detail below.

3.3.1 Discipline and Subject Area

Studies on information use show that discipline has an influence on information-seeking behaviour; therefore, any investigation of information seeking should be carried out within the context of the information needs of the particular user group (Zach 2005, p. 24). It is then necessary to identify the major components of the environment in which any user group functions, including characteristics of the group members, the settings in which they operate, and the types of problems they encounter (Zach 2005, p. 24). A number of studies have found that disciplinary differences influence the patterns through which end users search for the information they need (Hiller 2002; Whitmire 2002; Talja & Maula 2003; Tenopir 2003; Zhang, Anghelescu & Yuan 2005; Gardiner, McMenemy & Choudhury 2006). Prior to reviewing these studies, the following section will first discuss discipline-related theories underpinning studies of information seeking.

A number of studies carried out during the last decade into information-seeking behaviour in higher education have applied disciplinary-related theories. The most frequently cited theories or conceptual frameworks include Becher's typology of disciplinary differences (Becher 1994), Biglan's distribution of disciplines (Biglan 1973), Bates's hypothesis of domain size, and Whitley's theory of the intellectual and social organisation of the sciences (Whitley 1984). These frameworks are briefly reviewed in the following section.

Typologies and matrixes of disciplinary differences

Biglan (1973) and Becher & Trowler (2001) presented two similar matrixes outlining differences in the nature of scientific disciplines, both of which have been applied as theoretical frameworks in studies of scholarly communication and information behaviour. Biglan categorises academic disciplines into three types: 1) hard-soft, 2) pure-applied, and 3) life-nonlife systems. The hard-soft dimension is based on the discipline's level of paradigm: academic fields belonging to the hard type include Physical Sciences and Engineering, while the soft type includes Humanities, Business, Social Sciences and Education. The pure-applied dimension is based on the practical application of research. The final dimension, life-nonlife systems, is based on the discipline's degree of involvement with living or organic objects of study.

Applying Biglan's model in her study of the information-seeking behaviour of around 5,000 undergraduate students, Whitmire (2002) found significant differences between the disciplines investigated. Using t-tests, the author claimed the model was valid for distinguishing differences in the information-seeking behaviour patterns of students representing various disciplines. The argument is convincing in itself, but draws on a relatively old theory from the 70s. Analysis of the questionnaire showed that undergraduates majoring in soft, pure, and life disciplines engaged in more information-seeking activities than did students majoring in the hard, applied and non-life disciplines (Whitmire 2002, p. 636). Figure 3.1 illustrates the relationship between the academic disciplines and the Biglan dimensions:

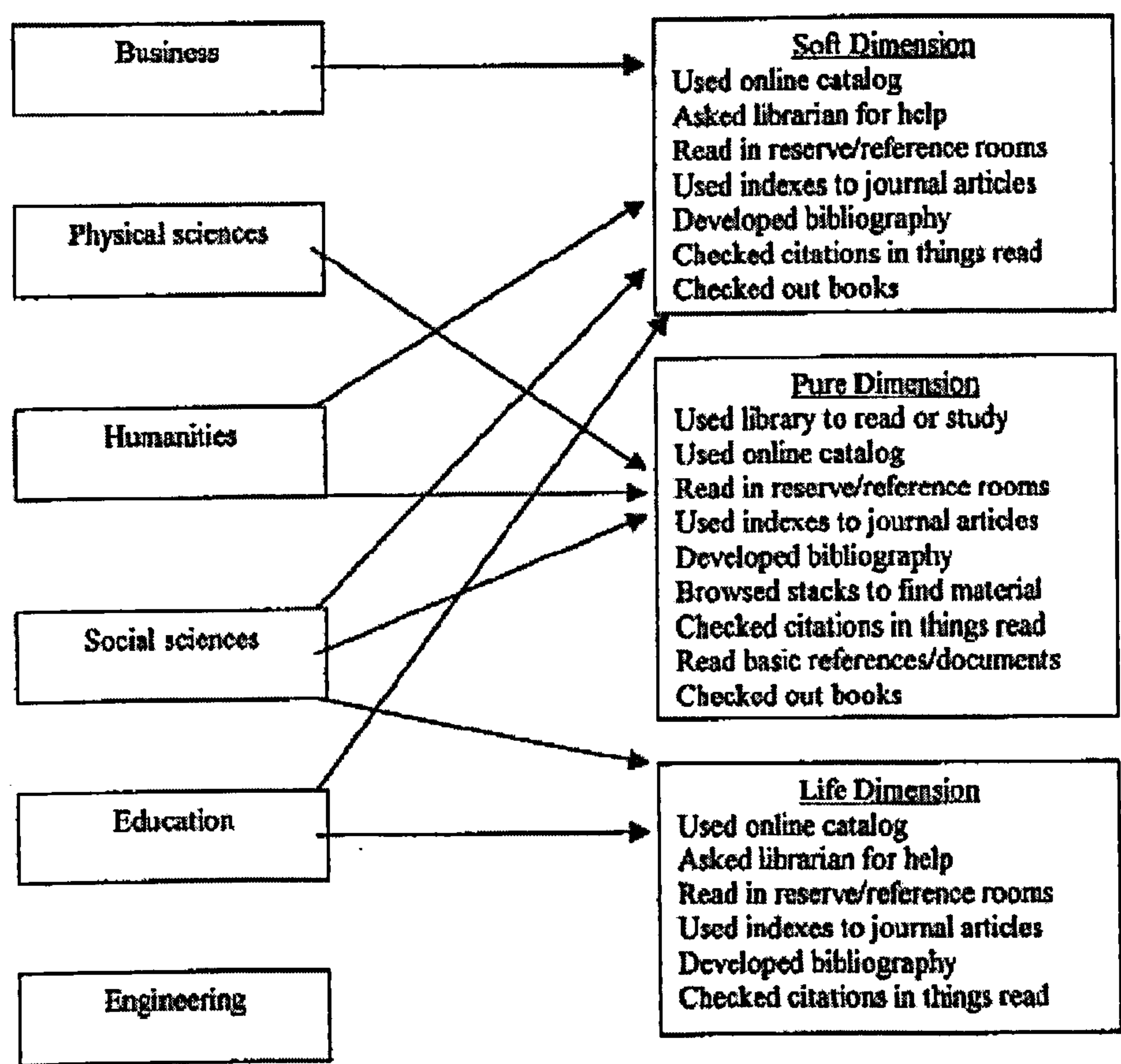


Figure 3.1 Whitmire's framework of Disciplinary differences

(Whitmire 2002, p. 638)

Whitmire's study is useful for demonstrating one way in which theories can be applied to the information-seeking behaviour patterns of users. However, the fact that no other studies have validated Biglan's model raises some doubts as to whether such models can still be applied in the electronic information environment. Despite such drawbacks, the results of the study indicate that Biglan's model is a valid theoretical framework for future LIS research (Whitmire 2002).

Becher's typology

In a domain analytic approach to information practices, Fry (2006, pp.305-306) summarised Becher's matrix of disciplinary cultures. This summary is presented in Table 3.3.

Table 3.3 Summary of Becher's typology of disciplinary differences

Soft sciences	Hard sciences	Nature of discipline
Humanities (e.g. History) & pure Social Sciences (e.g. Anthropology) 'soft-pure' knowledge structure	Physical Sciences (e.g. Physics) 'hard-pure' knowledge structure	Pure
Applied Social Sciences (e.g. Education) 'soft-applied' knowledge structure	Applied Sciences (e.g. Mechanical Engineering) 'hard-applied' structure	Applied

(Fry 2006, p. 306)

Using this matrix to identify cultural differences between various disciplines, Fry interviewed 30 academics from different universities in the UK. Participants represented High-energy Physics, Corpus-based Linguistics, and Social/Cultural Geography. They were asked to describe the nature of their information needs, searches and use within their scholarly communities. The study was mainly concerned with finding differences among the selected disciplines in terms of culture, the role of formal and informal communication, and the role of ICT in communication systems. Results from a grounded theory analysis showed that each case-study community approached digital resources in a different way. Disciplines with a high degree of “task uncertainty” are less successful in commanding control over channels of communication, whereas fields with low “task uncertainty” readily cope with digital information resources. These findings reveal that the use of digital resources is significantly influenced by the way in which scholarly disciplines control research problems and strategies (Fry 2006, p. 312).

Bates's hypothesis of domain size

Talja (2005, p.124) provides a detailed account of Bates’ (2002) stipulation that variation in scholars' search methods is directly related to field size:

- Research areas with high numbers of topically relevant materials are best searched by browsing;
- Research areas with middle numbers of topically relevant materials are best searched by directed subject searches;

- Research areas with very sparse relevant materials are best searched by chaining from documents.

Thus, Bates is suggesting a distinction between low-scatter domains and high-scatter domains. Scholars in low-scatter domains have a small number of highly specialised journals, whereas in high-scatter fields, relevant materials are distributed across several disciplines. Findings from some LIS studies are consistent with Bates' hypothesis of domain size and its effects on the information seeking process. For example, Talja & Maula (2003) conducted a qualitative study to explore scholars' use of networked resources in four different disciplines: Nursing Science, Literature/Cultural Studies, History, and Ecological Environmental Science. Participants included professors, assistant professors and lecturers, in addition to doctoral students and project researchers. On the basis of 44 interviews, the authors found that e-journals and databases were likely to be used most heavily in fields in which directed searching is the dominant search method, and where topical relevance is the primary relevance type. Findings also suggest that e-journals and databases were less used in fields in which browsing and chaining are the dominant search methods and where paradigmatic relevance is the primary relevance type. The findings support Bates' hypothesis that domain size has an important impact on the search methods used (Talja & Maula 2003, p. 673).

In addition to the effect of domain size, domain knowledge has also been shown to influence information-seeking behaviour. Zhang, Anghelescu & Yuan (2005) conducted an exploratory study on the effect of domain knowledge on the search behaviour of Engineering and Science students. The authors consider domain knowledge as the "contextual or the background information a user has about the topic". Thus, in their research, Zhang, Anghelescu & Yuan (2005) examined whether undergraduates and postgraduate students who were more aware of a field would perform better in searches than users who had less knowledge of the field. Data was collected through a user questionnaire, a Thesaurus term rating form, a post-search questionnaire, computer logs, and the printouts of records of search sessions. The results showed that the level of domain knowledge seems to have an effect on search behaviour, but not search effectiveness. Findings indicate that as the level of domain knowledge increases, users tend to do more searches and to use more terms in queries.

Whitley's theory of the intellectual and social organisation of the sciences

Whitley describes the nature of intellectual fields with reference to variations in dimensions of mutual dependence and task uncertainty (Fry & Talja 2007, p.117). The mutual dependence dimension relates to the extent to which a field is dependent upon knowledge produced in other fields in order to make a significant contribution to science, and also to the degree of dependence between scientists. In fields with high levels of mutual dependence, scholars are dependent upon particular groups of colleagues to make contributions to collective scientific tasks. On the other hand, the task uncertainty dimension refers to the degree to which task outcomes and research processes are predictable, visible, and clearly related to general goals (Fry & Talja 2007, p.118). Whitley further divides mutual dependence and task uncertainty into two sub-categories: strategic and functional dependence and strategic and technical uncertainty, resulting in a four-dimensional matrix. Strategic dependence refers to the degree of co-ordination of research programmes and task outcomes across research sites; whereas functional dependence refers to the degree to which researchers' results must be useful for others' research (Whitley 1984). Within the task uncertainty dimension, strategic uncertainty refers to the degree to which scholars within a field share their understanding of the nature of the research object; whereas technical uncertainty refers to the degree to which common technical procedures are used in research (Fry & Talja 2007, p.118).

The following section of the review shifts from a theoretical perspective based on paradigms and conceptual frameworks to a detailed account of studies that have focused on disciplinary differences in relation to information-seeking behaviour.

User studies on disciplinary differences

Before discussing the studies on disciplinary differences in the information-seeking behaviour of graduate students, it is worthwhile considering the means by which different disciplines think and practice in their fields. The “Enhancing Teaching-Learning Environments in Undergraduate Courses (ETL)” project focused on ways of thinking and practicing in a subject (WTP); that is, the foundation of knowledge and understanding of a subject, together with subject-related skills, conventions and practices for communicating within the subject area (ETL final report, 2005). The project aimed to capture the “breadth and depth” of what students learn at

undergraduate level and how this learning evolves as students reach final and graduate years to resemble that of “established subject practitioner[s]”. The report documents how disciplines differ in their ways of thinking and practice: for example, in final-year bioscience the emphasis is on experimental data and the literature; in economics, the WTP is more related to “fore” than to the practice of the subject, while in history, the focus is on alternative interpretations rather than on conceptual and thematic understanding of knowledge.

Most of the studies that have investigated graduate students' information-seeking behaviour and use of Internet-based resources have found differences between information behaviours in Sciences, Social Sciences and Humanities. Table 3.4 summarises recent studies that have focused on the effect of disciplinary differences on information behaviour and preferences for resources. The table is followed by a discussion of the studies.

Table 3.4 Studies on the effects of disciplinary differences on information use

The study	Scope	Findings
Gardiner, McMenemy & Chowdhury (2006)	Information behaviour of academics in the digital age	1. English majors use print resources and tend to have the lowest usage of e-resources. 2. Computer & Information Science majors make greatest use of e-resources and least use of print.
Ge (2005)	Information-seeking behaviour of researchers in the Internet age	E-resources are used less in Humanities than in Social Sciences; participants in the Humanities tend to rely more on print resources.
George <i>et al.</i> (2006)	Graduate students' information behaviour related to scholarly activities	1. Use of non-library Internet: 50% in Humanities, 93% in Computer Science. 2. Use of library databases: 50% in Arts & Archi, 95% in Humanities. 3. A majority of 82% reported using print resources. 85% in Sciences & Humanities use print materials vs 80% in Humanities.
Koroboli, Tilikidou & Delistravrou (2006)	Factors influencing use of library resources with a special focus on e-resources	Use of e-resources is higher in the school of Business Administration and Economics
Liu (2006)	Exploring the extent to which graduate students use print & e-resources	1. E-sources are more frequently used than print sources among all disciplines. 2. 71.4% of respondents in LIS cite online sources as the 1 st choice: 42.2% in Business, 37.1% in Computer Science, & 52.2% in Social Sciences. 3. Business & Comp Science tend to consult web more heavily than those in LIS & Social Sc.
Urquhart <i>et al.</i> (2003)	Highlighting trends in JUSTEIS report	Students of Humanities & Arts use databases least among disciplines; their counterparts in Sciences make most use of e-journals and databases.
Voorbij & Ongeing (2006)	Experience of faculties with electronic journals	75% of Scientists & Social Scientists have moderate or large experience with e-journals compared to less than 40% of Humanities researchers.
Whitmire (2002)	Explore disciplinary differences in undergrads' information seeking	Big differences in information-seeking behaviour patterns among disciplines.
Zhang, Anghelescu & Yuan (2005)	Domain knowledge, and search behaviour	As the level of domain knowledge increases, users tend to do more searches.

Discussion of the studies in Table 3.3

Looking at the table, it is evident that both domain knowledge and the nature of the discipline or research topic area have an influence on the way users search for information resources. Some of the studies are confined to a limited set of disciplines, while others adopt a broader approach, selecting all the disciplines in their institution.

Overall, it can be inferred from the studies that scholars in Humanities make the greatest use of print resources; while their counterparts in Science, Business and Computer domains make heavy use of electronic resources such as e-journals and databases. These findings are consistent with earlier studies that looked into the effects of disciplinary differences on the usage of information resources.

In her analysis of studies on the use of electronic library resources, Tenopir (2003) reports that experts from various subject disciplines have different usage patterns and preferences for print or electronic formats and that there is no one 'right solution' for using information services in every field of work. Tenopir (2003) also points out that scientists and Business faculty members were early adopters of electronic journals and may gather information from a variety of full-text databases and e-journals. Tenopir (2003) indicates that social scientists and those working in the Humanities use both print and electronic resources, but rely more on books.

Similarly, the report carried out by JUSTEIS (2004), the Joint Information Systems Committee (JISC) project to help UK academic users maximise the use of electronic information services, indicates that patterns of e-journal and specialist resource use are dependent on discipline. The differences were found to be statistically significant (JUSTEIS 2004, p.14) and it was therefore recommended that the JISC should continue to promote a variety of discipline-specific workshops on information skills training and promotion for specific resources.

As for the situation in developing countries, few studies have focused on discipline as a factor influencing the use of electronic information resources. An exception to this is a study conducted by Ibrahim (2004) on the use of electronic information resources by staff members in the United Arab Emirates. Results from his research did not support the notion that faculty members in the Humanities and Social Sciences use e-resources less frequently than academics from other disciplines such as Economics and Engineering (Ibrahim 2004, p.24). The findings did reveal a higher frequency of use of library resources among Humanities and Social Sciences than for respondents from the fields of Science, Engineering, Business and Economics (Ibrahim 2004, p.31). Respondents from Humanities and Social Sciences were more motivated than respondents in other fields; thus indicating a significant association between field of study and self-reported motivation for using information sources.

The overall ranking indicated that Humanities and Social Science majors were the most motivated, followed by Science and Engineering majors. These findings contradict the majority of studies, which suggest that Science and Engineering majors tend to exploit the potential of electronic information resources more than do Humanities and Social Sciences majors.

Overall, it is evident from a review of the studies that the effect of discipline on the information-seeking behaviour of end users is an important area that warrants further exploration in different contexts and cultures. However, it should be noted that it is not only discipline that influences the patterns of information seeking; the literature also reveals that tutors play a role in shaping the information-seeking behaviour of students, as the next section of the review discusses.

3.3.2 The Role of Academics

Influence of faculty members on graduate students

Published research suggests that faculty members and librarians have an impact on students' information seeking. Luck & Thompson (2006) carried out a study at Queensland University of Technology to investigate the effectiveness of providing graduate students with information literacy instruction on the range of information resources available in their fields. The findings revealed the necessity for collaboration between faculty members and librarians to develop tools to enhance the information literacy skills of students and thus develop their use of resources (Luck & Thompson 2006, p.2). George *et al.*'s (2006) study of graduate students from various disciplines indicated that the information-seeking behaviour of graduate students is primarily influenced by academic staff as, consistently across the disciplines, 96% of respondents reported that faculty members influenced their research and information seeking. The influence of faculty staff has also been referred to by Posada (2006), who assumes that the quality of teaching and learning in higher education relies not only on the implementation of new information technologies and the acquisition of information resources, but also on teachers having the necessary skills for teaching and research (Posada 2006, p.174).

A study by Serotkin, Fitzgerald & Balough (2005) provides further support for the influence of faculty members on the graduate students they teach and supervise. In a

focus-group study with 71 Health Sciences graduates in a small private Masters institution, students admitted that unless their instructors recommended specific journal titles, they were not likely to seek out those titles when conducting research (Serotkin, Fitzgerald & Balough 2005). In a similar vein, Tenopir (2003) indicated that recommendations of specific electronic resources by faculty members or academic librarians have an influence on students' choices of resources (p.34). Therefore, the most effective way for students to learn about important resources in academic libraries seems to be for librarians to work directly with faculties to bring relevant resources into the teaching process (Tenopir 2003, p.34).

Consistent with the above studies, Kerins, Madden & Fulton's (2004) qualitative study exploring the information-seeking behaviour of undergraduates and postgraduates from Engineering and Law found that students learned their information-seeking skills from educators (Kerins, Madden & Fulton 2004). Similarly, in a study by Barrett (2005), in-depth interviews with ten Humanities graduate students at the University of Western Ontario revealed that most participants reported learning about resources from supervisors and colleagues (Barrett 2005).

Tomaiuolo (2005) conducted a survey of 120 community college and university English faculty members, representing 66 public and private, large and small, institutions located throughout the United States of America. The aim of the study was to understand professors' observations concerning students' use of open web resources as compared to traditional library subscription databases. Findings revealed that despite the efforts of librarians and faculty to inculcate techniques for evaluating the materials available on the web, and despite allocated funding for databases, students often prefer to rely on web resources, most of which are regarded by faculty as unreliable (Tomaiuolo 2005).

Despite the fact that some of the above studies have shown the influence of faculty members on the information-seeking behaviour of students, few studies have investigated faculty members' perceptions of how graduate students in particular use electronic information resources. Furthermore, the available studies on faculty members' perceptions have focused on investigating specific disciplines such as Journalism, Communication, and English. Singh's (2005) survey investigated faculty members' perceptions of the information literacy of students in Journalism and Mass

Communication programmes (Singh 2005). Faculty members reported that most of their graduate students possessed the ability to think critically, organise information, carry out research and use print reference sources, electronic database and World Wide Web searches, and evaluate information.

Hewitson (2002) carried out a general study looking at UK electronic information services (EISs). This took the form of an investigation into the use and awareness of electronic information services by academic staff at Leeds Metropolitan University. Despite the faculty members' enthusiasm for students to use EISs, they had some reservations. Some academics felt that EISs undermine students' ability to think critically about their subjects as they tend to use search terms on the Internet to retrieve information. In addition, some staff expressed concern about plagiarism and students' abilities to assess and critically evaluate the information. On the other hand, other faculty members felt that electronic information services could enable students to become more exposed to a wide range of resources (Hewitson 2002, pp.49-52). The study revealed a consensus of opinion among staff members with regard to how they would like to receive training for their own skills in using EISs. The majority expressed preference for subject-led courses, which were more related to their information needs.

In the first study of its kind in a developing country, Adikata & Anwar (2006) found that the faculty members they investigated were not fully satisfied with their students' library skills. Using a modified version of Baker's (1997) instrument to examine academics' perceptions of undergraduate students' library use in Malaysia, the authors concluded that the library use skills of the students needed to be improved. Adikata & Anwar envisage further research investigating the perceptions of both user groups: faculty members and students (p.117).

Having reviewed the perceptions of faculty members towards students' information skills, the next section discusses another factor which influences information seeking: that is, support and training. For the purpose of this research, there is a special focus on library anxiety, due to its important influence on students' information-seeking behaviour in higher education.

Training needs of faculty members

Studies on faculty members' awareness of electronic information resources have revealed a consistent need for professional training programmes to enhance the academics' adoption of these resources (for example, Hewitson 2002). According to Hewitson (2002), skills in using electronic information services are related to individual factors such as IT skills, subject area, and the extent to which users adhere to a professional development scheme (p.51). Hewitson (2002, p.48) also indicates that although some staff members are aware of their lack of skills to efficiently use the e-resources, there is still a reluctance to acquire the necessary skills due to time pressures and factors such as the constant changes in Information Technology. Earlier studies of internet use by faculty members also recognised the need for additional training courses for this academic community (for example, Lazinger, Bar-Ilan & Pertiz 1997).

3.3.3 Support and Training

The theory of library anxiety was developed by Constance Mellon (Katopol 2005, p.235). Students with library anxiety express a sense of “powerlessness” when beginning an information search that requires using the library. Although the theory has mainly focused on undergraduate students (for example, Anwar, Al-Kandari & Al-Qallaf 2004; Jerabek, Meyer & Kordinak 2001), behaviours indicating anxiety have also been noted in graduate students (for example, Jiao & Onwuegbuzie 1998; 2001). As Katopol (2005, p.238) indicates, library anxiety remains a strong theory for explaining information behaviour not just in undergraduates, but also in graduate students who “find themselves lost in an unfamiliar information world”.

In an attempt to quantify attitudes and feelings about library use, in 1993 Bostick developed a Library Anxiety Scale, which included five dimensions of anxiety: barriers with staff, affective barriers, comfort with the library, knowledge of the library, and technical problems (Katopol 2005, p.236). In order to overcome a perceived limitation in this scale, the omission of anxiety about online source preferences, Kampen (2004) developed the Multidimensional Library Anxiety Scale, which improved on the original by adding factors of gender and online resources in relation to library awareness and anxiety.

In assessing factors associated with the library anxiety of off-campus graduate students, Collins & Veal (2004, p.13) found that the learners' perceptions of their capabilities to access information constituted an integral component of their anxiety levels while using library resources and the Internet. Based on their findings they advocate the inclusion of knowledge-based instruction with computer instruction to develop skills in accessing resources. The authors note the need to extend this line of research by investigating other variables in order to obtain an adequate understanding of what kinds of relationship exist between the performance levels of adult learners and their perceptions of their competencies in accessing technology and library resources.

Tenopir (2003) found that both faculty members and students most readily adopt and like to use electronic resources if they are perceived as convenient, relevant and timesaving. Another qualitative study, by Fast & Campbell (2004), showed that students preferred web searching to OPACs. This was found to be because of psychological factors related to the comparative ease with which search engines can be used, and system and interface factors which made searching the web much easier.

Liu & Yang (2004) used a self-administered questionnaire to determine the principal factors which influence students' decision processes for selecting and using their information sources. Based on a model of the information-seeking process for distance education students, the survey indicated the effect of the principle of least effort in the respondents' selection and use of information sources. Results showed that participants preferred timely and easy online information retrieval over information seeking associated with finding a physical information source. The study also found that the different motivation levels of students when choosing information sources are significantly associated with their fields of study. These findings have implications for the academic library, which ought to plan to increase access to electronic information resources, and promote more effective information literacy programmes in order to meet the information needs of graduate students (Liu & Yang 2004, p.34).

The next section of the review shifts focus from the micro factors influencing the information-seeking processes of students, to environmental factors. For the purpose

of this research, which will be conducted in a unique cultural context, the crucial environmental factors are culture and information resources.

3.3.4 Culture

In the field of Library and Information Science, cultural theories have been applied in two types of studies: those taking a broad perspective, based on the socio-cultural models of Hofstede and Hall (Komolodi 2005, pp.108-117); and information-use related studies with more specific focus on cultural variables such as language and learning styles (e.g. a number of ongoing studies in Australia by Hughes). This section of the review provides a brief overview of the macro cultural theories mentioned in the literature and then moves on to investigate Hughes' studies relating to cultural effects on online information use in particular. According to Komolodi (2005, p.108), the application of cultural models in studies of information behaviour has been limited to few studies such as Iivonen & White (2001) and Komlodi & Carlin (2004). Even in these studies, the cultural models and theories have been applied in order to understand variations in information behaviour rather than to investigate the effects of cultural differences (Komlodi 2005, p.108).

Hofstede defines culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another" (Hofstede 2001, p.10). Cultural groups can be identified at the level of institution (school, university and workplace), region (district, city), gender, generation, religion, language and, at the highest level, nation (Steinwachs 1999, p.194). Hofstede's theory of culture originated from surveys with IBM employees around the world between 1968 and 1972. Based on the data he obtained, Hofstede classified countries within four dimensions: *power distance*, *individualism/collectivism*, *uncertainty avoidance* and *feminine/masculine*. Later, *long-short-term orientation of societies* was added to reduce the Western bias of the model (Komlodi 2005, p.110).

By *power distance*, Hofstede means perceptions of equality and inequality by members of various cultures. People in low power distance societies de-emphasise socio-economic differences, whereas people in high power societies tend to support inequality within the society (Hofstede 2001, p.98). In the *individualism/collectivism* dimension, Hofstede ranks cultures based on the individual or collectivistic

orientations of their members. In individualistic societies, goals and accomplishment centre on the individual, while in collectivist societies collaborative action dominates (Hofstede 2001, p. 209). *Uncertainty avoidance* reflects the extent to which societies sense threat from uncertain and ambiguous situations and try to avoid them (Bagchi, Hart & Peterson 2004, p.34). This dimension is related to a need for security, dependence on experts, and the application of information. Members of cultures ranking high on this dimension do not tolerate situations with limited information and they seek certainty and long-term planning (Komlodi 2005, p.110). On the other hand, members of societies with low uncertainty avoidance do not get anxious when faced with uncertain situations and lack of rules. Within the *feminine/masculine* dimension, cultures with a masculine orientation emphasise values of masculine assertiveness and competition, career advancement, and financial accomplishment (Komlodi 2005, p.110). Meanwhile, cultures ranking high on the feminine index place importance on values related to nurturing, family, concern for relationships and quality of life.

As indicated by Steinwachs (1999, p.194), national culture (meaning patterns of thinking, feeling, and potential behaviour) can have an influence on the way in which people deal with information. In his paper analysing the impact of national culture on information processes, Steinwachs (1999, p.198) identifies four components of the information system: the producer of information, the user, the information itself, and the information channel. In this respect, Steinwachs (1999, p.200) points out that culture can influence what sources of information students gain access to and how they tend to use the information. Students from high power distance cultures tend to largely depend on their teachers and are therefore less likely to use information sources different from those recommended by their instructors. However, students from cultures with smaller power distance are more encouraged to use various sources of information due to the fact that they are accustomed to independent problem solving. In addition, research has shown that in cultures with strong uncertainty avoidance, teachers are expected to be the experts; therefore, students tend to largely depend on the information sources recommended by their teachers (Steinwachs 1999). On the other hand, in cultures with low uncertainty avoidance, students tend to have better awareness of information sources as this is considered an important skill to be mastered for their future careers.

Impact of culture as applied in information seeking studies

Despite the long tradition of studying information behaviour in electronic environments, there has been only limited investigation of the impact of culture on the use of information systems to find, retrieve, and use information (Komlodi 2005, p.111). Komlodi indicates that the study of cultural effects has gained more importance as users of many search systems access electronic systems from all over the world and often have to use the same interface (e.g. web search engines, online database systems). Table 3.5 summarises the studies that have investigated the impact of culture on information-seeking behaviour within the context of higher education. The table is followed by a discussion of the studies.

Table 3.5 Studies on the impact of culture on information use

Authors	Findings	Cultural variables	Methods	Participants
Iivonen & White 2001	Found significant differences between the two groups' initial search strategies –questions concerning cultural differences in designing web search access mechanisms.	Language, cross-national differences	Qualitative and quantitative methods (questionnaire)	Finnish & American web searchers (n=27 per country)-taking part in introductory graduate courses
Liao, Finn & Lu 2007	Language difficulties and cultural differences are still obstacles for some international students.	English language, length of stay in the USA	Web-based survey	International students from 27 countries and American students
Dagli 2004 PhD thesis	Factors directly influencing the way students meet their information needs: language, geo location, level of edu., comm. & interaction skills.	Language, gender, age, race, communication skills, country of origin, length of stay in the country	Semi-structured interviews	Multilingual graduate students
Hughes & Bruce (2006)	Cultural and linguistic differences can increase the challenges to effective online information use. Differences in teaching and learning style as well. Stress the importance of well developed information literacy.	Language, educational practices & learning styles	Semi-structured interviews and observed tasks	12 international students from 9 different countries

Discussion of studies in Table 3.4

It can be seen from Table 3.4 that there have been two broad types of studies on the impact of culture on information seeking and use: empirical and analytical. The empirical studies are mostly comparative: American students compared to international students; Americans compared to Finnish students and Australian students in comparison to graduate students from other nations. A common finding among the comparative studies is that linguistic differences and learning styles seem to be among the most influential factors in the way students seek, interact with and use information resources. Despite similarities between the studies in the broad findings and the methods employed (mostly interviews), there are differences in focus. Some are specific to certain elements, such as web-based distance learning (Dagli 2004), search strategies (Iivonen & White 2001), or online information use (Hughes & Bruce 2005), while other studies have looked more broadly at information-seeking behaviour in general (Liao, Finn & Lu 2007).

In a PhD thesis, Dagli (2004) examined the impact of culture on the information needs of multilingual graduate students engaged in web-based degree programmes. Using semi-structured interviews with nine graduates from various countries, the study found that language, geographic location, level of education, communication and interaction skills and styles, and length of stay in the host country all directly affect the way students meet their information needs in web-based courses. On the other hand, cultural elements such as social class, nation of origin, and age have an indirect impact.

Since 2005, a number of studies on the area of culture and information use have emerged (Hughes, Bruce & Edwards 2007; Hughes & Bruce 2006; Hughes 2005). In the most recent study, by Hughes, Bruce & Edwards (2007, p.66), the authors found that cultural and linguistic differences can increase the obstacles to effective online information use. Furthermore, in her study of international students in Australian universities, Hughes (2005) found that participants demonstrated practical IT skills; however, they showed limited experience in using specialised journals and databases. Hughes, Bruce & Edwards (2007, p.65-66) detected an “imbalance” between students’ well developed digital skills and less-developed critical skills with regard to effective use of online information resources for learning purposes. The authors further explain

that the difficulties in information use arise from factors such as limited vocabulary, academic and technical linguistic styles, and significant differences in teaching and learning styles among various cultural contexts. In her culture-related information study, Hughes (2005, p.4) also argues that differences in educational practices constitute a significant challenge to international students who are used to teacher-focused approaches, as in East Asian countries. Most of those students are accustomed to relying on set texts with little or no experience of using online resources for their studies.

In addition to these empirical studies, there have been some analytical studies on the impact of culture on information users. Steinwachs (1999) produced an analytical paper based on the cultural elements of Hofstede (large power and low power distance and uncertainty avoidance). The author discussed the impact of national culture on information processes and indicated that cultural aspects can influence the types of sources the students get access to and the way they are encouraged to use the information. Komlodi & Carlin (2004) explored the role of the cultural dimensions of Hofstede and Hall on information seeking. The authors set the ground for future research to examine the impact of culture on information behaviour. Both Steinwachs (1999) and Komlodi & Carlin (2004) based their research on Hofstede and Hall's cultural dimensions. Steinwachs (1999, p.197) indicates that the prevailing culture is influenced by the education system with regard to who takes the initiative in the learning process. In cultures with large power distances, students are accustomed to respecting their teachers as "gurus" who transfer wisdom. This tendency raises the issue of the extent to which students can be critical in their learning. In contrast, individualistic cultures encourage the speaking of one's own mind, which should support the development of critical thinking (Steinwachs 1999, p.199). For their part, Komlodi & Carlin (2004) conducted a preliminary analytical study to explore the role of culture on information seeking. The authors indicated that in a future phase of the study, information seekers from 4-6 cultures would be studied in various situations by conducting a series of interviews and observations.

The above section of the review has focused on how culture has been dealt with in the literature of information seeking, especially in a higher education setting. Overall, the studies reviewed suggest that English language, gender, age, race, communication

skills, country of origin, educational practices and learning styles, and length of stay in the host country all impact on the area of information science. These cultural variables should be re-tested in more comprehensive studies, particularly in developing countries, where very little research has yet been carried out.

The available studies on cultural effects in developing countries are confined so far to the acceptance of and diffusion of the Internet and information technologies related to PCs and cell phones, in addition to general IT adoption among knowledge workers and organisations (Bagchi, Hart & Peterson 2004; Loch, Straub & Kamel 2003).

The next section of the review discusses information resources as the second macro factor influencing information-seeking behaviour in higher education.

3.3.5 Information Resources and Accessibility Issues

Contrary to the notion that information seeking in the electronic environment has become easier, the excess of information sources means that effective retrieval of the best available information has become even more complex (Feather & Sturges 2003, p.173). The plethora of available information resources does not necessarily indicate the availability of good quality information. Therefore, searchers in this electronic information age must become increasingly competent in judging the quality of electronic information resources. As Feather & Sturges (2003, p.174) pointed out, “due to the vast increase in complexity of EIRs, the challenge is to make them accessible in useful ways for a hugely enlarged community, many of whom are inevitably unskilled in the use of the resources”.

In the context of tertiary education, information resources encompass a variety of print resources, including monographs, serials and original source manuscripts; in addition to electronic resources such as online databases, the World Wide Web, and electronic journals. The way these information sources are organised and the tools for locating information from them are considered to be important factors affecting access to such resources (Maybee 2006). The following section of the review provides an overview of the range of information resources available in higher education, with a special focus on electronic information resources, which constitute a major focus of the current research.

The section reviews studies in higher education related to the Internet and search engines, e-journals, and OPACs; it also includes a brief section on electronic books, which are not widely used within the context of Kuwait, the country being studied here.

Electronic Information Resources

Due to the use of various terms in the literature of LIS, there is a lack of consistency in defining electronic resources. Some authors refer to them as *Electronic Information Services* (EISs), some as *Electronic Information Resources* (EIRs), others have used the term *Electronic Library Resources* (ELRs) (Appleton 2006, p.620), and some have used *Online Resources* (Hughes 2006). For the purpose of the current research, the term EIRs is used.

Over the last decade, a significant body of literature has investigated the use of EIRs by various user groups in the higher education sector. These studies have investigated different aspects of EIRs, including:

- Awareness and use (for example, Tenopir 2003; Urquhart *et al.* 2003; Ibrahim 2004; Fast and Campbell 2004; Dadzie 2005; Eynon 2005; Gardiner, McMenemy & Chowdhury 2006; Ramlogan and Tedd 2006; Shuling 2007);
- Patterns of Internet use (for example, Adika 2003; Rehman and Ramzy 2004a; Eynon 2005; Jones & Johnson-Yale 2005; Aduwa-Ogiegbaen & Uwameiye 2006; Al-Ansari 2006; Hinson 2006; Spennemann 2007);
- Access, use, and acceptance of e-journals (for example, Bar-Ilan 2003; Abdulla 2005; Nicholas and Huntington 2006; Voorbij & Ongering 2006);
- Web-based OPACs (for example, Sridhar 2004; Ibrahim 2005).
- E-book technology (for example, Shiratuddin *et al.* 2003; Rao 2004; McFall 2005).

In addition, a number of studies have looked into the factors that influence the use of libraries and e-resources (e.g. Liu & Yang 2004; Korobili, Tilikidou & Delistravrou 2006; Posada 2006). The majority of these have covered issues related to accessibility, the frequency of and skills needed for Internet use, and factors hindering or enhancing the use of the medium. General conclusions from the Internet studies can be classified into two perspectives: user-centred, such as the need for professional development and training; and IT-centred, revolving

around issues such as information technology infrastructure, speed of access and costs.

3.3.5.1 The Internet

In the developed world, studies that have investigated the use of the Internet in higher education have focused on measuring Internet use patterns and the impact on teaching and learning. A recent study carried out in America by Jones & Johnson-Yale (2005) focused on the impact of the Internet on teaching and research, faculty-student interactions, and faculty perceptions of students' Internet use. The authors revealed the need to address three broad areas: IT infrastructure, professional development, and research and teaching. They argue strongly that “technology alone doesn't make for good teaching” (Jones & Johnson-Yale 2005, p.22), and stress the need for constant training of faculty members to make efficient use of all the available technologies and their complexities.

In the UK, two major studies have been conducted on the use of EIRs, information skills, and the role of training and wider learning experiences in further education colleges (Urquhart 2005). These two projects, JUSTEIS and JUBILEE (JUSTEIS 2004), were funded by the JISC User Behaviour Monitoring and Evaluation Framework. Findings from both projects revealed:

- An increase in the use of EIS in the curriculum with variations depending on institutions and disciplines;
- Tutors expressed concern about students' ability to evaluate and use the information they find. Students mostly used search engines and organisational web sites;
- The solutions to improving students' information skills are to be found through peer instruction, surfing and personal experience, instruction from tutors, and LIS induction and training.

Most of the research into the use of electronic resources in developing countries has been conducted in an African context. These studies have uncovered recurring barriers hindering efficient use of electronic information resources. The barriers are mainly related to lack of accessibility, slow Internet speed, connectivity problems, lack of awareness of the resources and unfamiliarity with computerised searches

(Adika 2003; Kavulya 2003; Idiodi 2005; Jager & Nassimbeni 2005; Hepworth & Wema 2006; Uddin 2003; Oyelaran-Oyeyinka & Adeya 2004).

Dadzie (2005) surveyed all students, faculty members and administrative staff at Ashesi University College in Ghana, and recommended three strategies for improving information competency in the curriculum: (1) involving the faculty, (2) introducing a one-unit course to be taught at all levels, and (3) providing more computers on campus. Dadzie argues that the continuous use of expensive electronic resources depends on sustaining the current technological development of the university. Similarly, Adika (2003) indicates that improved access to information resources would lead to an increase in research productivity in universities, an improved curriculum and high quality information.

Ramlogan & Tedd (2006) gathered empirical information on the use/non-use of selected subscribed electronic information services among undergraduates at the University of West Indies. The authors found that over half of the total respondents had not accessed any of the electronic information services due to lack of awareness of their availability. In line with other information behaviour studies, Ramlogan & Tedd underline the important role of academics in promoting the use of the electronic information services to which the institution subscribes. Adika (2003) concurs and argues that faculty information skills should be upgraded by some mechanism.

In the Arabian Gulf region, a number of studies have focused on the use of EIRs in higher education institutions. In his case-study investigating the history and development of e-journals at the United Arab Emirates University (UAEU), Abdulla (2005) attempts to illustrate how the effective use of Internet technology has changed the way in which the academic community communicates and benefits from the proliferation of information. Discussing the promotion of e-journals, Abdullah points out that access to journal literature is essential to narrow the knowledge gap between developing and developed countries (Abdullah 2005, p.48). Efforts suggested by the author to increase use of e-journals include regulating policies for importing technical knowledge and expertise; providing opportunities for lifelong learning and, critically, communicating knowledge by taking advantage of ICT opportunities that facilitate access to information. Abdulla stressed the need to move toward changing attitudes among faculty members, and to make them aware that a shift in the current system of

information dissemination is required. In Kuwait, only Rehman & Ramzy (2004a; 2004b) and Al-Ansari (2006) have investigated the use of the Internet by faculty members. Both studies surveyed Internet use patterns and the problems hindering effective use of the medium. These studies are discussed in detail in Chapter 4.

While the studies discussed above have focused on the Internet, other research has investigated the role of search engines in shaping the information-seeking behaviour of the academic scholarly community. The following section of the review discusses in particular Google Scholar, one of the most recent developments in search engine services for academic purposes.

3.3.5.2 Search engines: “The Google phenomenon”

Since 2005, a number of studies have investigated the effects of search engines on scholarly practice (e.g. Brophy & Bawden 2005; Griffiths & Brophy 2005; Godwin 2006; Head 2007; Myhill 2007). Griffiths & Brophy (2005) report the results of user studies aimed at evaluating the digital information services of the UK academic sector. These studies focused on students' web-searching behaviour and the extent to which Internet search engines influence their information-seeking strategies. Summarising the results, Griffiths & Brophy indicate that that 45% of students use Google as their first choice when searching for information, while the library catalogue was used by only 10% of the population. The authors also revealed that students' use of academic resources is low, and that they often find it difficult to locate information and resources. Griffiths & Brophy (2005) also expressed concern that students' use of search engines influences their perception and expectations of other electronic resources.

Brophy & Bawden (2005) used a qualitative case study to assess the relative value, strengths and weaknesses of Google and other library database services. The findings revealed that the two systems of search engines and library services seem to be complementary: Google appears superior in coverage and accessibility; whilst library databases are superior in terms of the quality of results. In contrast to these findings, Head (2007) found that undergraduate and graduate students were not very reliant on search engines when they searched for information to satisfy their academic needs. Using content analysis of coursework assignments and a student survey, Head

explored how students in Humanities and Social Sciences use the Internet and library resources for their research. Results showed that the majority of students (40%) were consulting course reading lists more than any other source of information.

The following section of the review focuses on Google Scholar, which is specifically designed for academic purposes. Studies that have investigated this research tool include Jasco (2005), Kesselman & Watstein (2005), Mullen & Hartman (2006) and Pomerantz (2006).

Google Scholar, the latest in information-seeking tools, is a “speciality search tool, provided by Google, which enables the user to search for scholarly literature online”; it is also “a union catalogue, through a catalogue of publishers' electronic offerings provided by libraries” (Pomerantz 2006, p.54). Since its emergence in 2004, Google Scholar has been heavily used in higher education, and debate has grown over the effect of this service on the scholarly community. In his general review article, Jasco (2005) identified the advantages and disadvantages of Google Scholar. With regard to the advantages, Jasco argues that Google deserves “credit” for facilitating the search for scholarly information; many records have links to full text articles and offer abstracts of others; coverage is “impressively broad” and includes the most important publishers' scholarly archives. On the other hand, Jasco states that Google Scholar does not provide detailed information on the publishers whose archives Google is allowed to search. Furthermore, the search tool limits the indexing of the collected files to texts below a certain number of bytes, which means that many articles will not be retrieved if their size exceeds 1 mega-byte.

In a similar vein, Kesselman & Watstein (2005) discuss two conflicting views about Google Scholar: those who see it as a “source of frustration” versus those who consider it an “opportunity”. Despite some librarians' fears about the service, Kesselman & Watstein found that academic libraries can make best use of Google Scholar if they can market it well through their links. The authors express the belief that libraries should be “flexible” towards the benefits of new technology. Pomerantz (2006) also argues that Google Scholar holds promise as a means by which libraries can expand their research to new user communities, and which can enable them to provide quality resources for their users to engage in the online search process.

Similarly, Mullen & Hartman (2006) viewed introducing Google Scholar through the academic library's web pages or OPACs as constituting both a challenge and an opportunity. The authors conducted a case study on the experience of integrating Google Scholar onto ARL university libraries. While findings revealed that many libraries have not incorporated the resource into their web site, Mullen & Hartman indicate that libraries ought to keep abreast with changes affecting information technology. Pomerantz (2006, p.55) also refers to the debate among librarians about whether it is appropriate to provide access to Google Scholar. After all, the author argues, Google is a “commercial entity and its primary motivation is profit before meeting the information needs of library users”.

3.3.5.3 Electronic journals and books

During the last decade, e-journals have become the most utilised tool for locating resources by users of academic libraries (Mounissamy & Rani 2005). Studies on e-journals have focused particularly on aspects of usability and evaluation (e.g. Mounissamy & Rani 2005; Serotkin *et al.* 2005); economics, marketing and pricing issues (e.g. Skaggs, Poe & Stevens 2006; Moghaddam 2006); user satisfaction, future trends and the use by particular groups of professionals or in specific academic fields (Voorbij 2006). In addition, there have been investigations of the use of e-journals within specific institutions (Vishala & Bhandi 2005). Other user studies related to e-journals have focused on students, on staff, or on both staff and students. In light of the purpose of the current research, the focus here is on studies relating to graduate students and faculty members.

Most of the research on the use of electronic resources by graduate students has focused on acceptance and use patterns (Cochenour & Moothart 2003; Dillon & Hahn 2002; Serotkin, Fitzgerald & Balough 2005). These studies have in common one broad aim: to determine views on the usage and acceptance of e-journals among graduate students. In a survey of faculty members, graduate students and administrative professionals in Colorado State University, the majority of respondents used e-journals at least once per month and almost all respondents supported adding e-access to print subscriptions (Cochenour & Moothart 2003). A web-based survey conducted by the University of Maryland to determine views on, and the use of, e-journals by faculty members and graduate students found that the latter user group

was both more inclined than the former to use e-journals, and more likely to use them at least once per month (Dillon & Hahn 2002). In this study, the responses of graduate students to the survey were similar to those of faculty members; however, students were moderately more comfortable with e-only journals (Dillon & Hahn 2002, p.381).

Serotkin, Fitzgerald & Balough (2005) conducted focus groups with graduate students followed by online surveys to measure the students' use of a set of e-journals without print counterparts. Although the role of academics was emphasised throughout the study, they were excluded as participants and only students were surveyed. The fact that the journals used for the study were chosen by faculty members proves that their perceptions are essential, and thus they should have been part of the overall population surveyed. The study provides insight into the value of extending information literacy training across the curriculum and points out the students' need for programmes that incorporate collaboration with faculty in developing information literacy skills across disciplines. However, it did not examine the factors that might affect users' preferences, such as age, gender and academic year.

The Super Journal project, which ran from 1997 to 1999 (Baldwin & Pullinger 2000), examined how readers at 13 UK universities valued electronic journals. Adopting log file analysis, surveys, interviews and focus groups with faculty members and students, the study found that the core requirements for the success of e-journals were timeliness, a wide range of journals, fast access and ease of use. Key advantages of e-journals were convenience, timesaving and efficiency. Tenopir (2003) confirmed these findings in a review of studies on the use and users of electronic resources from 1995 to 2003. The study found that both faculty members and students most readily adopt and use electronic resources if the sources are perceived as convenient, relevant and timesaving.

E-books provide another source of information for the academic community, but are used less than e-journals, especially in the context of developing countries. In recent years, studies on electronic books in the higher education sector have focused on debate over their advantages and disadvantages, and on IT related issues such as application software and hardware associated with the use of e-books. For the purpose of this research e-books are discussed only briefly, because they are not widely

adopted in the context of developing countries such as Kuwait, and the focus here is on recent studies in the sole context of higher academia.

McClelland & Hawkins (2006) conducted case studies and used questionnaires to examine the problems surrounding the adoption of e-books in the UK higher education sector. The study found that barriers to development of this resource are associated with costs, expertise, pedagogic issues, and lack of full web-based support from publishers. Despite these problems, the authors argue that the future of e-books “is probably secured for the next five years at least” (McClelland & Hawkins 2006, p.81). Bennett & Landoni (2005) summarised the barriers to the use of e-books in both higher education and further education as lack of adequate definition, the diverse software and hardware products, and lack of promotion by faculty members. In their case study, Bennett & Landoni explained the low uptake of e-books by claiming that “the usability of e-books is too poor to offer a genuine alternative to printed resources for serious academic study” (Bennett & Landoni, 2005 p.15). According to Rao (2004), success or failure of e-books depends on the ability of the publishing industry to see beyond traditional business models and to recognise that e-books constitute a new medium with their own potential and are not just a replacement for paper-based books. The advantages of using e-books include availability, access to titles, searching of text, customisation, portability and multimedia facilities (Rao 2004, p.370).

In his online survey investigating students' reactions to e-books, McFall (2005) found that the absence of a widespread use of e-books is due to “marketing issues”. The author points to the focus on replicating paper texts as another factor hindering the use of e-books (McFall 2005, p.74). In addition, McFall found that no significant differences in student learning or textbook usage were observed between students using the electronic and paper versions of the textbook. The surveys indicate a generally neutral reaction to the electronic textbook. McFall argues that merely creating an electronic form of an existing textbook is not a sufficiently motivating condition for instructors and students to shift from paper to electronic formats.

Shiratuuddin *et al.* (2003) explored the potential of using electronic books in the context of distance education. The study used a remote testing approach and asked a group of 11 students who had no prior experience in using electronic books to use the medium. Findings revealed interest among students to use e-book technology despite

the reported disadvantages, which included limited multimedia features, uncomfortable reading from the screen, and the high cost of e-book hardware devices.

3.3.5.4 OPACs

Online Public Access Catalogues (OPACs) appeared in the libraries of developed countries in the early 1980s, but not until about five to ten years later in developing countries (Sridhar 2004). The first generation OPACs lacked authority control over name and subject headings; however, the second generation brought about improved and remote access, a variety of search features, display and user interfaces, e-mail delivery, holdings of other libraries, current awareness services and other features (Sridhar 2004, p.176). Harmsen (2000) sets out the advantages of web OPACs as first, the use of a standard interface, the web browser; and second, ease of use, as these OPACs allow the use of the web's standard functionality of hyperlinking text files, as well as database reports or searches (Harmsen 2000, p.110). In addition to searching and browsing the library catalogue, end users can transmit orders or view their own borrower accounts through the web OPAC (Harmsen 2000, p.111). Harmsen indicates that by making effective use of what the WWW can offer, OPACs can serve as the first choice when it comes to searching the web for scientific and technical information.

In contrast to this view, Fast & Campbell (2004) point out that OPACs are no longer the most important information retrieval system and therefore may not meet the expectations of users who are more accustomed to utilising the Internet. By conducting interviews and through the use of observation and video-capturing of search sessions, the authors tried to explore how university students perceive and interact with web search engines and how OPACs match their expectations and research skills. Fast and Campbell's study revealed two paradoxes. First, although participants admired the organisation of the OPACs, they still preferred using the web, despite its "clutter". Second, even though participants had more trust in documents catalogued in OPACs, they remained confident in their ability to evaluate the trustworthiness of the varied documents available via the Internet (Fast & Campbell 2004, p.144).

Ortiz-Repiso *et al.* (2006) surveyed researchers' use of the OPAC in a large scientific institution in Spain. The study showed that users still faced problems related to information seeking, such as information overload, incorrect subject searching, and the predominant use of the system's easy options. Findings revealed that the OPAC is broadly used by end-users not only for obtaining printed material, but also for connecting to the electronic resources subscribed to by the library.

3.4 Summary

Various themes emerged from the review related to the information needs and information-seeking behaviour of graduate students in an academic setting, where they are required to perform diverse tasks and are subject to time pressures. Graduate students are also subject to a set of complex influences ranging from personal to environmental in the course of seeking and using information for learning. These issues are compounded by the proliferation of ICT in higher education and the emergence of digital information resources. One conclusion common to the majority of the studies reviewed is that information-seeking behaviour in the new electronic age should not be investigated in isolation. It should be studied as part of an interconnected whole in the social context of the information use environment being explored. The social context encompasses the academic programme, the participants' work roles, goals and tasks, their perceptions and thoughts on their work environment, and the information resources and tools available to them from within and outside their work environment. Based on the review, hypotheses were generated in this study (Chapter 5, 5.6) to test whether there are significant differences between students' information-seeking behaviour patterns and a set of factors revealed from the literature review (role-related, demographics, environmental and cultural).

Overall, the review reveals a gap in the literature on graduate students' information-seeking behaviour, especially in the context of the recent changes in electronic information resources, particularly in developing countries. Research on the means by which students search for information and how they use digital information resources is hard to synthesise due to important gaps in both areas (Urquhart & Rowley 2007). One of the outcomes of the current review is consistent with what Urquhart & Rowley found regarding the lack of recognition of the influence of peer group and tutors on

the students' information-seeking behaviour. Thus, there is a need to conduct a comprehensive empirical study that explores the relationships between information literacy and the patterns of graduate students' information behaviour. More in-depth research on factors influencing the information seeking of graduate students, employing a triangulation of methods, would be useful for information providers and professionals as it would enable them to customise products and services more effectively for users, and would have a positive effect on graduate students, who would be able to acquire information more efficiently and skilfully from the most relevant sources. This in turn will add value to research carried out in the context of higher education.

A detailed account of the search strategy adopted is provided in Appendix 9, p.337. In addition, a table illustrating a systematic review of the studies included in the literature is provided in Appendix 10, p.340.

CHAPTER FOUR - THE CONTEXT OF KUWAIT

4.1 Introduction

This chapter presents a brief overview of Kuwait, background information on its higher education system, and a description of the main setting of this research, graduate studies in Kuwait. First, background contextual information about Kuwait, including location, population and economy, is provided. Then, the main components of the Kuwaiti higher education public sector are described. The chapter also provides an overview of research conducted on information-seeking behaviour within the context of Kuwaiti higher education.

4.2 Background

Kuwait is located in south-western Asia, on the north-western coast of the Arabian Gulf (see Figure 3.1). It is bounded to the north and northwest by Iraq, to the east by the Arabian Gulf, and to the south by Saudi Arabia. Kuwait is a constitutional monarchy, ruled by the Al-Sabah family, and it is a member of the Gulf Cooperation Council (GCC), which is similar to the European Union. The other six Gulf States share with Kuwait the same language, religion, heritage and traditions. Arabic is the official language of the country, but English is widely used as the official second language. The country's total area is 17,820 square kilometres. According to the census of 2005, the population of Kuwait was around two million, with Kuwaiti citizens constituting 888,774, out of which 433,977 were males (49.3%) and 446,797 were females (50.7%) (Kuwait Ministry of Planning 2006).

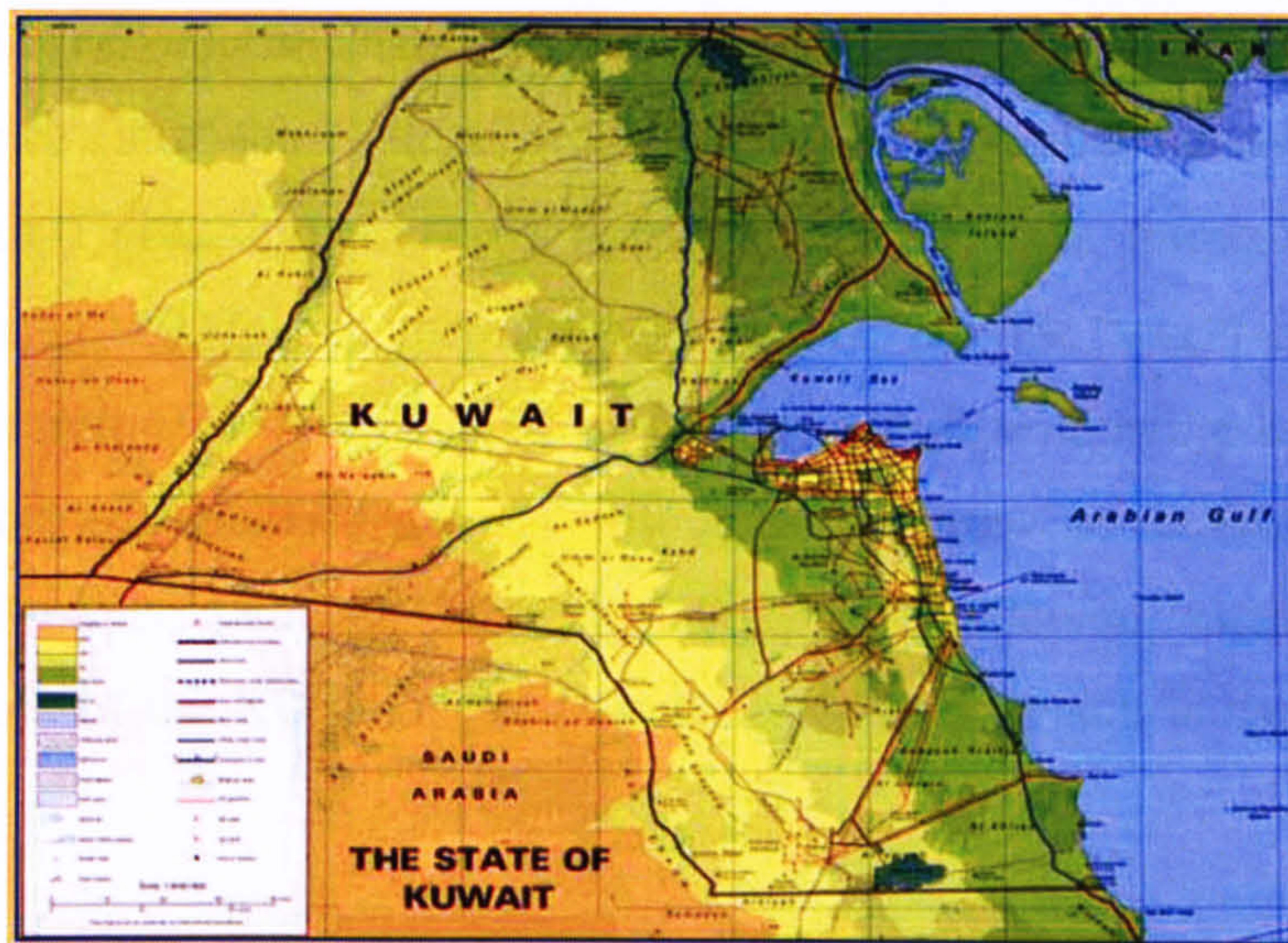


Figure 4.1 Map of Kuwait
(Kuwait Ministry of Information)

4.3 The Higher Education System

Higher education institutions began to emerge in Kuwait during the mid 1960s, when the government established Kuwait University. Currently, higher education in Kuwait is offered by two main institutions: Kuwait University (KU) and the Public Authority for Applied Education and Training (PAAET), which offers adult education and vocational training (Kuwait Ministry of Information 2007). The main difference between KU and PAAET is that the latter does not offer any postgraduate degrees; it only grants scholarships for students to continue their studies abroad. In addition to PAAET and KU, there are a growing number of private institutions offering higher education, for example the Gulf University for Sciences and Technology, Australian College of Kuwait, American University of Kuwait, Gulf American College, Maastricht School for MBA and Box-Hill College for Girls (Kuwait Ministry of Higher Education 2007). However, Kuwait University is still the only institution which offers a complete range of postgraduate studies (Masters, PhDs and higher diplomas). The following section focuses on Kuwait University, as the current research is concerned with the graduate sector (post-bachelor level education).

4.4 Kuwait University

Established in October 1966, Kuwait University launched its academic programme with Colleges of Science, Arts and Education, and a Women's College, with only 418 students and around 30 faculty members. One year after its establishment, three

additional Colleges, of Law, Shari'a (Islamic studies), and Commerce, Economics and Political Science (now the College of Business Administration) were inaugurated. Today, Kuwait University offers 65 academic programmes through 14 colleges (Kuwait University 2007). The university's vision is to provide "world-class education through its commitment to advancing, preserving and disseminating knowledge and preparing educated qualified human resources in order to realise the society developmental needs" (Kuwait University 2007). The following section provides a detailed account of the KU College of Graduate Studies, which is the focus of this research.

4.5 Background of Kuwait's Graduate Education

The history of post-baccalaureate education (college level at UK) at Kuwait University can be traced back to 1966 when the by-laws setting the university's rules and regulations were established, allowing for the teaching of graduate studies at both the Masters and Doctoral levels (Kuwait's Graduate College, 2006). During the academic year 1968/69, graduate work started in the Colleges of Sciences, Arts and Education, and Commerce, Economics and Political Science. Between 1968 and 1976, graduate studies were offered under the direct supervision of individual academic departments and colleges. The College of Graduate Studies was officially established in 1977; since then, it has been entrusted with the task of supervising the implementation of Kuwait University policies concerning graduate studies. Between 1996 and 2006, the by-laws governing Masters degree programmes were expanded to include PhD degree programmes and joint degrees, in addition to special graduate diploma programmes (Kuwait's Graduate College 2007). During the academic year 2005/2006, several proposals aimed at establishing new graduate programmes were passing through various stages of preparation, evaluation or approval. All approved programmes are evaluated every five years by internal and external experts.

4.6 Teaching and Supervision

The policy on the teaching and supervision of graduate students is based on Article 8 of the by-laws governing graduate studies at the university (Kuwait's Graduate College 2006). According to this article, professors and associate professors in academic departments are eligible to teach graduate courses and supervise or co-

supervise students who are engaged in writing theses and dissertations. Assistant professors with suitable experience may participate in some or all of these activities, while qualified researchers or scientists from outside the university may only participate in teaching and supervision upon nomination by the programme committee and approval by the Dean of the College of Graduate Studies. According to the College Annual Report (2006), during the years 2004-2006, the total number of qualified graduate course instructors, supervisors, and co-supervisors increased from 897 to 915. However, many of the faculty members concerned are also heavily involved in teaching undergraduate students. According to the 2006 Annual Report, the status of those who are eligible to participate in teaching and supervision may be specified in one of the following ways:

1. Teaching and Supervision (T&S).
2. Teaching and Co-supervision (T&C).
3. Co-supervision only (COS).

4.7 Resources and Facilities

According to its Annual Reports, the College of Graduate Studies is exerting efforts to support a wide range of graduate activities. However, more financial resources are needed to support the increasing number of graduate programmes and students. In order to mobilise human resources more effectively, the College is engaged in implementing planned administrative reforms and in providing appropriate training for college employees.

In addition, plans for the development of graduate studies at Kuwait University are periodically updated and gradually implemented at two levels, the academic and the administrative (Kuwait's College of Graduate Studies 2006). At the academic level, the planned evaluation of current and proposed graduate programmes will have a positive impact on quality control and sustainable development. At the administrative level, the College is planning to develop the new Students' Information System and to improve efficiency in the management of graduate studies, so that it will be able to cope effectively with future demands. The number of approved Masters degree programmes offered under the supervision of the College of Graduate Studies has increased from three in 1979/80, to 50 in 2005/2006.

Long-term plans for the development and management of graduate studies at Kuwait University are periodically reviewed and updated in the light of changing priorities, technological developments and economic realities. The stakeholders responsible for monitoring such plans include the university administration, technical and academic committees, and the academic library. The latter plays a central role in the overall improvements at the level of information and technical services, which in turn contribute to satisfying the information needs of academic users. The library also has a role in improving the information-seeking behaviour of graduate students.

4.8 Graduation Requirements for Masters and PhD students

Graduation requirements for Masters degrees include coursework, a comprehensive examination and a dissertation or non-dissertation option. With regard to the PhD degree, the graduation requirements include coursework, a qualifying examination and a thesis (Kuwait's College of Graduate Studies 2006).

4.9 Information-seeking Behaviour in Kuwait Graduate Education

A number of studies have been conducted on information-seeking behaviour within the context of Kuwait. These include studies focusing on journalists (Anwar, Al-Ansari & Abdullah 2004), on the information literacy of Kuwaiti police officers (Al-Daihani & Rehman 2007), and on the information needs of people in the construction sector in Kuwait (Anwar & Tuqan 2006). Studies in the academic context in Kuwait have focused on specific patterns of information-seeking, such as the use of the Internet by faculty members (Al-Ansari 2006; Rehman & Ramzy 2004a,b) or undergraduate students (Al-Najran 1998; Rehman & Mohamad 2002). No study has yet investigated the information-seeking behaviour of graduate students in different disciplines. Al-khezzi (2002) included this group of students in his research, but the participants were all from the field of Education, and the author limited the scope of the study to use of the Internet for various purposes (academic, everyday life, leisure or communication).

Al-Ansari (2006) investigated the patterns of Internet use by the faculty members of Kuwait University. The goal of the study was to examine the purposes of Internet use, its impact on teaching and research, the main resources used and the problems faced while using the Internet.

The total population of the study was 491 faculty members from Sciences, Engineering and Social Sciences and Al-Ansari decided to take half of the number of faculty from each college thus ending up with a sample of 246. A total of 161 questionnaires were returned with a response rate of 65.6 (Al-Ansari 2006, p.795). The study found that faculty members used the Internet mostly for e-mail, search engines and WWW resources. In addition, the findings showed that the major problems hindering the use of the Internet were slow speed, lack of time and lack of access from home. However, the author only used quantitative data collection methods; the adoption of qualitative methods to complement the study might have produced results that shed light on the factors behind the lack of access or training. Furthermore, the study mainly describes the demographic characteristics of the respondents, such as age and gender, without investigating the influence of these factors on the use of the Internet.

Rehman & Ramzy (2004a; 2004b) conducted two studies in a similar setting in the same year, both of which covered the health professional sector of Kuwait University. The first study (2004a) looked at the Internet use of health professionals and found that 65.4% of respondents perceived the Internet as being “extremely valuable”. The total number of faculty population in the health sector (medicine, Dentistry and Pharmacy) was 180 covering clinician professionals and non-clinician researchers. Questionnaires were administered to 171 (as nine faculty were not available) and 131 responses were received with a response rate of 76.6% (Rehman & Ramzy 2004a, p.55). The study revealed that professionals were making active use of the Internet for professional tasks and communication; however, a clear majority of respondents expressed the need to improve their Internet use capabilities (p.57).

Both Al-Ansari (2006) and Rehman & Ramzy (2004a) showed that the common barriers to effective use of the Internet in the context of Kuwait’s academia are slow access, lack of time and lack of training. However, neither study explored the reasons for these deficiencies. In addition, both studies noted the need for formal training programmes and the active involvement of librarians as crucial steps in facilitating effective use of these resources.

4.10 Kuwait University Libraries

Kuwait University libraries are organised under the Kuwait University Libraries Administration (KULA), which includes technical processing, eleven faculty libraries and specialised collections. It also supervises seven other affiliated libraries spread over different campuses in various locations: the Jaber Al-Ahmed Central Library; the Engineering & Petroleum Library, the Science Library, the Education Library, the Shari'a (Islamic Studies) Library; the Arts Library/Women; and the Women's College Library. The library administration controls expenditure, procurement, technical services, and distribution of library materials for all faculty and special collection libraries (Al-Ansari 1999).

The KULA is at the centre of academic and research activities at Kuwait University. The mission of the library is to provide and promote access to information in all formats to support academic programmes and scholarly research.

The library provides users with access to information services including:

- Circulation: Graduate students, lecturers and teaching assistants are allowed 10 books per month;
- Reserve materials: Items reserved upon professors' request to be used in the library only;
- Photocopying: In some libraries, there are tokens available to faculty members and graduate students;
- Instruction and orientation: These services aim to familiarise users with the library and how to use its resources such as OPAC and electronic journals;
- Reference;
- Online searches;
- Internet: This service allows users access to electronic resources such as bibliographic databases, OPAC and electronic journals;
- Interlibrary loan: Kuwait University faculty members are entitled to 30 articles free of charge per year;
- Current awareness: This service aims to keep faculty members up to date with new library materials through distributing tables of contents of various

periodicals; Selective dissemination of information: This service provides researchers with regular updates on the current developments in the literature in accordance with their information needs;

- Audio-visual and photography.

4.10.1 The Libraries' Collections

KULA holds approximately 347,429 volumes of Arabic and non-Arabic monographs and reference materials in different domains. KULA subscribes to 2,957 Arabic and non-Arabic (print) scientific periodicals, and 170 Arabic scientific periodicals. In addition, the Libri-Access Database provides electronic versions of some of those titles, as well as access to 15 electronic subscriptions (KULA's guide 2006). The library also hosts 61 bibliographic and full-text databases on various topics. Special collections include 15,554 volumes, such as UN publications, in addition to 3,984 volumes plus 1,197 original manuscripts and 14,181 copy manuscripts. The audio-visual collection consists of approximately 20,000 items.

4.10.2 Electronic Services

1. Online Search

KUL provides faculty members with online search facilities through a direct link with the DIALOG databank in the U.S.A., through which users can search 800 electronic files in various disciplines. This service provides bibliographic citations for journal articles, in addition to access to abstracts or full-text copies.

2. Database Search

English and Arabic electronic databases are available at KUL through the library's website. Table 4.1 illustrates examples of the English databases provided.

Table 4.1 Examples of E-databases provided by some of KULA’s libraries

Electronic Databases	Library
Ranm (Online)	Arts
ACM Digital Library/ACM (Online)	College for Women
Angeline (Online)	
Gender watch (Online)	
Contemporary Women’s Issues (Online)	
Britannica (Online)	
Food & Human Nutrition	
FSTA (Food Science & Technology Abstracts)	
LLBA (Linguistics & Language Behaviour Abstracts)	
Education Index (Full text)	Education
ERIC	
Britannica (Online)	
Architectural Publication Index Ondisc	Engineering
Petroleum Abstracts	
ASTM, BSI, ACI, PFI – Standards	
Current Contents Connect (Online)	
EI Compendex	
ICONDA	
IEL/IEEE (Online)	
NTIS	
Pollution Abstracts	
SPE-Society of Petroleum Engineers	
Britannica (Online)	

Recent statistics on the information services provided by Kuwait University libraries are provided in Table 4.2 below.

Table 4.2 Statistics of the information services provided by KULA (2006-2007)

Library	ILL services			Online search services		
	The British Library	Gulf Region	Local	Online Search	Internet	CD-ROM
Jaber Al-Ahmad Central Library	138	6	8	1	No accurate statistics available	48275
United Nations collections	-	-	-	-	719	147
Engineering Library	29	51	89	40	356	1390
Science Library	240	36	221	2	1315	860
Arts Library	-	-	-	-	3600	
Education Library	50	5	23	-	149	169
Islamic Studies Library			1	-	85	27
Women’s College Library	51	-	58	-	1000	40
Law Library	-	-	-	-	-	-
Total	769	98	400	43	7224	45508

4.11 Summary

This chapter has provided general information about Kuwait and an overview of the country’s higher education system. The chapter has focused Kuwait's College of Graduate Studies; the context in which this research has been conducted.

CHAPTER FIVE - RESEARCH DESIGN

5.1 Introduction

This chapter presents and discusses the methodology adopted in this research. The first section reviews the broad philosophies that underpin the research methodology. Next, the various research strategies, including the quantitative and qualitative methods adopted, are discussed. Following this, there is a detailed account of the research design, which includes surveys, interviews and focus group discussions. The theoretical framework, which is based on Wilson's (1996) Model of Information Behaviour and influenced by the information behaviour model proposed by Urquhart & Rowley (2007), is also discussed. Finally, issues related to sampling, data collection, and data analysis are explored.

5.2 Research Methodology: Philosophical Perspective

When conducting research, a fundamental concern is to determine an appropriate methodology. Within any disciplinary area, an understanding of the philosophies underlying research is essential to grasp the real distinction between the various approaches, whether qualitative, quantitative, or mixed methods. Therefore, in the following subsections, prior to presenting the research design of this study and the choice of methods, the major philosophies and paradigms related to the methodology are discussed.

5.2.1 Ontology vs. Epistemology

Research in Social Science has been highly influenced by two major philosophical considerations related to knowledge: *epistemology* and *ontology*. Epistemology asks the questions of “how do we come to know?” (Bernard 2000, p.8); while ontology is more concerned with the natural world and how it came to be rather than the analysis of what it is; it asks “what is?” or “what can we know?”. Ontology refers to the study of being (Crotty 1998, p.10), while epistemology concerns the question of what is (or should be) regarded as acceptable knowledge in a discipline (Bryman 2004, p.11). These philosophical paradigms underpin the basic assumptions of a research process.

Before moving the discussion to research design and strategy, it is also important to review two essential paradigms underlying Social Science research: *positivism* and *interpretivism*. Comprehending the difference between these two philosophies is essential to understand the research design methodology of any research, and to compare and contrast the relative values of qualitative and quantitative research.

5.2.2 Positivism, Postpositivism and Interpretivism

The term *positive philosophy* was coined by Auguste Comte and is the basis of modern *positivism* (Kolakowski 1993, p.1). Positivism is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond (Bryman 2004, p.11). Therefore, positivism assumes that social reality is made up of objective facts that researchers can precisely measure and to which they can apply statistics to test causal theories. As Crotty (1998, p.27) notes: “One thing is certain: positivism is linked to empirical science as closely as ever.”

Positivists may use inductive and deductive inquiry, but the ideal is to develop a general causal law or principle and then to use logical deduction to specify how it operates in concrete situations (Neuman 2007). The majority of positivist studies are quantitative, and positivists generally see the experiment as the ideal way to carry out research (Neuman 2007, p.43). Positivist researchers seek precise quantitative measures, test causal theories with statistics and believe in the importance of replicating studies.

Postpositivism challenges the traditional positivist idea of the absolute truth of knowledge (Creswell 2003, p.7). As indicated by Creswell, the problems addressed by postpositivists reflect a need to examine causes that influence outcomes and an intent to reduce ideas into discrete sets of concepts which constitute hypotheses and research questions: “Thus, developing numeric measures of observations and studying the behaviour of individuals become paramount for a postpositivist” (Creswell 2003, p.7). Based on this review of the differences between research paradigms, it can be argued that the current research can be characterised with a postpositivist approach, within which the researcher relies heavily on quantitative methods:

A quantitative approach is one in which the investigator primarily uses postpositivist claims for developing knowledge (i.e. cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data. (Creswell 2003, p.18)

In contrast to positivism, *interpretivism* assumes that social scientists should grasp the subjective meaning of social action and should respect the differences between people and the objects of natural sciences (Bryman 2004, p.13). Interpretivism is often linked to the ideas of Max Weber, who suggested that in sciences related to human beings, there is a need to focus social inquiry on the meanings and values of acting persons and on their subjective meaning (Crotty 1998, p.69). Interpretive researchers tend to trust and favour qualitative data, which they believe can more accurately capture the fluid processes of social reality (Neuman 2007, p.43). Researchers within this approach tend to prefer to use ethnographic methods and case studies as their main research methods (Weber 2004). Interpretivism, also referred to as *humanism*, is a paradigm in which researchers favour an *idiographic* form of explanation and use inductive reasoning (Bernard 2000, p.8). Idiographic, or “specific description”, methods explain aspects of the social world by offering a highly detailed picture or description of a specific social setting, process or type of relationship (Neuman 2007, p.44).

5.3 Research Design

A research design sets a framework for the collection and analysis of data (Bryman 2004, p.27). In his view of the philosophical foundations in information research, Wilson (2002) stresses that the choice of an appropriate methods in a research design should be determined by an amalgamation of the philosophical position of the researcher in relation to the research objectives, the nature of the problem, how novel it is, in addition to the resources and the time available to conduct research. Creswell (2003, p.5) addresses three main issues essential to the design of research: what knowledge claims are being made; what strategies of enquiry might be used; and what methods of collecting data and analysis will be employed. The choice of research design depends on the nature of the enquiry and the purpose of the research; that is, whether the focus is on expressing causal connections between variables or on gaining

an understanding of behaviour and the meaning of that behaviour in its specific social context. Neuman (2007) broadly classifies the purpose of research into three main objectives: *exploratory*, *descriptive*, or *explanatory*.

In *exploratory* research, researchers tend to adhere to qualitative data to explore a new area or formulate precise questions that they can address in future research, thus constituting the first stage in a sequence of studies (Neuman 2006, p.33). On the other hand, *descriptive* researchers focus on questions of “How?” and “Who?” and present a picture of the specific details of a situation, social setting or relationship (Neuman 2007, p.16). As Punch (2005, p.15) indicates, to describe is to draw a picture of what happened, or of how things are proceeding, or what a situation or person or event is like. A researcher begins with a well-defined subject and conducts a study to describe it accurately; thus the outcome is a detailed picture of the subject. Therefore, descriptive research is often regarded as the primary focus of the first research conducted on a particular issue (Schutt 2006, p.13).

Explanatory research seeks to account for what has happened, or for how things are proceeding, or what something or someone is like (Punch 2005, p.15). This approach involves finding reasons for things, events and situations, showing why and how they have come to be what they are. Researchers identify sources of social behaviours, beliefs, conditions and events. This type of research documents causes, tests theories, and provides reasons (Neuman 2007, p.17). As Punch (2005, p.15) points out, *explanatory* knowledge is more powerful than *descriptive* knowledge; however, the *descriptive* approach is still important, since any explanation requires description first.

According to Punch, a research design includes four main ideas: 1) a strategy, 2) a framework, 3) whom to investigate and 4) how to carry out the study (tools and procedures to be used for collecting and analysing empirical materials). These ideas or procedures in conducting research are similar regardless of the design of the research strategy or of whether it is quantitative or qualitative research. In light of the above, Table 5.1 illustrates details of the design used in this research.

Table 5.1 The research design adopted in this research

The main component of the research design	Description of the component	Method used
Following what strategy?	The logic or rationale the study follows to answer research questions	Correlational survey
Within what framework?	Conceptual framework	Pre-specified framework (Wilson’s model of information-seeking behaviour and Urquhart & Rowley’s information behaviour framework.
From whom are the data collected?	Sampling	Graduate students, faculty members, academic librarians
How are the data collected?	Tools and procedures	Questionnaires, focus groups, semi-structured interviews
How are the data analysed?	Data analysis	Quantitative, descriptive and statistical. Qualitative and interpretive.

(Adapted from Punch 2005, pp.63-65)

5.3.1 Time Dimension

Research design can be cross-sectional or longitudinal, or can take a case-study approach. Cross-sectional research examines a single point in time or takes a one-time snapshot approach. It is the simplest and least costly alternative, however, it cannot capture social processes or change (Neuman 2007). Cross-sectional research can be exploratory, descriptive or explanatory, but it is most consistent with a descriptive approach. Longitudinal research examines features of people or other units at more than one time. It is usually more complex and costly than cross-sectional research, but it is more powerful and informative (Neuman 2007, p.17). Within the case-study approach, researchers carefully select a few key cases to illustrate an issue, examining in depth many features of the selected cases over time, with very detailed, varied and extensive data, often in a qualitative form (Neuman 2007, p.20). This contrasts with longitudinal studies, in which researchers gather data on many units or cases and then look for general patterns in the mass of numbers.

5.4 Research Strategy

Research strategy refers to the general orientation of the conduct of social research (Bryman 2004, p.19). Punch (2005, p.63) defines research strategy as “a set of ideas by which the study intends to proceed in order to answer the research questions.”

5.4.1 Quantitative and Qualitative Approaches

Quantitative and qualitative strategies encompass different assumptions with regard to the underlying research philosophy. Creswell (2003, p.18) describes a quantitative approach as one in which the researcher primarily uses positivist claims for developing knowledge. Such claims might include cause and effect thinking; reduction to specific variables, hypotheses and questions; use of measurement or observation, and the testing of theories. In this approach, the investigators employ experiments and surveys, and use predetermined instruments that yield statistical data.

By contrast, qualitative researchers often rely on interpretive or critical social science, follow a nonlinear research path and speak a language of “cases and contexts” (Neuman 2007, p.85). Qualitative researchers conduct detailed examinations of cases that arise in the natural flow of social life. Creswell (2003, p.18) describes the qualitative approach as one in which researchers make knowledge claims based on constructivist perspectives which encompass multiple meanings of individual experiences, meanings socially and historically constructed with the intent of developing a theory or pattern. This approach also uses strategies of inquiry such as narratives, phenomenologies, ethnographics, grounded theory studies or case studies.

Quantitative and qualitative researchers adopt different approaches to formulating research questions and hypotheses. Quantitative researchers narrow a topic into a focused question as a discrete planning step before they finalise the study design; in this sense, they follow a deductive approach (Bryman 2004, p.19). Qualitative researchers on the other hand often begin with vague or unclear research questions and the topic emerges slowly during the study, thus entailing an inductive approach. The qualitative research style encourages a slow focusing of the topic throughout the study. By contrast, in quantitative research only a small amount of topic narrowing occurs in the early research planning stage, and most takes place after the researcher has begun to collect data (Neuman 2007, p.86).

In addition, qualitative research is open to unanticipated data and constantly re-evaluates the focus early in a study, enabling researchers to change the direction of research and follow new lines of evidence. In qualitative research, the following types of questions are asked: How did a certain condition or social situation originate? How is the condition/situation maintained over time? What are the processes by which a condition/situation changes, develops or operates? (Neuman 2007, p.86)

Bryman (2004, p.20) summarises the fundamental differences between quantitative and qualitative research strategy, as illustrated below in Table 5.2

Table 5.2 Differences between quantitative and qualitative research strategies

	Quantitative	Qualitative
Role of theory in relation to research	Deductive; testing of theory	Inductive; generation of theory
Epistemological orientation	Positivism	Interpretivism
Ontological orientation	Objectivism	Constructionism

(Bryman 2004, p.20)

According to Bryman’s analysis, this study employs the quantitative deductive, testing of theory paradigm as the basic strategy, but this is combined with other methods and data collection strategies in order to meet the aims of the research. This freedom in the choice of methods is referred to by Creswell (2003, p.12) as “pragmatic knowledge claim” in which researchers can choose the methods, techniques and research procedures that best meet their purposes: “Pragmatists do not see the world as absolute unity; it is not based on strict dualism between the mind and a reality completely independent of the mind.”

5.4.2 Mixed Methods Approach

Johnson, Onwuegbuzie and Turner (2007, p.129) defined mixed methods approach as:

“An intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm (along with qualitative and quantitative research). It recognises the importance of traditional quantitative and qualitative research but also offers a powerful third paradigm choice that often will provide the most informative, complete, balanced, and useful research results.”

All methods have limitations, and researchers have recognised that biases inherent in any one method could neutralise or cancel out the biases of others; it can therefore be desirable to use a combination of both quantitative and qualitative methods (Creswell 2003, p.15). The concept of mixing different methods probably originated in 1959, when researchers started to use multiple methods to study the validity of psychological traits. Since then, the concept of triangulating data sources as “a means for seeking convergence across qualitative and quantitative methods” has been widely adopted (Creswell 2003, p.15). For Brewer and Hunter (2006, p.4), “A diversity of imperfection allows us to combine methods, not only to gain their individual strengths but also to compensate for their particular faults and limitations.” The authors summarise the advantages of the multi-method approach as follows:

1. The strong confirmation of theory as a mixed-method approach adds to the strength of the evidence.
2. Avoiding over-reliance on one type of method and therefore guarding against the specific sources of error which threaten a specific method.
3. The ability to test a hypothesis both experimentally for causal precision, and also with survey data to determine the generalisability of the hypothesis to the larger population.
4. The ability to aid weak methods by the use of strong methods. For example, survey research can contribute to fieldwork by helping to establish the generality of field observations, while fieldwork interviews may be used to cross-check the accuracy of a survey.

5. Employing different types of methods helps to guard against methodological bias, either for or against certain types of theories.

According to Tashakkori & Teddlie (2003, p.14), mixed methods are “superior” to single approaches for various reasons. First of all, mixed methods can give answers to research questions that the other methodologies cannot. Second, mixed methods research provides the opportunity for presenting a greater diversity of views, and that mixed methods can provide stronger inferences. On the basis of these advantages, this research adopts a mixed methods approach, combining quantitative and qualitative data collection tools. Prior to discussing these methods in detail, it is first important to provide a thorough analysis of the theoretical framework of the study, which helped in formulating research questions and hypotheses and in determining the appropriate data collection approaches.

5.5 Theoretical Framework

Jarvelin & Wilson (2003) state that: “A conceptual model provides a working strategy, a scheme containing general, major concepts and their interrelations. It orients research towards specific sets of research questions.” The literature review in Chapter 2 examined the major theoretical models in the area of information-seeking behaviour. The review showed that these models provide a clear understanding of the problem under investigation, and explain the relationships between concepts and variables that are of interest. Case (2007, p.147) points to the difficulty of establishing causation in human behaviour, especially in information seeking, in which many important aspects cannot be observed. However, the author confirms that “it is certainly possible to identify key factors and their likely sequences and interactions in the process of information seeking. Models make these aspects explicit and thus guide research design and theory development.” Bates (2005, p.3) argues that models are most useful at the description and prediction stages of understanding a phenomenon. Only when we develop an explanation for a phenomenon can we properly say that we have a theory. Consequently, most “theory” in LIS is really still at the modelling stage.

Therefore, to achieve the aims and objectives of this research, a theoretical model was proposed to help guide the study by serving as a framework for designing the research

tools, formulating hypotheses, testing the results and assisting in the analysis and discussion of the findings.

5.5.1 The Study Model

Wilson's 1996 Model of Information Behaviour was chosen as the principle theoretical framework to guide this study, on the grounds of the set of "intervening variables" identified by Wilson as affecting the information-seeking process, which were of particular interest for this research. The model was adopted because it is comprehensive, displaying the information-seeking behaviour as a process that includes various information patterns, such as passive, active and ongoing search, all of which could influence the acquisition of information in a particular environment. Moreover, it is a general model, well-established in the field and thus applicable in different contexts, roles and disciplines. Inevitably, the use of such a rich model adds validity to its application in other studies or research.

The adoption of Wilson's model as the broad conceptual framework for this study was expected to provide useful insights into determinants of the information-seeking behaviour patterns of students in a multi-disciplinary graduate context. For the purpose of this study, the model has been extended in order to predict the information-seeking behaviour of graduate students on the basis of a set of predictors (independent variables). The extended components of the model are the "active search" and "intervening variables." Active search was extended into non-linear behavioural aspects: initiating search strategies, searching, and locating information. These were further broken down into specific patterns of information-seeking behaviour: place where the search was carried out, resources used, sources of awareness, and problems faced when conducting the search.

Wilson's model has provided empirical and reliable data through logistic regression analysis which revealed that library anxiety, information literacy skills, gender, nationality, enrolment, and accessibility of information resources are predictors of graduate students' information-seeking behaviour patterns.

In addition to Wilson's model, it was decided that this study would draw on other information-seeking behaviour models. This was necessary because Wilson's model is general, and this research needed to identify a specific set of factors from which

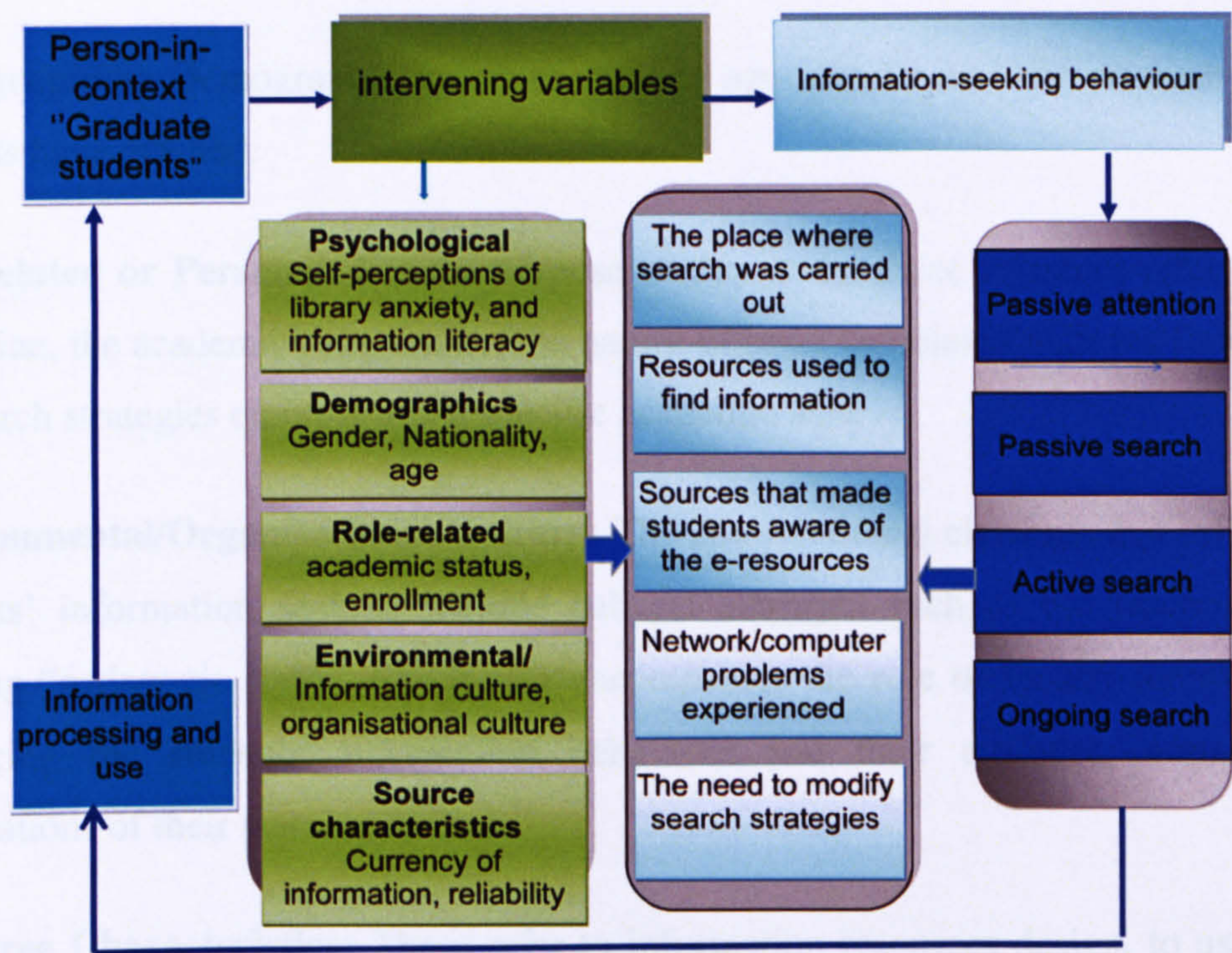
hypotheses could be formulated. Therefore, the factors identified were integrated into an information-seeking behaviour model created in a recent UK study by Urquhart & Rowley (2007), and then used within the broad framework of Wilson's 1996 model. In their study, Urquhart & Rowley (2007) grouped the factors influencing information behaviour into two broad categories: macro factors, which have an indirect effect; and micro factors, which have a direct influence on the information seeking (Figure 2.5, Chapter 2). Their model provides specific factors that impact on student information behaviour, such as information literacy, an aspect closely related to the objectives of this research. The decision to nest Urquhart and Rowley's Information Behaviour Model into Wilson's general model was also due to other reasons. First, Urquhart and Rowley's model proposes associations that can be tested, which is in line with the objective of this research, to identify key factors associated with patterns of information seeking.

In addition, Urquhart and Rowley's framework is specific to the study of information-seeking behaviour, particularly in the electronic environment. Moreover, components of their framework are applicable to a higher education context. A set of factors were adopted from Urquhart & Rowley's model and nested within Wilson's intervening variables. These variables were chosen because they are the ones most closely related to the enquiry of this research, which aims at investigating the factors that influence information-seeking behaviour of students in an academic context. The variables are presented in the proposed model of information seeking for this research. These factors are as follows:

- Discipline and curriculum;
- Academics' information-seeking behaviour;
- Pedagogy;
- Support and training;
- Search strategies;
- Information literacy;
- Organisational culture;
- Availability and constraints to access;
- Information resources and design.

The research conceptual framework is shown in Figure 5.1

Figure 5.1 The theoretical framework of the research



(Based on Wilson, 1996)

The following components are found in the model:

Person in Context: The main aim of this element is to shed light on what academic tasks graduate students engage in. In an educational context, individuals engage in various tasks, including writing essays, problem-solving exercises, taking examinations and writing theses (Ford 2004, p.186), and these tasks influence their information-seeking behaviour. In other words, it is necessary to determine the information context in order to understand how it links with an individual's information needs.

Intervening Variables: According to Wilson's model, intervening variables affect the individual's motivation to search for information. The original variables in Wilson's 1996 model include psychological elements, demographics, role-related or personal, environmental and source characteristics. As outlined above, for the purpose of this research, Wilson's intervening variables were further classified into a set of factors adopted from the information-seeking framework developed by Urquhart & Rowley (2007), (See Chapter 2, Figure 2.5). The main aim was to explore the significance and

strength of the relationship between the intervening variables or factors, and the information-seeking behaviour of graduate students.

Demographics: Demographic variables include age, gender and the research stage students have reached.

Role-related or Personal: For the purpose of this study, these variables refer to the discipline, the academic programme, the nature of tasks associated with the field, and the search strategies employed in a specific academic area.

Environmental/Organisational Culture: The environmental elements that influence students' information seeking include cultural elements such as the teaching and learning "pedagogic style", which also encompasses the role of faculty members in enhancing the students' information behaviour and their attitudes, norms and expectations of their learning system.

Resource Characteristics: These refer to information resources design, to usability issues related to electronic information resources and to constraints and barriers to access, including the need for password login.

5.6 Research Hypotheses

This research focuses on exploring the patterns of information-seeking behaviour of graduate students, and identifying the factors influencing the information-seeking process. Those patterns comprise:

- The place where the search is carried out: at home, in the library, or in an office;
- The need to modify search strategies;
- Use of search engines, library databases, e-journals and personal contacts to find the information needed;
- Experiencing computer/network problems while doing the search;
- Sources that make students aware of the electronic resources used in the search;
- Asking for help when needed.

Drawing upon the conceptual framework and the research questions, the study generated hypotheses to test whether certain factors influence the above patterns of information-seeking behaviour. Those hypotheses are as follows:

Demographics

Null Hypothesis 1: There is no significant relationship between students' patterns of information-seeking behaviour and (a) Gender; (b) Nationality; (c) Age and (d) English proficiency.

Alternative Hypothesis 1: There is a significant relationship between students' patterns of information-seeking behaviour and (a) Gender; (b) Nationality; (c) Age and (d) English proficiency.

Role-Related

Null Hypothesis 2: There is no significant relationship between students' patterns of information-seeking behaviour and (a) Discipline; (b) Information Literacy; (c) Requirement to Write a Thesis and (d) Computer Skills.

Alternative Hypothesis 2: There is a significant relationship between students' patterns of information-seeking behaviour and (a) Discipline; (b) Information Literacy; (c) Requirement to Write a Thesis and (d) Computer Skills.

Psychological

Null Hypothesis 3: There is no significant relationship between students' patterns of information-seeking behaviour and Library Anxiety factors.

Alternative Hypothesis 3: There is a significant relationship between students' patterns of information-seeking behaviour and Library Anxiety factors.

Environmental

Null Hypothesis 4: There is no significant relationship between students' patterns of information-seeking behaviour and use of information resources.

Alternative Hypothesis 4: There is a significant relationship between students' patterns of information-seeking behaviour and use of information resources.

Faculty v Students Differences

Null Hypothesis 5: There is no significant difference in patterns of information-seeking behaviour between faculty and students.

Alternative Hypothesis 5: There is a significant difference in patterns of information-seeking behaviour between faculty and students.

5.7 Methods Adopted

Creswell (2003, pp.21-23) highlights three considerations when deciding which approach to select: the research problem, the personal experience of the researcher and the audiences for whom the report will be written. For example, if the problem involves identifying factors that influence an outcome, or understanding the best predictors of outcomes, then a quantitative approach is best.

This research employs a triangulation approach, using both qualitative and quantitative methods. It was decided that a simultaneous mixed method design, with data collected from more than one level of organisations or groups, was the most appropriate method. The reasons for this decision are as follow:

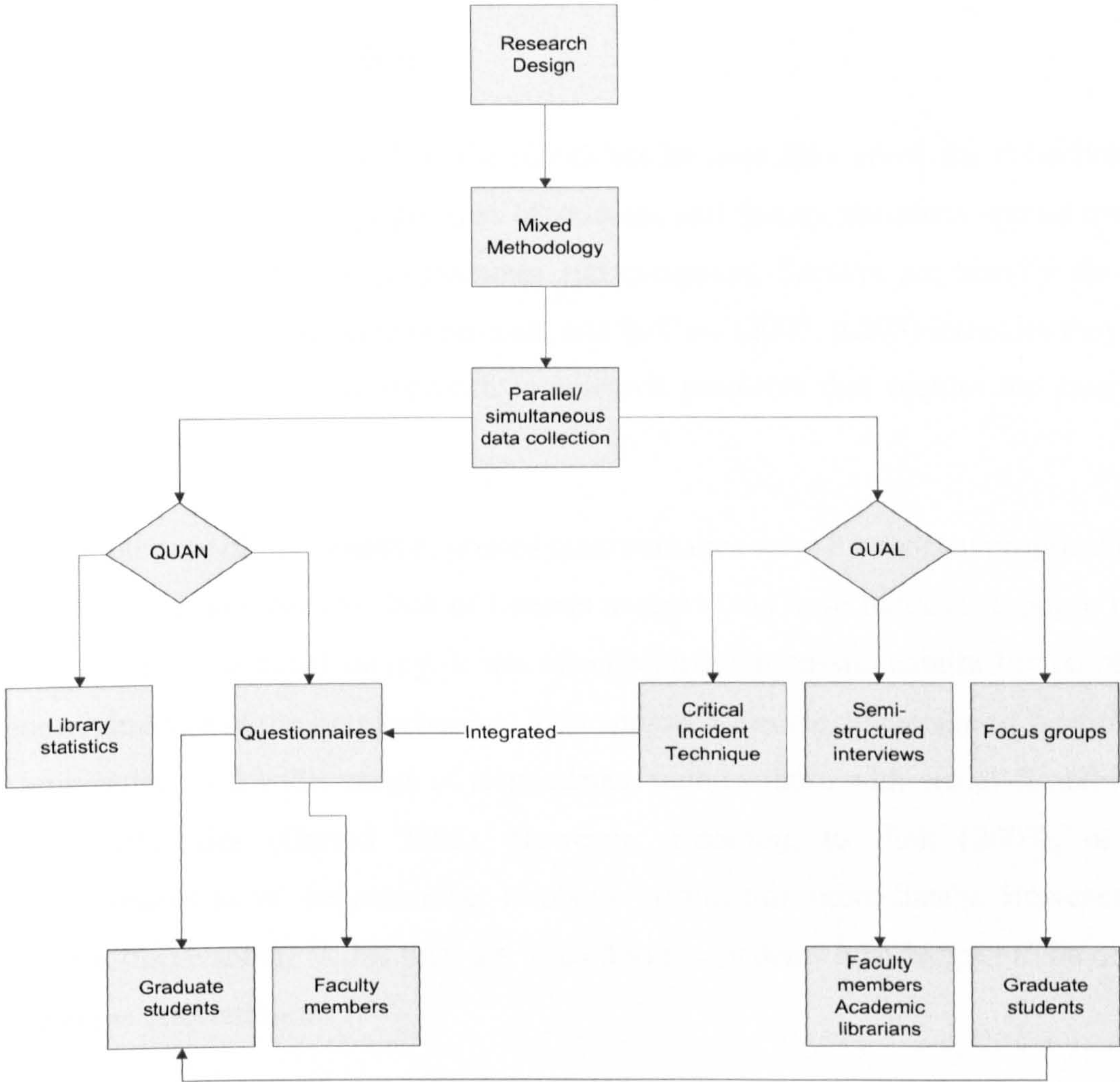
- Qualitative data are used to make the quantitative data more meaningful and understandable and vice versa. This approach was deemed convenient in order to allow in-depth discussion of results by relating quantitative findings to qualitative ones. This would allow the exploration of issues not covered by the questionnaires;
- Data from two different groups (students and faculty members) were gathered to achieve more comprehensive inferences regarding the information-seeking behaviour of both groups;
- Data were collected from various clusters scattered over different locations (campuses) in different areas in Kuwait. This necessitated a lengthy cross-sectional data collection carried out over two successive months.

Other research methods were considered as alternatives to the survey, but were deemed inappropriate. Cultural barriers related to the context of the study meant that it was not possible to conduct observations as students refuse to be observed, and even if some agrees, they are very few. Furthermore, observation would be inappropriate to collect data on the information-seeking behaviour of students because the use of various search strategies and locating different information resources are complex behavioural patterns that tend to take time, are usually carried out over different time spans, and could also be conducted from different locations.

Citation analysis of theses or dissertations was also considered as a potential data collection method for this research. However, because many graduate programmes in Kuwait are non-dissertation based, the researcher decided that this technique was not suitable. The fact that many of the graduate programmes are taught in Arabic would add further to the difficulty of conducting citation analysis. Future research might make use of citation analysis within the context of graduate studies to provide some in-depth data about the types of information resources used by graduate students. This will in turn contribute to a greater understanding of their information-seeking behaviour.

Figure 5.2 illustrates the research design. The figure is followed by an explanation of the reasons leading to the final choice of methods in this study.

Figure 5.2 Research Design



5.7.1 Quantitative Methods

5.7.1.1 Survey questionnaires

Questionnaires were selected by the researcher because they allow the collection of information from a large population of students and faculty members spread over a wide range of disciplines, programmes and campuses. Surveys are heavily used in studying information-seeking behaviour, and as Case (2007, p.205) indicates they are “an appropriate and valid approach to research problems that require the study of large populations”.

For the purpose of this research, printed questionnaires were the most appropriate data collection method, because lack of Internet access could have reduced response rates from an online or email survey. It was also decided that on-site administration of the questionnaire was the best technique. This approach has the advantage of facilitating participation by a wider range of respondents, such as those with visual disability or other difficulties (Gorard 2003). However, according to Fink (2003), on-site questionnaires allow the researcher to obtain information immediately. However, an obvious disadvantage is that they are limited to respondents who happen to be on the site at the relevant time.

Two different forms of questionnaires were administered: one for graduate students and the other for faculty members. Due to the fact that survey questionnaires tend to produce limited data on respondents' perceptions and attitudes, it was decided to incorporate the Critical Incident Technique in the survey. This technique helped to elicit detailed accounts of students' and faculty members' information behaviour.

The questionnaires made use of a set of questions from a validated questionnaire used in a UK study by Urquhart & Rowley (2007). The questions were based on a Critical Incident Technique used to explore the information seeking behaviour of staff and graduate students. The Critical Incident Technique is explained fully in the qualitative method section at point 5.6.2.1. In a two-part article (Rowley & Urquhart 2007; Urquhart & Rowley 2007), the authors provided a detailed account for their use of the technique in their study. For its adoption in this research, permission was granted by Christine Urquhart to use a similar set of CIT-related questions.

The researcher discussed with the author, via emails, the modifications that needed to take place for this research. It should be noted that efforts have been made to make all the necessary modifications to the instruments and the design of the questions, taking into consideration the specific context of Kuwait's higher academia, without affecting the validity of the scales. For example, Urquhart & Rowley used two forms of questionnaire, one for doctoral students and staff members, based on a view that the two groups have similar work tasks; and the other for undergraduates and MA students. In the current research the original questionnaire was used to produce two separate forms, one for Masters and PhD students, and the other for faculty members. Within the context of Kuwait University faculty members are more engaged in research duties, in addition to their teaching and administrative tasks, while graduate students are heavily engaged in their coursework and assignments and rarely have the time or the opportunity to publish or attend conferences. This indicates that each group is likely to have different information-seeking behaviour, which requires exploration. Such differences made it desirable to use sets of questionnaires.

Two versions of the questionnaires were used, one in English and one in Arabic, depending on the nature of the graduate programme and the language in which it is taught. The English questionnaire was distributed to students enrolled in programmes taught in English (e.g. Science, Engineering, Medicine), whilst the Arabic version was used for students in the Arabic-based programmes (e.g. Psychology, Philosophy, Education). Professional translation was used to convert the original English questionnaire into Arabic.

In addition to the CIT-related questions, two validated scales were used in the questionnaire: one to measure information literacy, and the other to measure library anxiety among graduate students. The information literacy self-efficacy scale was validated in a study by Kurbanoglu, Akkoyunlu & Umay (2006). The library anxiety statements used in this study were elicited from a validated instrument, the MLAS (Multidimensional Library Anxiety Scale), developed by Kampen (2004). Another scale was used to measure faculty members' perceptions of their students' use of the library and information resources. This was based on a validated 20-statement instrument developed by Baker (1997). Using validated instruments has advantages. For example, validated questionnaires will have been piloted and used before and they

may therefore carry some extra authority for readers (Gorard 2003, p.102). As Schutt (2006, p.250) points out: “If another researcher has designed a set of questions to measure a key concept, and evidence indicates that this measure is reliable and valid, then, by all means, use the instrument.”

Structure of the Questionnaire

Introduction

The questionnaire begins with an introductory paragraph that explains the purpose of the research, guarantees confidentiality of the data, and provides the researcher’s contact information.

Part I: Demographic Background

This section of the questionnaire is the same for students and for academics. It consists of closed questions to elicit information regarding the respondents' major, degree, nationality, age and gender. It also asks respondents to rate their English language proficiency and their perceived skills in using computer applications, in each case using a seven-point Likert scale.

Part II: Searching for Information

The objective of this section was to elicit information on the participants’ use of information resources in particular situations. The critical incident had to be an academic task and related to any of the course or programme requirements. This section was used in both questionnaires. Statements related to this construct are presented below:

Questions related to searching for information

- Where did you carry out the search?
- Did you experience any computer or network problems when doing the search?
- Did you need to modify your search question or strategy at all?
- What did you use to find this information?

Table 5.3 Questions related to searching for information

Part III: Information Literacy

For the graduate students' questionnaire, this section comprised a series of questions to explore respondents' competence/confidence levels in their information literacy. The questions were presented as statements, to be answered using a self-efficacy scale, based on a seven-point Likert scale. The statements covered the following elements: defining information needs, initiating the search strategy, locating and accessing the resources, assessing and comprehending information, interpreting, synthesising, and using information, communicating information, and evaluating the product and process (see Table 5.4).

Table 5.4 Information literacy statements

Statements related to information literacy

- I feel confident with defining the information I need
- I am unsure about being able to identify a variety of potential sources of information
- I am confident with limiting search strategies by subject, language and date
- I feel confident with initiating search strategies by using keywords and Boolean logic (and/or)I feel anxious when deciding where and how to find the information I need
- I am confident with using different kinds of print sources (books, periodicals, encyclopaedias, chronologies)
- When I think about using electronic information resources, I feel confident
- I am apprehensive about being able to locate resources in the library using the library catalogue
- I feel confident using Internet search tools (such as search engines, directories, etc)

- I am confident with using many resources at the same time to carry out research
- I am unsure about how to determine the reliability of information sources
- I know how to determine the currency of information sources
- I am confident with selecting information most appropriate to my information needs
- I am confident with my ability to evaluate sources from the World Wide Web
- I am unsure about how to combine newly gathered information with previously obtained information
- I am confident with writing a research paper
- I know how to create bibliographic records for different kinds of materials (i.e. books, articles, web pages)
- I'm apprehensive about criticising the quality/outcome of my information-seeking process

Part IV: Pedagogy

This section is intended to explore the role of faculty members in influencing the information-seeking behaviour of graduate students. It also seeks to understand the teaching styles adopted by different disciplines (see Table 5.5).

Table 5.5 Statements related to pedagogical style

Attribute	Related questions/statements
Academics' role	Guidance on how to use information resources
	Laying down the foundation for my research work
	Passing on journals, research papers of their own or of noted authors
	Assigning projects that require using information resources available in the library
	Offering guidance on how to conduct literature searching
Teaching style	Based largely on traditional lecturing, on lab work, a combination of lectures and tutorials, a problem solving and individual or group work.

Part V: Library Awareness

Awareness and anxiety: This section was used only in the graduate students' questionnaire. The objective was to measure the students' attitudes to their use of the library and their perceptions of library anxiety. A seven-point Likert scale was used, adapted from a doctoral library anxiety survey developed by Kampen (2004). The statements related to this construct were chosen as they were closely related to

electronic information resources, which are the focus of this research. They are shown in Table 5.6

Table 5.6 Library awareness statements

Statements related to library awareness

I can usually find the resources I need in the library
I am aware that the library offers online search services for graduate students
When I think about my dissertation/thesis as it relates to the library, I feel stressed
I know what resources are available in the library
I understand how to begin my research in the library
When I use the library for information, I feel overwhelmed
I am uncomfortable using the library’s online catalogue
I am uncomfortable using the library’s website
I am comfortable using the computers inside the library
The library should provide more services for masters and doctoral students
The library's resources for my area of interest are satisfactory
It is difficult to locate materials I need in the library
The library offers enough information skills training sessions for graduate students
My knowledge of the library is limited to my area of interest
I would rather use the library online
The library is easy to use
There are too many possible sources of information
I can use Interlibrary Loan for access to materials not in my library
In general, I think my ability to use the library has had a negative effect on my research

Source characteristics: This section was used in both questionnaires (for graduate students and faculty members. The objective was to elicit the perceptions of the participants towards issues mainly related to accessibility and availability of information resources. A seven-point Likert scale was used for the questions referred to in Table 5.7

Table 5.7 sources' attributes and related statements

Attribute	The question related statement
Availability and constraints to access	Access to the internet
	Access to computers
	Access to printers
	The need for passwords to access information
	Interlibrary loan
	Computing skills
	English language skills
Information resource search	What did you use to find the information you needed?
Usability	How often do you use the information resources for your study?
IT	Did you experience any computer or network problem when conducting search.

5.7.2 Qualitative Methods

5.7.2.1 Critical Incident Technique

Critical Incident Technique (CIT) is a qualitative research method developed in the early 1950s by John Flanagan, a member of the U.S. Army Air Forces Aviation Psychology Programme (Urquhart *et al.* 2003). It has been tested in a wide range of discipline areas for various purposes and has been recognised as a valid, reliable and effective method for gathering rich qualitative data (Fisher & Oulton 1999, p.124).

The method focuses on a recent concrete incident to collect data on a phenomenon (Ingwersen & Jarvelin 2005, p.91). Data collection tools include interviews, group interviews, questionnaires and record forms (Flanagan 1954, p.342-343). In his classic article on CIT, Flanagan indicated that there is no one rigid rule governing data collection when using this method, and that it “should be seen as encompassing a flexible set of principles that should be adapted to meet the specific objective of the research design at hand” (Flanagan 1954, p.335). The author justifies the use of questionnaires by stating that: “In situations where observers are motivated to read the instructions carefully and answer conscientiously, this technique seems to give results which are not essentially different from those obtained by interview methods.” (Flanagan 1954, p.343)

The objective of CIT is to provide a means of identifying behaviour that contributes to the success or failure of organisations in specific real-life situations. It involves inductive analysis of significant behaviour observed by researchers, or reported by participants (Hughes 2005; Fisher & Oulton 1999), as is the case in this study. According to Tenopir *et al.* (2004, p.236), the CIT method in information-related studies has taken two basic forms of applications. One approach has been to identify an “incident” in which information may be needed, as in problem solving, and this is mostly recognised in health studies. The other approach is to identify an information service incident or event such as reading an article or conducting an online bibliographic search.

Urquhart *et al.* (2003) reviewed the use of CIT in studies of information-seeking and use. The review showed that many of the studies that have employed CIT have examined motivations for information seeking, the urgency of the request, the type of information required, the sources used and the reasons for selecting those sources (Urquhart *et al.*, 2003, p.70). The authors also summarised the methods by which CIT was used in studies of information seeking from 1983 to 2001. These methods included telephone interviews, face-to-face interviews, questionnaires combining multiple choice and CIT, short weekly questionnaires, and postal and e-mail questionnaires (Urquhart *et al.*, 2003, p.74). The strengths of the method are that it relates the use of information to the problem-solving process, and that it is more

reliable because it is easier to report on a recent concrete incident than to answer more general questions (Ingwersen & Jarvelin 2005, p.91).

According to Jamali (2008, p.70), CIT-related questions can be asked through a questionnaire survey, as is the case in this research. Table 5.8 illustrates examples of application of CIT in information-seeking studies from 2002 to 2009, a period chosen because Urquhart (2003) had already presented studies using CIT prior to 2001.

Table 5.8 Examples of CIT application in studies on information-seeking behaviour in academia (2002-2009)

Authors	Purpose	Sample Population	CIT Method
Kerins, Madden & Fulton 2004	Investigate the information-seeking of students studying for professional careers.	Engineering and Law	Semi-structured interviews
Urquhart & Rowley 2007	Investigate students' information behaviour in relation to EIS	Undergraduates, postgraduates, staff, librarians, managers	Questionnaires
Jamali 2008	To investigate the patterns of information-seeking behaviour of scholars in physics and astronomy.	Graduate students in Astronomy and Physicists	Web-questionnaire, semi-structured interviews, diaries
Roos et al. 2008	Explore the information environment of researchers in Molecular Medicine.	91 researchers: 57 PhD students, 5 undergraduates, 29 senior researchers	Survey and semi-structured interviews

It can be inferred from Table 5.8 above that few studies have actually adopted the Critical Incident Technique in the area of graduate students, researchers and academics. The two basic techniques used have been interviews and questionnaires. Some of these studies were of a small scale and limited to a handful of subjects (for example: Kerins, Madden & Fulton 2004; Jamali 2008). Apart from the academic context, there are recent studies that have employed the technique mostly in the health vocational sector (for example, Urquhart et al.2007; Publicover et al. 2006). Both studies employed the Critical Incident Technique in collecting data; the first used the method in questionnaires to help respondents focus on a particular incident of information need and use, while the second study used interviews with clinicians.

5.7.2.2 Rationale for selecting CIT

The Critical Incident Technique was adopted in this research on the grounds that it offers advantageous characteristics fully compatible with the study. As highlighted by Hughes, Williamson & Lloyd (2007), CIT focuses on real life experience and thus assists in identifying broader patterns of understanding. This was consistent with the aim of this research, to explore the information-seeking patterns of graduate students as they engage in searching for information to fulfil academic tasks. As observation was not deemed appropriate, it was decided that CIT would be helpful in identifying real-life information-seeking incidents. The focus on a recent recalled incident also brings immediacy and authenticity. In addition, CIT is relatively flexible in terms of the means of collecting data and analysis, while simultaneously offering clearly defined guidelines for collecting and analyzing data (Hughes, Williamson & Lloyd, 2007). Furthermore, the method provides in-depth examination of a situation rather than a broad investigation of many incidents. Above all, it is evident from the literature that the method has successfully supported other LIS studies, thus ensuring validity of this research.

For the purpose of this study, the “critical incidents” were instances of information seeking in relation to the use of electronic information resources, as reported by graduate students and faculty members. CIT was used to help students focus on their reasons for seeking information, the information sources they use and the factors that influence the patterns of their information-seeking behaviour. Such data fostered an in-depth identification of the major problems faced by the users of electronic information resources. This technique was integrated into the questionnaire to extract reflective data from graduate students who had finished their MA, PhD or Higher Diploma, or were just about to finish a coursework project. The same technique was used with faculty members, whose information needs differ from those of students in accordance with their different academic tasks.

5.7.2.2 Semi-structured interviews

Semi-structured interviews with faculty members were used to collect in-depth information on the perceptions of lecturers and supervisors about students’ information skills when working on assignments or research projects. A semi-

structured interview allows the interviewer to ask further questions, in addition to those specified in the form of the interview guide (Bryman 2004, p.543). The interview is a good way to access participants' perceptions, meanings, and definition of situations and construction of reality (Punch 2005, p.168). For this research, face-to-face interviews were conducted to strengthen and 'deepen' the data obtained from the questionnaires. For example, the semi-structured interviews investigated the expectations, suggestions and recommendations of faculty members on how to enhance students' information-seeking behaviour skills. In addition, the interviews enabled the researcher to explore emerging patterns of information-seeking behaviour that could not have been covered by the questionnaire.

Despite the rich data they can provide, interviews have limitations. For example, they should be carried out by a researcher who has been properly trained (Fink 2003). To use interviews effectively, the researcher needs to possess the required interviewing skills and the ability to code the text, which is time-consuming and then needs to be analysed in detail.

Semi-structured interviewing is based on the use of an interview guide, a written list of questions and topics that need to be covered in a particular order (Bernard 2000, p.191). This kind of interviewing works well when the researcher is dealing with "elite members of a community", people who are accustomed to efficient use of their time (Bernard 2000, p.191). Therefore, for the current research, interviewing was seen as an appropriate tool to collect data from faculty members and senior academic librarians.

5.7.2.3 Focus groups

The focus group discussions were intended to gain in-depth information relating to how students go about seeking information for their coursework and research projects. The technique was also used to elicit as much detailed information as possible about the problems faced when using the range of e-resources available through the library or the Internet. In addition, the focus groups helped identify the cultural influences on the information seeking of students by eliciting information about their attitudes, norms and expectations in the context of Kuwait's higher academia.

Focus group discussions are “a form of group interview in which there are several participants, in addition to a moderator or facilitator; there is an emphasis in the questioning on a fairly defined topic” (Bryman 2004, 346). This technique has several advantages. For example, focus groups can be used after the survey in order to “flesh out” views and information on the topics surveyed (Punch 2005, p.172). In addition, focus group research is known for its flexibility, as it can be used as a stand-alone qualitative method or combined with quantitative techniques (Silverman 2004, p.178). Furthermore, according to Silverman, the focus group approach allows a wide variety of different types of data analysis – including content, thematic, ethnographic, phenomenological, narrative, and conversation analysis. The technique also allows the researcher to uncover the underlying reasons for opinions and motivations by capturing facial expressions and body movements’ as much as spoken words (Case 2007, p.217).

Despite these advantages however, the focus group technique does have limitations. Bryman (2004, pp.359-360) provides a detailed account of these, as summarised below:

- The researcher has less control over proceedings than with the individual interview;
- The data are difficult to analyse and organise;
- The recordings are probably more time-consuming to transcribe than those of equivalent individual interviews;
- There are the possible problems of group effects (for example, participants may be more prone to expressing culturally-expected views than in individual interviews).

In order to overcome some of these limitations, the researcher employed the help of a moderator to gain more control on recording the data and organising the discussion.

5.8 Sampling

A population is a group (usually of individuals) to whom researchers wish their research results to be generalisable (Gorard 2003, p.235). A sample is a “subset of the population – usually with the implication that the subset resembles the population closely on key characteristics (is representative of the population)” (Sapsford 2007,

p.7). For each population participating in this study a different sampling technique was used, as discussed in the following sections.

5.8.1 Graduate Students

It was decided that cluster sampling was the appropriate technique to select graduate students to take part in the study, since treating the various disciplines or programmes as clusters has several practical advantages. According to Onwuegbuzie, Jiao & Bostick (2004, p.107), cluster random sampling is a “method of sampling wherein clusters (in other words, intact groups) instead of individuals are randomly selected. For example, rather than randomly selecting all graduate students at a university, a library researcher could randomly select graduate classes and then select all students in each class. Cluster sampling is most appropriate when the population is very large or geographically spread out.” Neuman (2006) too states that cluster sampling is particularly appropriate where the population to be sampled is spread across a wide geographical area. Moreover, according to Black (1999, p.122), clustering makes it possible to select randomly when no single list of population members exists, but local lists do. As Gorard (2003, p.70) indicates, it is easier to obtain a list of clusters than it is to get a complete list of the people in them. Miller & Salkind (2002, p.55) summarise the advantages and disadvantages of cluster sampling as follows:

Advantages:

- It requires listing only individuals in selected clusters, the characteristics of clusters as well as those of the population can be estimated;
- Can be used for subsequent samples, because clusters, not individuals, are selected and substitution of individuals may be allowed.

Disadvantages:

- Larger errors for comparable size than probability samples;
- Requires the ability to assign each member of the population uniquely to a cluster; and
- Inability to do so may result in duplication or omission of individuals.

According to Gorard (2003, p.70), the chief drawback of clustering is the potential bias introduced in cases where the clusters are too similar to each other. In order to

overcome this problem, researchers should try to sample more clusters and use appropriately fewer cases in each cluster. For this research, various disciplines were chosen at a broad level, without focusing on specific departments. Then, within each department, as many clusters were chosen as possible, from which participants were randomly chosen to take part in the survey.

Cluster sampling was found to be appropriate for choosing the sample from the Kuwait Graduate Studies' programme, in which students are scattered at various campuses in different areas, in academic settings that are diverse both physically and in terms of academic discipline, and university regulations mean that it is difficult to get a list of all the students registered. In addition, the number of students in each college varies to the extent that in some programmes there were only ten students, while in others there were more than 50 students. There was also a big disparity between the numbers of males and females, making it difficult to use any other random sampling technique.

The stages in cluster sampling, according to Sapsford (2007, p.83), are first to sample geographic units (clusters) and then sub-units within them (and so on, for as many levels of complexity as may be desirable and practical), and finally to sample a randomly-determined number of individuals within the smallest unit. Therefore, for the purpose of this research, a multi-stage cluster sampling was used. Clusters were first selected at the level of academic fields, and then within each field departments/schools were randomly selected, followed by cluster sampling of individuals from these groups (Tashakkori & Teddlie 1998, p.75). The two-month data collection procedures were conducted between April and June in 2007.

Cluster sampling was used to determine the sample from the population of graduate students. The clusters were based on the number of 1113 students (the total population of graduate students registered in the College of Graduate Studies), based on statistics from Kuwait's College of Graduate Studies for the year 2006-2007. The process of sampling involved:

- All 10 disciplines were chosen (Sharia, Engineering, Law, Education, Arts, Social Sciences, Science, Business Administration, Joint degree, Medicine);
- There were 50 departments under the broad 10 disciplines, for the purpose of this research, departments were randomly selected;
- Selecting a sufficient number of classes from each department to ensure that there are approximately equal numbers of first, second and third year masters' students, using probability proportional to the size of the total population in graduate students.
- The number of students in the randomly selected chosen classes amounted to 800 across all disciplines. Questionnaires were distributed to those students and 370 valid responses were obtained (a response rate of 46.2%).

Figure 5.3 illustrates the clusters out of which the sample of graduate students was drawn.

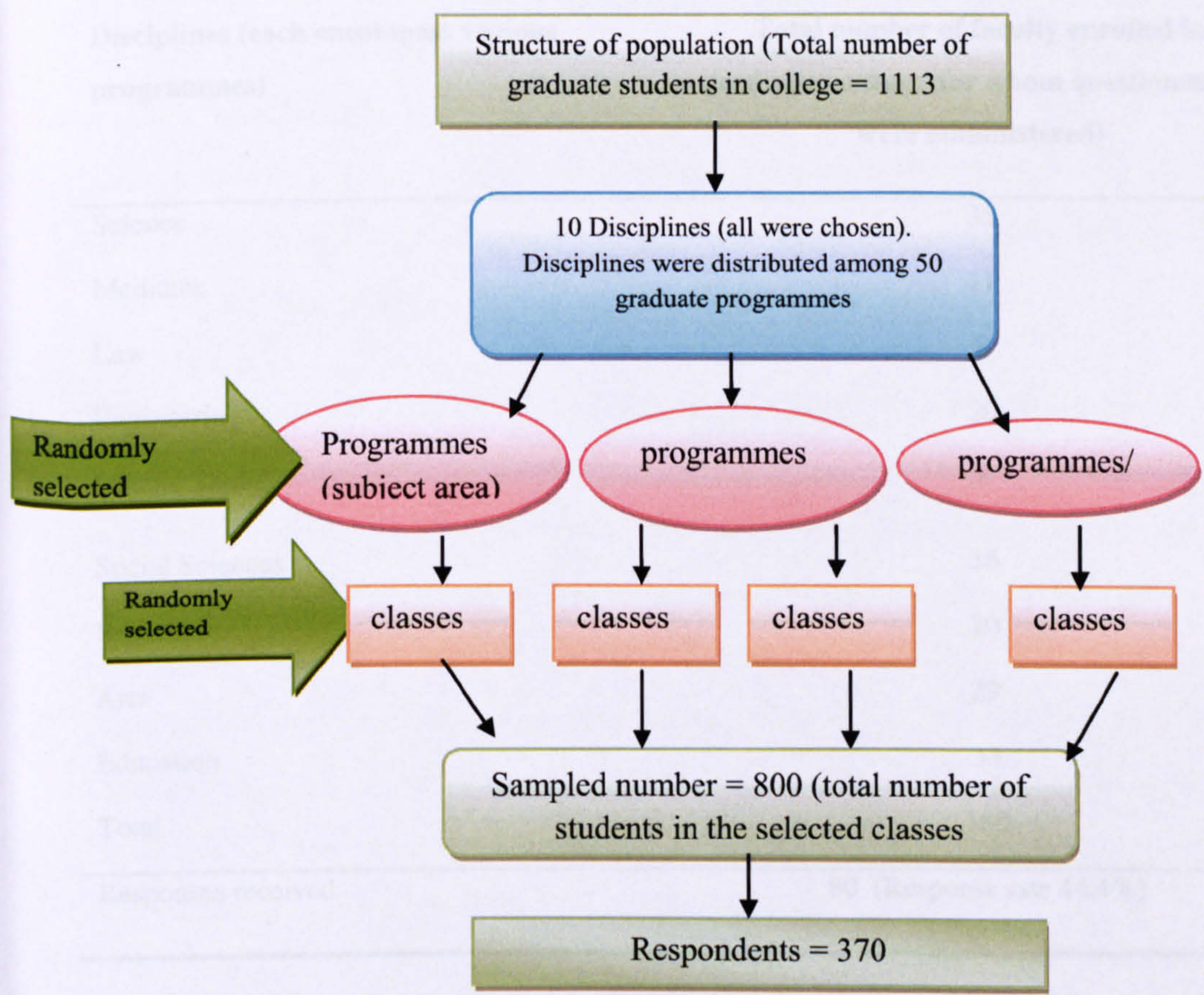


Figure 5.3 Cluster sampling of the graduate students

5.8.2 Sample of Faculty Members and Librarians

The total number of the population of faculty members enrolled in teaching and supervising in graduate programmes was found to be 180 (Records of Graduate College 2007). Therefore, it was decided to administer questionnaires to the whole population in order to get as many responses as possible, taking into consideration the busy schedules of faculty members. Altogether, 80 responses were received. More details on procedures of administrating the questionnaires to faculty members are provided in section 5.9.2, part two. Table 5.9 illustrates the distribution of faculty members among the major disciplines. It should be noted that each discipline encompass various academic programmes.

Table 5.9 Distribution of faculty members among disciplines and response rate

Disciplines (each encompass various programmes)	Total number of faculty enrolled in graduate courses (for whom questionnaires were administered)
Science	35
Medicine	11
Law	8
Engineering	20
Islamic Studies	8
Social Sciences	16
Business	20
Arts	29
Education	33
Total	180
Responses received	80 (Response rate 44.4%)

As for the interviews with faculty members and librarians, purposive sampling was chosen. Due to the necessity to choose only faculty members who were teaching and supervising graduate students, it was not possible to choose the faculty population from a random list of teaching staff. In addition, it was decided to conduct interviews

with senior personnel from the academic library in order to identify their perceptions and attitudes towards the information literacy training offered to graduate students.

In summary, the above discussion has described an appropriate research, strategy and design for the conduct of this research, and has given a justification of the population chosen. The next section describes the methods that were used to collect data.

5.9 Data Collection

This section provides a detailed analysis of the methods and procedures applied to meet the aims and objectives of the research. With regard to the stages of data collection, Tashakkori & Teddlie (1998, pp.47-50) differentiate between two approaches to the use of mixed research methods: the *sequential* mixed methods design, and the *parallel/simultaneous* mixed methods design. In the sequential type, researchers conduct a qualitative phase of a study and then a separate quantitative one, or vice versa. On the other hand, in a simultaneous design researchers attempt to collect quantitative and qualitative data at the same time and analyse it in a complementary manner. The simultaneous design is also referred to as the concurrent procedure, in which researchers integrate the information gained from both research types in the interpretations of the results (Creswell 2003, p.16).

In addition to the sequential and the simultaneous designs, Tashakkori & Teddlie (1998, pp.48-50) refer to the *multilevel* approach common in both quantitative and qualitative types of research, where data from more than one level of organisation or group are used in order to arrive at more comprehensive inferences regarding behaviours and/or events. In multilevel research, it is also possible to collect data quantitatively at one level and qualitatively at another. An example of this would be research in which a survey is conducted with students while principals are interviewed in detail. In that case, the administrative-level qualitative data can be used to enrich the meaning of the student-level data, and vice versa.

Whether the research is cross-sectional or longitudinal, sequential or concurrent, the choice of a particular design depends heavily on the aims and objectives, the environment, the budget, and the timeline for completing the proposed study. In the

following sections, and in light of the discussions above, the specific reasons for the choice of methods employed in this study are set out.

5.9.1 Pre-testing and Pilot Study

According to Neuman (2006, p.191), research reliability can be improved by first using a pilot version of the measure, trying one or more drafts before applying the final version in the actual situation. Pilot studies allow the researcher to determine the adequacy of instructions to respondents completing a self-completion questionnaire, and also show how well the questions flow (Bryman 2004, p.159). For this research, the many drafts were corrected and revised before starting the actual piloting, which was conducted in three main steps. First, an early draft of the students' questionnaire was distributed to 15 graduate students at Loughborough University, from different fields such as Information Science, Computer Science, Social Sciences and Sports. The participants made a number of suggestions to improve the questionnaire, including the need to clarify some of the statements which they found confusing, reducing the number of pages, using a larger font, and adding an open-ended answer for some of the multiple-choice closed questions. All comments were considered when the questionnaire was revised. Six participants provided feedback for the design of the faculty questionnaire, commenting on length and the need to clarify some of the questions, which were found to be vague.

The second stage of piloting was conducted in Kuwait, where the Arabic version of the graduate questionnaire was distributed to 10 graduate students from disciplines such as Arts, Education and Law. This was in order to test the Arabic translation of the questionnaire. Some changes were made, in accordance with the comments received from participants. The third step was to distribute the faculty members' version of the questionnaire to six staff members involved in teaching graduate courses, both in Arabic and in English (Library and Information Science, Mathematics and Computer Science, Psychology, and English Literature). Valuable comments were received from the participants and changes were made before the final version was ready for distribution.

5.9.2 Questionnaire Distribution

Part one: Procedures for conducting the survey of graduate students enrolled in Kuwait University

A permission letter was issued by the Dean of the College of Graduate Studies, allowing the researcher to conduct the survey of graduate students and faculty members. The Dean's letter was distributed to all graduate programmes at Kuwait University. Next, a copy was obtained of the full schedule of the programme, with the list of classes in each department, the number of enrolled students and the names of faculty members teaching the courses. Departments were selected based on the availability of students attending lectures, then classes were chosen randomly. The questionnaire survey was distributed to graduate students in their lectures in order to ensure a high response rate. Being there personally had many advantages, allowing more room to explain the objective of the research and its value to graduate students, and providing the opportunity to answer queries about the survey questions. The survey was also distributed to graduate students during an open day arranged by the College of Graduate Studies, during which students from several programmes gave presentations and showed posters about their Masters' dissertations and doctoral theses.

One of the obstacles which hindered getting a response rate higher than 370 was that many of the students registered in the administration list were not attending lectures, because they had started writing up their dissertations. Some students were abroad because they came from other countries and had completed their classes in Kuwait. Furthermore, few students were actually enrolled in each programme, as many had withdrawn after the first semester or decided to halt their studies. Another major difficulty was related to the venue and timing of lectures, which were all taking place at similar times in the afternoon and evening. Due to the fact that the researcher did the work personally, she had to cancel her attendance at some lectures and rearrange her visits to other departments in order to cover as great a variety of disciplines as possible.

To increase the response rate, the researcher obtained permission from some programmes to attend the last 15 minutes of the final exams and remain in the class. When students handed in their papers, the researcher handed them the survey and

asked them to complete it there and then if possible. The average time students spent in answering the questionnaires was 10-15 minutes. Some students showed interest and enthusiasm about the subject of the research, while others complained that it was long and some parts were difficult. English terms which were difficult were further explained by the researcher. Participation was voluntary; therefore, some participants chose not to complete the survey and left parts of it without answering. This factor hindered a higher response rate.

Part two: Procedures for conducting the survey of faculty members engaged in teaching/supervising graduate students at Kuwait University

Contacts were made with the secretariat of each department offering graduate programmes in order to get a list of faculty members responsible for teaching and supervising students. In total, 180 faculty members were listed as teaching graduate courses. Two copies were left for each faculty member, one with the secretary and another copy in the academic's mailbox. Surveys were given in an envelope, with a request that faculty members hand in the completed surveys to their secretary within two weeks. Follow-up phone calls and personal visits to the secretaries were made. Faculty members were also reminded personally. There were 80 valid responses from faculty members.

Part three: Focus groups with graduate students from various disciplines

The researcher then contacted the administrative authorities in each college to get their permission to book seminar rooms convenient for carrying out the focus groups. The rooms were checked personally for suitability by the researcher. Following the survey, the researcher extracted the names and contact numbers of students who had provided completed questionnaires and contacted each of them by telephone. Students were reminded of the survey and then invited to participate in the focus group discussions. The telephone invitations were followed up immediately by text messages to the students' mobiles confirming the time and venue of the gathering. In order to encourage the students to participate, the text messages mentioned that there would be snacks and that all participants would be entered for a prize draw. Some students showed high interest in the subject and confirmed their attendance, while others apologised for not being able to attend. Four focus group discussions took

place in four different venues, which were chosen in accordance with the students' disciplines.

Part four: Interviews with faculty members

A list of names and contact numbers of those who expressed willingness to participate in interviews was extracted by the researcher. Faculty members were then contacted either personally or through the department's secretariat to arrange a face-to-face interview. Only a few faculties agreed to participate, due to their busy schedules. Eight personal interviews were conducted by the researcher at the offices of the faculty members. The average time for the interview ranged between 30 and 60 minutes.

In order to increase the faculty response to the interview survey, the researcher decided to send the interview questions to the remaining faculty members via an e-mail attachment. All the face-to-face interviews were digitally recorded and then saved as computer documents by the researcher.

Part five: Interviews with librarians working in Kuwait University's library administration

The researcher first conducted a face-to-face interview with the director of Kuwait University's academic library. Because Kuwait University library is not centralised, there are different venues for libraries scattered over various geographic locations. Therefore, the researcher decided that it would be more time-saving to send the interview questions to other librarians by fax. The objectives of the research and the importance of the librarians' contribution to the survey were mentioned in each fax. The librarians were asked to return their answers within one week to the library's administration main office, from where the researcher would collect them. Questions were all in Arabic, which the librarians found easier to comprehend. Ten librarians out of 12 (whom were sent the questions), all senior librarians from the libraries of Education, Social Sciences, Arts, Engineering, Islamic Studies, Law, and Science answered the structured questions and returned them on time. This was the final stage of the data-collection fieldwork.

5.9.3 Focus Group Design

The focus group technique was used in this study to elicit in-depth data from graduate students with regard to the factors influencing their information-seeking behaviour as they engage in academic tasks such as course work, projects, dissertations and theses. This technique was also used to explore the barriers students think are affecting the way they seek for information to meet their academic needs. A homogenous sampling technique was adopted to select the focus groups. According to Onwuegbuzie, Jiao & Bostick (2004, p.124), "Homogenous sampling involves sampling individuals, groups, or settings because they all possess similar attributes or traits. Participants are selected for the study based on membership in a subgroup or unit that has specific characteristics. This approach is often used to select focus groups."

5.9.4 Semi-structured Interviews

Semi-structured interviews were conducted with faculty members to gain in-depth data about the patterns of their information-seeking behaviour and to elicit their attitudes towards the information literacy skills of graduate students. The research plan was to interview faculty members from among the nine faculties representing graduate programmes taught at Kuwait's College of Graduate Studies. The faculties from which respondents were selected were Engineering, Science, Business Administration, Social Sciences, Law, Arts, and Education.

In addition to faculty members, a number of academic librarians were selected purposively for interviews. The aim was to gain in-depth information about the information literacy support provided by the library, problems with subscriptions to online databases, and the librarians' attitudes towards students' use of the available information resources.

5.10 Data Analysis

The analysis of collected data was conducted in different stages. First quantitative data were coded and entered into the Statistical Package for the Social Sciences (SPSS). Prior to the actual analysis, data screening and cleaning was undertaken in order to check for errors where values fell outside the range of possible values for variables. Qualitative data were recorded, transcribed, translated into English, and analysed using qualitative data analysis software, namely ATLAS/ti.

5.10.1 Questionnaire Analysis

The quantitative analysis was based on three main types of statistical tests:
1) Descriptive statistics, 2) Factor analysis, and 3) Logistic Regression. Table 5.9 illustrates the non-parametric tests and the rationale for their use.

Table 5.9 Summary of the statistical tests used in the study

Statistical test	Purpose
Descriptive statistics	To calculate means, frequencies and percentages
Chi-square	To determine the significance of difference between respondents in terms of independent variables with one or more levels of nominal data (e.g. to compare between students' nationality and their perceptions of their library use)
Mann-Whitney <i>U</i> -test	To find out statistically significant differences between two independent groups (males and females). Also used to compare between graduate students and faculty members in terms of the ordinal data related to their information-seeking behaviour.
Kruskal-Wallis	To find out statistical significant differences among the academic disciplines
Fisher's Exact test	To compare the patterns of the information-seeking behaviour of graduate students and their faculty members in terms of categorical data
Factor analysis	To identify clusters of variables that share underlying relationships in two scales: information literacy and library awareness
Logistic regression	To identify variables that significantly contribute to predicting the patterns of information-seeking behaviour of graduate students

5.10.2 Descriptive Statistics

In descriptive statistics, frequencies and mean scores were obtained for the demographic variables and the group of variables included in each dimension of the study's model. In addition, Likert scores were calculated for statements related to information literacy, library awareness and the perceptions of faculty members towards students' information use skills. The scores were calculated by multiplying the number of respondents for each preference with the score for each statement. Table 5.10 illustrates the type of response measured by the seven-point Likert scales.

Table 5. 10 Type of response and the descriptive item used in the scale

Response category		Scale values					
Agreement	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
Satisfaction	Totally dissatisfied	Dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Satisfied	Totally satisfied
Frequency	Never	Rarely	Sometimes	Not v.often	Often	V.often	Always
Perceptions of computer skills	No skills at all	No skills	Slightly not skillful	Neutral	Slightly skillful	Has good skills	Expert
Level of English Language skills	No English at all	poor	Fair	Neutral	Good	Very good	Fluent

Chi Square

Chi-square tests were conducted to test for significant differences among the groups of students classified by gender, age, discipline, and research stage. According to Bryman (2004, p.238), the Chi-square “allows us to establish how confident we can be that there is a relationship between the two variables in the population”. When running the chi-square analysis in this research, some of the expected cell frequencies were lower than five, which could potentially cause problems in the estimation of these tests. That said, it should be noted that a relatively low proportion of the cells had this issue, so the violation of this assumption was not severe.

Factor Analysis

Factor analysis was used as the statistical technique to identify constructs explaining the factors influencing students' information-seeking behaviour. These factors were then classified into the four dimensions defined in the research model: demographics, role-related variables (disciplines), environmental variables, and source characteristics. As mentioned earlier in this chapter, an exploratory factor analysis was conducted to determine the underlying dimensions of the variables in the section measuring information literacy. The scale was tested for its reliability, and the

Cronbach's alpha value was 0.807 for the overall scale. The listwise deletion method was used to exclude respondents who did not check any of the items from the factor analysis. Principal component analysis was employed to extract factors, and four factors were retained by a scree test and Kaiser's criterion (eigenvalue > 1). Statements with the highest loading with a particular factor were grouped under that factor, and those that correlated less than 0.5 with a factor were not loaded.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is a test of the amount of variance within the data that could be explained by factors. As a measure of factorability, a KMO value of 0.5 is poor; 0.6 is acceptable; a value closer to 1 is better. The Bartlett's test indicates that the data is probably factorable if $p < .50$ (Brace, Kemp & Snelgar 2006).

Logistic Regression

Logistic regression is multiple regression, but with an outcome variable that is a categorical dichotomy and predictor variables that are continuous or categorical (Field 2005, p.218). Logistic regression depends on the calculation of the odds (probabilities) of a given case lying in one rather than the other of the two categories of the dependent variable (e.g: yes/no, print/electronic) (Sapsford, 2007, p. 206). The analytic strengths of loglinear analysis are that it works on categorical (nominal) data and that it allows the researcher to test the fit of different hypotheses to the data (Sapsford, p.207). Logistic regression can be used in a wider range of situations than other types of statistical procedures such as discriminate analysis. For example, while discriminate analysis makes assumptions about the predictor variables, including that they should be normally distributed, logistic regression makes no such assumptions (Brace, Kemp, & Snelgar, 2006, p. 275). Logistic regression computes the probability that a case will belong to a particular category.

Logistic regression analysis was conducted using SPSS version 16.0 to identify the key predictors of the information-seeking behaviour of graduate students. The goal of this analysis was to study the associations between each dependent variable representing elements of information-seeking behaviour and all of the independent variables in the study's theoretical model (gender, age, nationality, major, programme requirement, enrolment, stage of study, English proficiency, computer skills, use of study resources, information literacy, and library anxiety).

Because logistic regression produces an overwhelming amount of information and SPSS provides various outputs for the analysis. There are different methods to enter independent variables into the logistic regression model. The default method is “enter”, while other methods include “forward and backward stepwise methods”. These stepwise models offer the opportunity to assess the individual contribution of predictor variables to the -2 log-likelihood scores.

According to Field (2005, p.249), SPSS calculates the change of odds that result from a unit change in any predictor variable. The outcomes explained in the following section were chosen from the regression models that significantly predicted the related outcome variable. In logistic regression, the model that best fits the data is chosen by looking at the drop in the value of the -2 log likelihood and the difference in the percentage of the correctly classified cases to look for improvement in the accuracy of these predictions. The purpose of logistic regression is to examine how the increase or decrease in the odds of the significant independent variables (predictors) is associated with an increase or decrease in the odds of the dependent variable. A value >1 in the odd ratios indicates a positive association, while a value <1 indicates a negative association. The best models from the logistic regressions were chosen based on significant p value <0.05 , a significant Omnibus Test of Model Coefficients, and on the drops in the -2 log likelihood and the percentage of the predicted cases.

On this basis, logistic regression was chosen as the most appropriate statistical technique, in particular because it fits predictor variables that are dichotomous, as in this research where the answers to the Critical Incident Technique questions were binary. It has proven to be a useful statistical test tool in identifying variables that are significantly associated with the patterns of the information-seeking behaviour of graduate students. For the purpose of this study, only the significant outcomes from the analysis on each dependent variable are displayed in the following section. All of the SPSS outputs of the logistic regression are included in an Appendix 8 (A CD is attached).

5.10.2 Qualitative Data Analysis

There were several stages of qualitative data analysis. First, all data obtained from focus group discussions and semi-structured interviews conducted in Arabic were transcribed and translated into English; then final transcripts were uploaded into ATLAS/ti software. The next step was assigning codes to the answers of the questions. Finally, a thematic analysis approach was used to report the results of the qualitative data.

5.11 Reliability and Validity

Sapsford (2007, p.15) defines reliability as “the stability of the measure – the extent to which repeated measurement yields constant results”. Validity, on the other hand, refers to the “issue of whether an indicator (or a set of indicators) that is devised to gauge a concept really measures that concept” (Bryman 2004, p.71). In this research, reliability testing was conducted for both the graduate students’ and the faculty members’ questionnaires. The approach used was to measure internal consistency of the data, which is an appropriate method for scales with Likert scores. Internal consistency was then measured using SPSS by calculating Cronbach’s coefficient alpha. It was found that the overall consistency for the scales used in both questionnaires represented good reliability.

According to Sapsford (2007, p.11) “A research argument is said to be valid to the extent that the conclusions drawn from the data do logically follow from them.” The author refers to three major aspects of validity: *validity of measurement* - the extent to which the data constitute accurate measurements of what is supposed to be being measured; *population validity* – the extent to which the sample gives an accurate representation of the population which it is supposed to represent; and *validity of design* – the extent to which the comparisons being made are appropriate to establish the arguments which rest on them. Part of the validity of measurement is what Bryman (2003, p.73) refers to as *construct validity*, in which the researcher deduces hypotheses from a theory that is relevant to the concept. That approach was adopted in this research. In addition, the likelihood ratio test in logistic regression analysis indicates how well data are predicted by the model. In terms of the validity of design, this research has correlated the quantitative data outcomes to the qualitative ones.

As indicated by Ingwersen & Jarvelin (2005, p.93), the advantage of triangulation or multiple methods is that it allows cross-checking of the results against each other, thus increasing the reliability and validity of the data.

5.12 Ethical Issues

Several ethical issues were considered when planning and implementing this research. Participants were assured that their identities, names and roles would be kept confidential. In addition, the research did not use language or words that are biased against persons because of gender or race. As Creswell (2003, p.67) indicates, “the word “participant” should be used rather than “subject” and physician rather than “woman physician”. Further, the researcher has adhered to the principle of informed consent, whereby research participants understand the purpose of the research, what it is about, the nature of their involvement, and the fact that their participation is voluntary and that they can withdraw from participation in the research at any time (Bryman 2004).

5.13 Summary

This chapter has provided a detailed account of the research design and the data-collection tools used to achieve its aims and objectives and to answer the research questions. As has been discussed above, this study has made use of a mixed quantitative and qualitative data collection method: questionnaire survey, open-ended questions, semi-structured interviews, Critical Incident Technique, and focus groups. The sampling methods used have also been explained, and details of the data collection field work have been given. The chapter has also provided an overview of the quantitative data analysis, which included various tests; and of the qualitative data analysis, which was conducted using a thematic approach.

CHAPTER SIX – ANALYSIS OF THE STUDENTS' QUESTIONNAIRE

6.1 Introduction

This chapter provides a descriptive analysis of the data obtained from the sample of students from Kuwait's College of Graduate Studies. Data analysis was conducted using SPSS for Windows version 15.0. Descriptive statistics (percentages, frequencies, means and standard deviations) were used to describe the main trends and sample distribution. Chi-square tests of independence were performed to determine whether significant relationships exist between the variables. When performing chi-square tests, some of the questions with multiple categories were collapsed into fewer groups based on categorical similarities. Grouping similar categories increases the chance of meeting the test criteria. Chi-square tests that did not meet the test assumptions are not reported in this study.

In order to determine the factors influencing respondents' information literacy and library awareness, an exploratory factor analysis was conducted on the answers to the statements on the information literacy scale and library awareness scale, both of which were based on a seven-point Likert scale. Responses to both scales were subjected to a principle component analysis and a varimax rotation. Factors were retained based on Kaiser's criterion (eigenvalues >1) and a scree plot. In addition, a logistic regression analysis was conducted in order to identify the factors predicting the information-seeking behaviour of graduate students.

6.2 Demographics

Of the 370 graduate students who participated in this research, 248 (67.0%) were female, and 122 were male (33.0%). According to the official records of Kuwait's College of Graduate Studies, out of a total population of 1,113 graduate students, 702 were female compared to 411 male (*Kuwait's College of Graduate Studies* 2007). Figure 6.1 shows a cross-tabulation of age and gender, revealing that the majority of respondents (76.0%) fell within the 20-23 years of age category, whilst less than a quarter (21.1%) were between 31 and 40 years old.

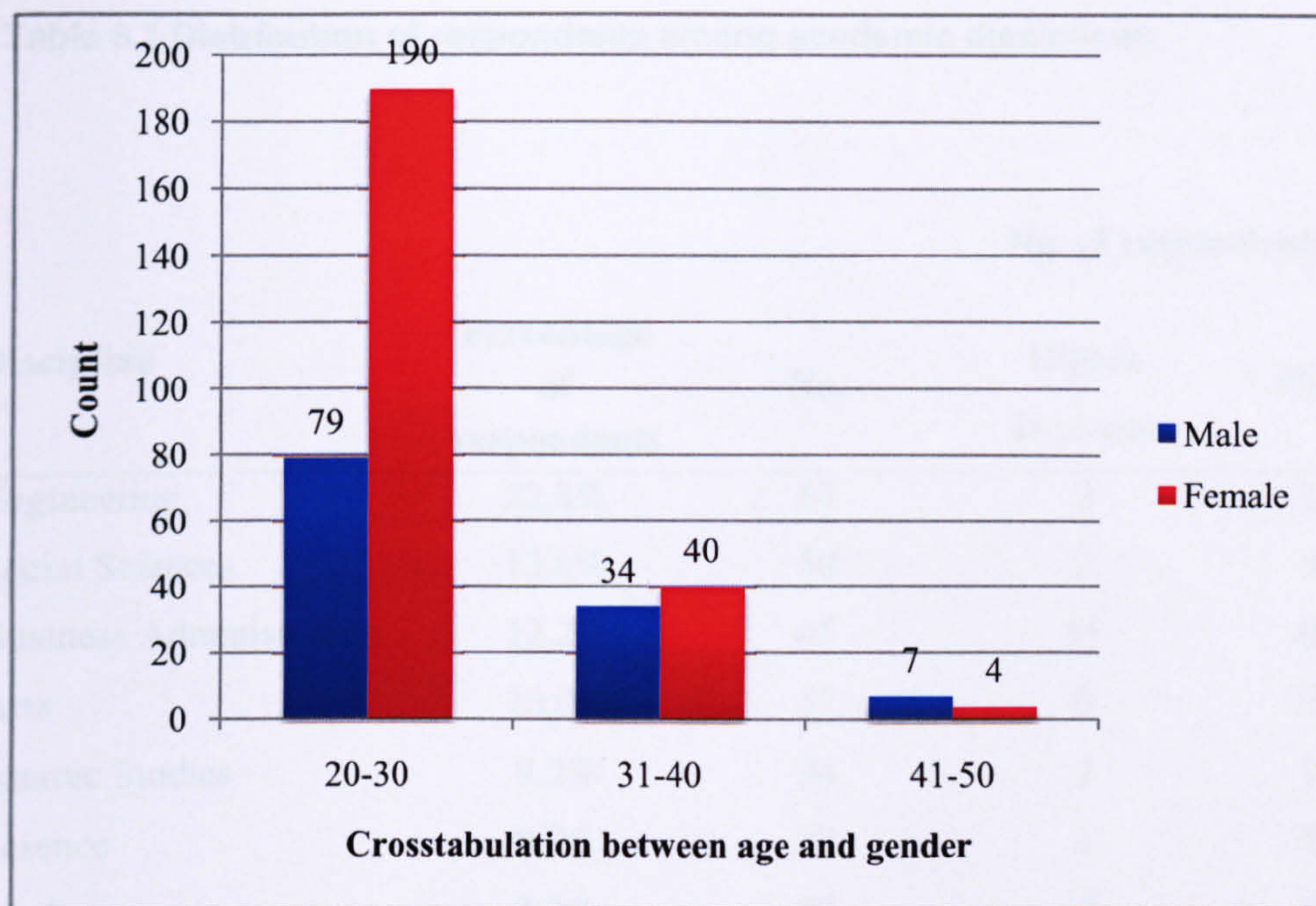


Figure 6.1 Gender and age of graduate students

6.3 Discipline, Degree Sought and Enrolment

In this section, students were asked to provide information on their academic field. Of the 370 respondents, the highest proportion (84; 22.8%) came from Engineering, whilst Law students made up the lowest proportion, with only 15 participants (4.1%). An overwhelming majority (89.0%) of the respondents were studying for a Masters Degree; while 7.0% were enrolled on a Higher Diploma, and 4.3% were studying for a PhD (Table 6.1).

Table 6.1 Distribution of respondents among academic disciplines

Discipline	Percentage of respondents	No.	No. of respondents enrolled at		
			Higher Diploma	PhD	Masters
Engineering	22.8%	84	0	2	84
Social Sciences	13.6%	50	2	0	48
Business Administration	12.2%	45	15	0	30
Arts	10.0%	37	0	2	35
Islamic Studies	9.2%	34	2	1	31
Science	8.9%	33	1	3	29
Medicine	7.3%	27	0	6	21
Education	6.8%	25	0	0	25
Joint Degree	5.1%	19	1	0	18
Law	4.1%	15	3	2	10
Total	100%	369	24	16	331

The low number of PhD students participating in the survey reflects the fact that few students were actually registered as PhD students in the College of Graduate Studies, which was consistent with the figures provided by the Dean’s Office, which only reports the number of Masters students. Those Doctoral students who did respond were recruited during an open day and had finished their theses in the previous six-month period. As shown in Figure 6.2, enrolment was almost equally distributed between part-time (51.8%), and full-time (48.1%) students.

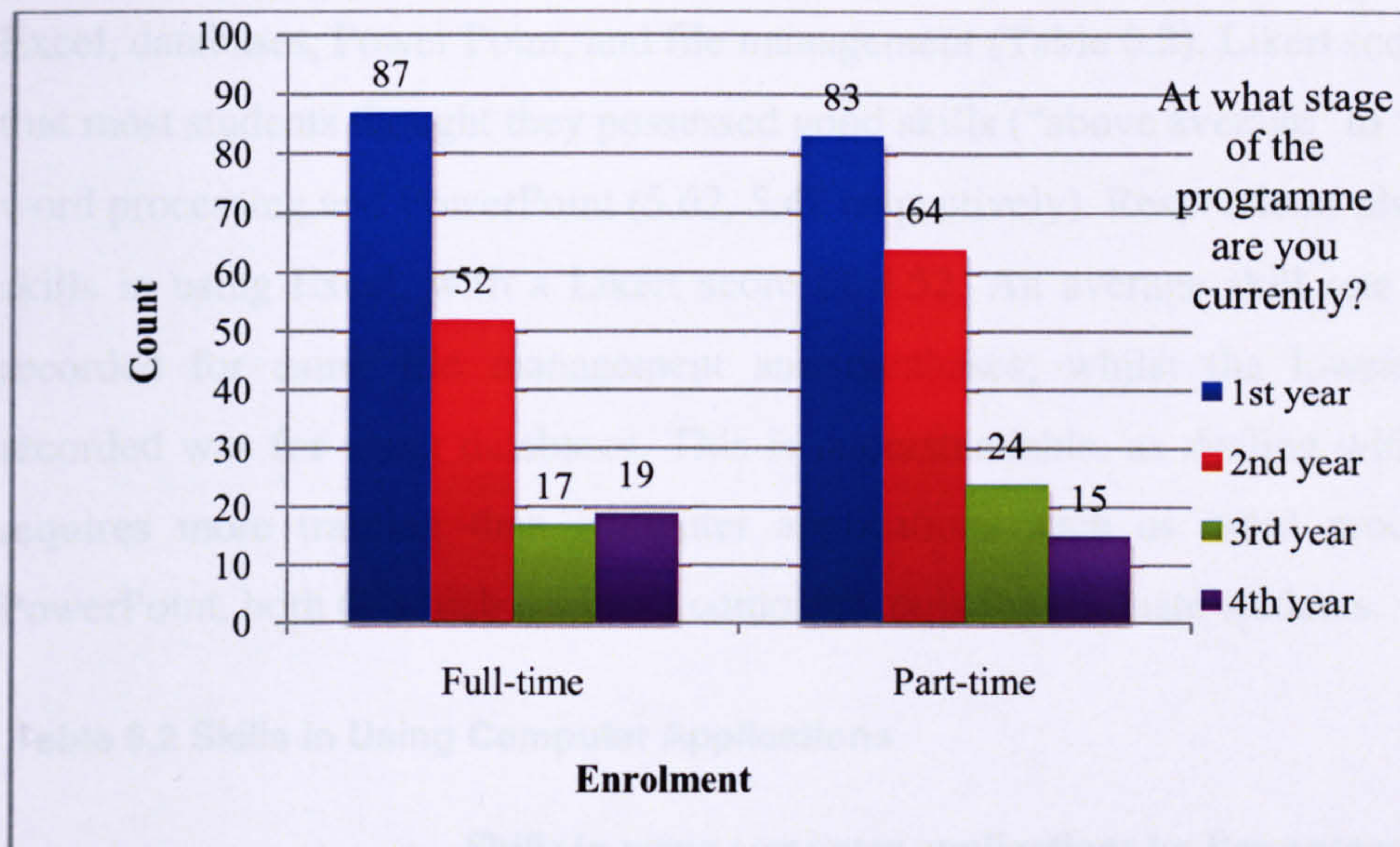


Figure 6.2 Enrolment and year of study

6.4 Nationality

Of the 363 respondents, 82.0% were Kuwaiti citizens. This makes the sample fairly culturally homogenous, which may have an effect on the students' information-seeking behaviour; that is, on the way they use the library and the information resources available to them. However, it should be noted that such cultural homogeneity might imply that Kuwaiti students might act differently in a more heterogeneous sample, even if they were still in Kuwait.

6.5 English Language Proficiency

For English language proficiency, 66.3% of the 365 respondents claimed they had good English skills, ranging from "above average" to "fluent"; compared to 18.0% who thought their English skills were "average", while only 1.1% had no English skills at all. The Likert score of 5.03 indicates that graduate students generally thought that they possessed good English language skills. These results are understandable, since the majority of respondents were from Engineering graduate programmes, which are taught in English.

6.6 Computer Application Skills

Students were asked to rate their computer literacy skills (applications) on a seven-point scale ranging from "no skills at all", through "have some skills", "novice", "average", "above average", "good" to "expert." Applications were word processing,

Excel, databases, Power Point, and file management (Table 6.2). Likert scores showed that most students thought they possessed good skills (“above average” to “expert”) in word processing and PowerPoint (5.62, 5.47 respectively). Respondents also had good skills in using Excel, with a Likert score of 4.52. An average skill rate (4.25) was recorded for using file management and databases; whilst the lowest skill rate recorded was for using databases. This is understandable, as dealing with databases requires more training than computer applications such as word processing and PowerPoint, both of which are basic computer tools for graduate students.

Table 6.2 Skills in Using Computer Applications

Skills in using computer applications by Percentage									
Computer application	No.	Expert	Good	Above average	Average	Novice	some skills	No skills at all	Likert scores
Word Processing	368	30.0	37.2	16.0	7.1	4.3	2.4	3.0	5.62
Power Point	364	31.0	30.5	17.0	10.2	3.6	2.7	5.0	5.47
Excel (spreadsheets)	365	14.2	21.1	20.3	18.1	8.2	9.3	8.8	4.52
File management	363	17.9	16.8	15.4	13.8	10.7	9.1	16.3	4.25
Databases	360	7.8	13.3	19.4	18.9	11.1	10.6	18.9	3.81

6.7 Information Literacy

This section of the questionnaire (Appendix One) was intended to elicit graduate students’ perceptions of their information literacy skills. A self-efficacy scale was adapted from a study conducted by Kurbanoglu, Akkoyunlu and Umay (2006). A seven-point Likert scale was used to measure whether respondents agreed or disagreed with a series of statements, to which the possible responses ranged from “slightly” to “strongly” agree, and from “slightly” to “strongly” disagree. There was also a “neutral” option. The results of calculated Likert scores for the information literacy statements are listed in descending order in Table 6.3.

Table 6.3 Likert scores related to information literacy statements

Statement	Respondents	Likert scores
I feel confident using Internet search tools.	357	5.57
I am confident in selecting information most appropriate to my information needs.	350	5.42
I feel confident in defining the information I need.	359	5.38
I am confident in using different kinds of print sources (e.g. books, encyclopaedias).	353	5.35
I am confident in using many resources at the same time to carry out research.	353	5.32
When I think about electronic information resources, I feel confident.	353	5.31
I am confident in limiting search strategies by subject, language and date.	347	5.24
I am confident about writing a research paper.	355	5.03
I feel confident in limiting search strategies by using keywords and Boolean logic.	350	4.99
I am confident with my ability to evaluate sources from the World Wide Web	354	4.95
I know how to determine the currency of information sources.	347	4.70
I know how to create bibliographic records for different kinds of materials.	352	4.26
I feel anxious when deciding where and how to find the information I need.	356	4.04
I am unsure about how to determine the reliability of information sources.	356	3.86
I am apprehensive about being able to locate resources in the library using the library catalogue.	350	3.79
I am unsure about being able to identify a variety of potential sources of information.	357	3.65

It can be inferred from Table 6.3 that the information literacy statements focus on the following major themes:

- Confidence in initiating search strategies, locating and using information resources;
- Knowledge and confidence with evaluating information resources and presenting the outcomes of information searches;
- Anxiety with the overall information-seeking process.

The calculated Likert scores (ranging from 5.57 to 4.95) showed that the majority of students endorsed the statements related to the first theme. This indicated that respondents were confident with their skills in defining their information needs, selecting the appropriate resources, and then using these resources to fulfil their research aims. However, the Likert scores related to the second category (4.70-4.26) revealed that graduate students had less knowledge on evaluating information resources; for example, how to determine the currency of information resources or how to create bibliographic records. The Likert scores for the third category (4.04-3.65) revealed that a majority of students were confident with identifying various sources of information, using the library catalogue, and determining the reliability of information resources. The following sections provide a detailed descriptive analysis of the information literacy scale. They also report on statistical tests used to determine significant associations between the information literacy statements and other demographic/role-related variables.

To reduce the otherwise considerable length of this chapter, all figures (except those related to Kruskal-Wallis tests, Mann-Whitney U tests, or Factor Analysis) are located in Appendix 7. The appendix also includes some figures, from Figure 6.3 through 6.19, which are referenced but not included here.

6.7.1 Confidence Using Internet Search Engines

The majority of respondents (78.2%) agreed that they were confident about using Internet search engines (“slightly agree” to “strongly agree”). Only 13.7% were neutral; whilst a minority (8.1%) disagreed with this statement (“slightly disagree” to “strongly disagree”, Figure 6.3 in Appendix 7. Based on the results of Mann-Whitney U and Kruskal-Wallis tests, the study found no significant differences between the respondents’ confidence in using Internet search tools according to their gender ($U = 12995$, $p = .238$), , or programme ($\chi^2 = 2.539$, $df = 3$, $p = .468$)*. *Note:Kruska-Wallis tests uses a chi-square statistics. So the chi-square here doesn not refer to the result ofa chi-square test, it refers to the results of Kruskal-Wallis.

6.7.2 Confidence Selecting Appropriate Information

The statement related to confidence in selecting information appropriate to their needs had an agreement response of 76.5%. Only 14.9% were neutral and 8.6% disagreed (Figure 6.4 in Appendix 7). No statistical differences between respondents were found according to gender ($U=1151$, $p=.823$), age ($\chi^2 = 0.007$, $df = 2$, $p = .997$), nationality ($U = 8354$, $p = .500$), enrolment ($U = 14481$, $p = .682$), English language proficiency ($\chi^2 = 12.531$, $df = 6$, $p = .051$), or stage of the programme ($\chi^2 = 4.234$, $df = 3$, $p = .237$).

6.7.3 Confidence Defining Needed Information

Three quarters of the respondents (75.2%) agreed that they were confident about defining the information they needed; 13.6% were neutral and 11.1% disagreed (Figure 6.5 in Appendix), giving a Likert score of 5.38. These results indicate that the majority of graduate students showed positive attitudes about their confidence in defining their information needs.

6.7.4 Confidence Using Printed Sources

The majority of respondents (70.5%) agreed that they were confident in using printed sources. Nearly a fifth (18.4%) were neutral, whilst only 11.0% disagreed (Figure 6.6 in Appendix 7). These results suggest that graduate students were confident with using various types of print information sources. The Mann-Whitney U-test showed that female graduate students were significantly more confident in using print sources (Median = 6, $N=242$) than their male counterparts (Median = 5, $N=121$, $U=11586.000$, $p<0.05$). ($U=11586.000$, $p<0.05$).

6.7.5 Confidence Using Multiple Sources

A majority of respondents (72.5%) expressed confidence in using multiple resources simultaneously to carry out research, while 10.5% disagreed and 16.7% were neutral (Figure 6.7 in Appendix 7). The Likert score of 5.32 indicates that the majority of graduate students were confident using more than one information resource at the same time when carrying out research.

6.7.6 Confidence Using Electronic Information Resources

A majority of the respondents (71.4%) agreed (from “slightly” to strongly”) with the statement “When I think about electronic information resources, I feel confident”, whilst 18.4% were neutral and 10.1% disagreed (Figure 6.8 in Appendix 7), producing a Likert score of 5.31. These results indicate that a majority of graduate students thought they were confident in using electronic information resources.

6.7.7 Confidence Selecting Appropriate Information

Just over two thirds of the respondents (70.0%) agreed with the statement “I am confident with limiting search strategies by subject, language and date”; whilst 17.3% were neutral and just 12.6% disagreed. The Likert score of 5.23 suggests that the respondents felt confident using search strategies by subject, language and date (Figure 6.9 in Appendix 7). When asked about confidence writing a research paper, 66.5% of the respondents agreed with the statement, whilst 13.5% disagreed, giving a Likert score of 5.03. The results suggest that the respondents felt confident with writing research papers.

6.7.8 Confidence Using Search Strategies

Two thirds of the respondents (66.3%) felt confident in limiting searches through the use of keywords and Boolean logic; only 16.9% disagreed with the statement (Figure 6.10), resulting in a Likert score of 5.00. These results suggest that the respondents were confident about using keywords as a strategy to limit their searches. The chi-square test found that respondents for whom a thesis was not required were significantly more likely to feel confident initiating search strategies by using keywords and Boolean logic than were those respondents who did have to write a thesis ($\chi^2=14.822$, $df=6$, $p<0.05$) (Tables 6.4 and 6.5 illustrates cross tabulation and chi-square values for the test conducted between thesis as a requirement or not and responses to confidence using search strategies).

Table 6.4 Cross Tabulation of Thesis as a requirement and responses to confidence using search strategies

	Is thesis required to complete your programme			Total
	yes	no		
Response	1	11	2	13
		5.19%	1.53%	3.79%
	2	15	3	18
		7.08%	2.29%	5.25%
	3	19	8	27
		8.96%	6.11%	7.87%
	4	40	17	57
		18.87%	12.98%	16.62%
	5	43	38	81
		20.28%	29.01%	23.62%
	6	41	38	79
		19.34%	29.01%	23.03%
	7	43	25	68
		20.28%	19.08%	19.83%
Total		212	131	343
		100.00%	100.00%	100.00%

Table 6.5 Results of the Chi-square test for thesis as a requirement and using search strategies

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.822	6	0.021
Likelihood Ratio	15.692	6	0.016
Linear-by-Linear Association	7.164	1	0.007
N of Valid Cases	343		
a	1 cells (7.1%) have expected count less than 5. The minimum expected count is 4.97.		

Although this result is surprising, it can be argued that the difference depends on the subjects and the teaching style adopted. The Mann-Whitney U-test showed that male graduate students were significantly more confident with these search strategies

(Median = 6, N = 114) than their female counterparts (Median = 5, N = 236, $U=11481.000$, $p<0.05$). This indicates that male students are more skilled in search techniques.

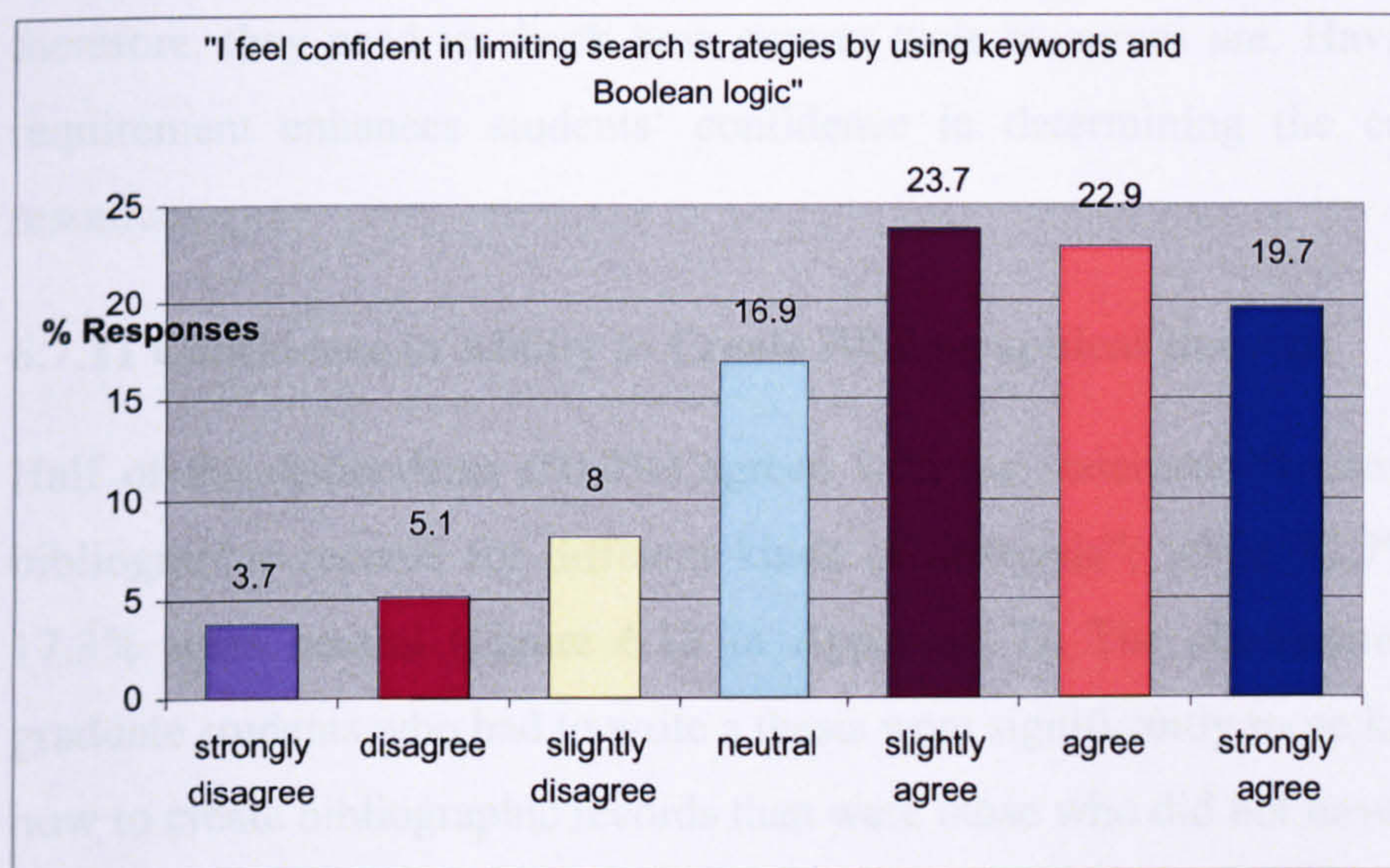


Figure 6.10 Confidence limiting search strategies using keywords & Boolean logic

6.7.9 Confidence in Ability to Evaluate Sources from the World Wide Web

For the statement “I am confident with my ability to evaluate sources from the World Wide Web”, the results (Figure 6.11 in Appendix 7) showed that two thirds (63.8%) agreed, 20.3% were neutral, and 15.8% disagreed. The Likert score of 4.96 indicates that the majority of respondents were positive about having confidence to evaluate sources from the web. A chi-square test showed that part-time graduate students were statistically more likely to feel confident with evaluating sources from the World Wide Web than were full-time students ($\chi^2=12.465$, $df=6$, $p\leq 0.05$). This finding suggests that part-time students have more space and time to thoroughly assess resources from the Internet, whereas full-time students have tight schedules in their programmes. Part-time students spend fewer hours in college and thus they use the Internet more than full-time students, who spend most of their time in college, attending classes and also teaching some classes.

6.7.10 Confidence in Ability to Determine Currency of Information Sources

Just over half of the respondents (56.5%) agreed with the statement “I know how to determine how current the information sources are”; 21.9% were neutral and 21.7% disagreed (Figure 6.12 in Appendix 7). A chi-square test showed that graduate students who had to write a thesis were significantly more confident with determining

the currency of information resources than were those who did not have to write a thesis ($\chi^2=12.918$, $df=6$, $p<0.05$). This indicates that students who are required to write a thesis need to keep up with developments in their research areas, and therefore, they need to check how current their resources are. Having a thesis as a requirement enhances students' confidence in determining the currency of their resources.

6.7.11 Confidence in Ability to Create Bibliographical Records

Half of the respondents (50.0%) agreed with the statement "I know how to create bibliographic records for different kinds of materials"; while 32.7% disagreed and 17.3% were neutral (Figure 6.13 in Appendix 7). The chi-square test found that graduate students who had to write a thesis were significantly more knowledgeable on how to create bibliographic records than were those who did not have to write a thesis ($\chi^2=14.593$, $df=6$, $p<0.05$). This is understandable, as a student who is writing a thesis will keep updating lists of references for their literature review; thus they have more training in creating bibliographic records.

6.7.12 Anxiety about Deciding Where and How to Find Information

Fewer than half of the respondents (44.9%) agreed with the statement "I feel anxious when deciding where and how to find the information I need"; 35.7% disagreed and 19.4% were neutral (Figure 6.14 in Appendix 7). Based on Mann-Whitney and Kruskal-Wallis tests, no statistically significant differences were found among respondents according to age ($\chi^2 = 2.757$, $df = 2$, $p = .252$), gender ($U = 13656$, $p = .717$), nationality ($U = 8817$, $p = .674$), English language proficiency ($\chi^2 = 9.029$, $df = 6$, $p = .172$), or stage of the programme ($\chi^2 = 1.008$, $df = 3$, $p = .799$).

6.7.13 Confidence in Ability to Determine the Reliability of Information Resources

Around one third of the respondents (35.7%) were unsure how to determine the reliability of information resources, whilst 41.2% were sure, and 22.8% were neutral (Figure 6.15 in Appendix 7). The chi-square test showed that graduate students who had to write a thesis were significantly more likely to know how to determine the reliability of information resources than were respondents who did not have to write a

thesis ($\chi^2=17.161$, $df=6$, $p<0.01$). This suggests that having to write a thesis may have a positive influence on students' abilities in evaluating information resources.

6.7.14 Apprehensiveness about Criticising the Quality of Information-seeking Process

Replies to the statement relating to criticising the quality of information seeking process resulted in a Likert score of 3.94, with 39.8% agreeing that they were apprehensive and 33.8% disagreeing, leaving 26.6% neutral (Figure 6.16). Overall this suggests a negative attitude towards the statement. A chi-square test found that graduate students who had to write a thesis were significantly more likely to know how to criticise the quality of their information seeking process and outcomes than those who did not have to write a thesis ($\chi^2=27.680$, $df=6$, $p<0.01$). This result indicates that having to write a thesis may enhance students' critical thinking, as they need to check the quality of their information-seeking process more rigorously than do students who are not required to write a thesis. The Mann-Whitney U-test indicated that males were significantly more apprehensive than females about evaluating their information seeking process ($U=11324.500$, Wilcoxon $W=38819.500$, $Z=-2.083$, $p<0.05$, $n=346$). This result indicates that gender may influence the information-seeking behaviour of students. In the Kuwaiti culture, female students in general tend to spend more time on their studies than males.

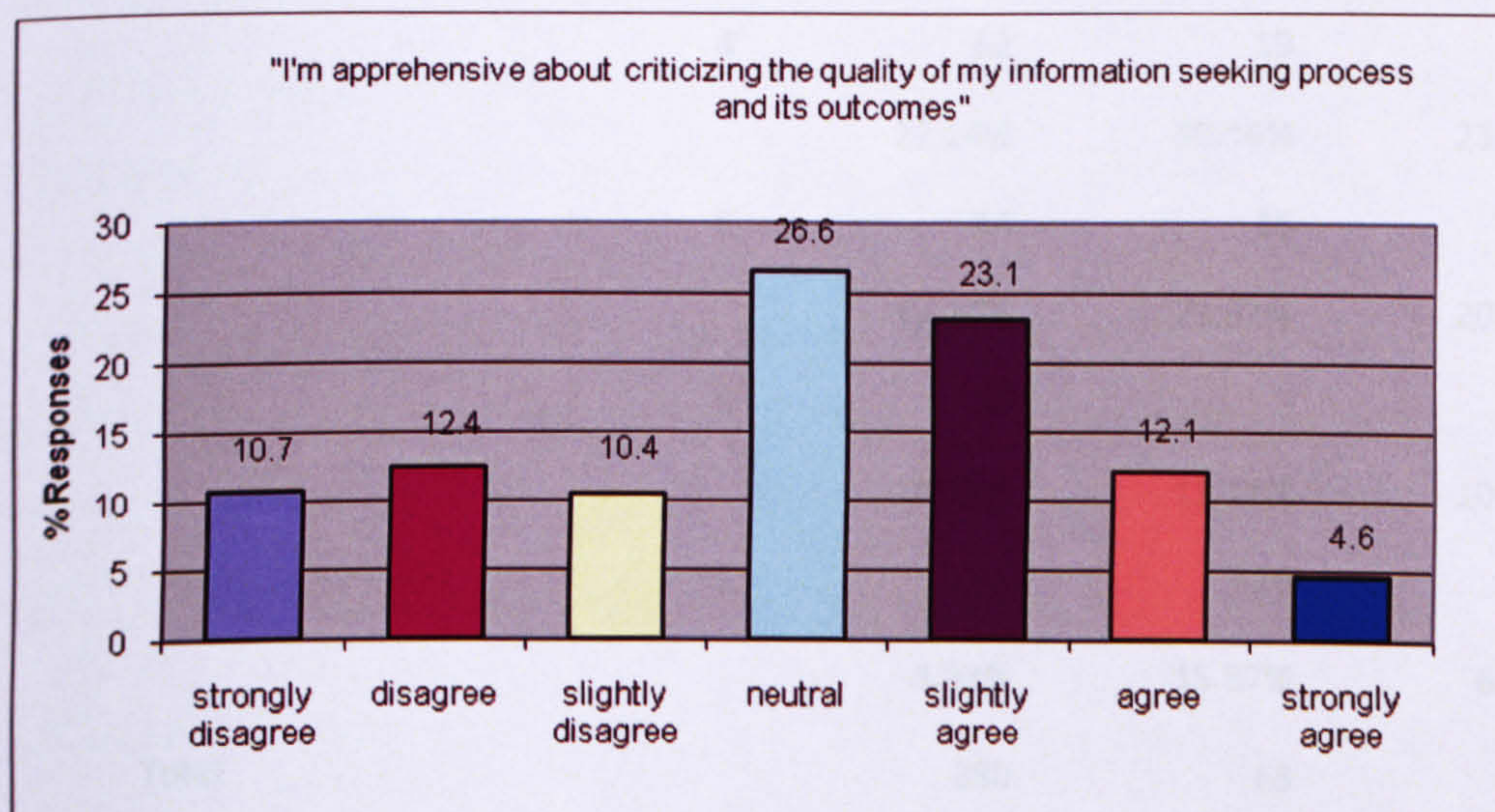


Figure 6.16 Criticising the quality of the information-seeking process

6.7.15 Apprehensiveness about Locating Information Resources in the Library Catalogue

More than a third of respondents (36.9%) were apprehensive about locating information resources using the library catalogue, while 39.2% thought they were able to use the catalogue and the remaining 24.0% were neutral (Figure 6.17 in Appendix 7). A chi-square test showed that graduate students with Kuwaiti nationality were significantly more confident in locating resources using the library catalogue than were students of other nationalities ($x^2=25.522$, $df=6$, $p<0.01$, $n=343$), See Tables 6.6 & 6.7.

Table 6.6 Cross Tabulation between nationality variable and responses to the use of the library catalouge

		Nationality		
		Kuwaiti	Non Kuwaiti	Total
Response	1	55	1	56
		19.64%	1.59%	16.33%
	2	25	3	28
		8.93%	4.76%	8.16%
	3	43	8	51
		15.36%	12.70%	14.87%
	4	62	19	81
		22.14%	30.16%	23.62%
	5	54	15	69
		19.29%	23.81%	20.12%
	6	30	7	37
		10.71%	11.11%	10.79%
	7	11	10	21
		3.93%	15.87%	6.12%
Total		280	63	343
		100.00%	100.00%	100.00%

Table 6.7 Results of the chi-square test.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.522	6	0.000
Likelihood Ratio	28.293	6	0.000
Linear-by-Linear Association	18.769	1	0.000
N of Valid Cases	343		
a	1 cells (7.1%) have expected count less than 5. The minimum expected count is 3.86.		

This result indicates that Kuwaiti students may be much more familiar with their academic library environment than their non-Kuwaiti counterparts, who may have had different experiences with the libraries in their countries. The test also showed that full-time graduate students were significantly more confident with using the library catalogue than part-time students ($x^2=12.838$, $df=6$, $p<0.05$, $n=344$). Full-time students tend to spend more time in college and thus have more opportunities to visit the library and use its facilities; while part-time students come to college only for their lectures, as they have other work responsibilities.

Around one third of the respondents (34.9%) were uncertain about being able to identify a variety of potential sources of information, while 43.6% disagreed with the statement and 21.2% were neutral (Figure 6.19 in Appendix 7). The chi-square test found that graduate students who had to write a thesis were significantly more likely to know how to identify various potential sources of information than those who did not have to write a thesis ($x^2=14.009$, $df=6$, $p<0.05$). This result indicates that having a thesis as a requirement may influence students' abilities in identifying potential sources of information.

6.8 Teaching Style

Graduate students were asked to indicate the extent to which they agreed or disagreed with statements relating to the general teaching styles and methods used in their programmes.

Table 6.8 Teaching styles adopted in graduate programmes

Teaching Approaches	No. of responses	Likert Score
Based largely on individual work	355	5.09
Based largely on traditional lecturing	359	4.79
Based largely on problem solving and critical thinking	359	4.75
Based largely on group work	357	3.98
Based largely on combination of lectures and tutorials	355	3.88
Based largely on lab work and experiments	356	3.27

For most students, the teaching style adopted by their departments was largely based on individual work, traditional lecturing, and problem solving and critical thinking. Group work and a combination of lectures and tutorials also featured heavily. Teaching style based on lab work and experiments was experienced by fewer students.

Two thirds of the respondents (65.9%) agreed that the teaching approach in their programmes was “based largely on individual work”, while just 14.0% disagreed, and 20.0% were neutral, giving a Likert score of 5.10. These results indicate that the majority of graduate students thought the teaching method in their programmes was based largely on individual work. A Kruskal-Wallis test showed a statistically significant difference among the different disciplines in their teaching styles ($p<0.05$). The discipline that relied most heavily on individual work was Arts.

Regarding the statement, “Teaching and learning is based largely on traditional lecturing”, 59.8% agreed, whilst 23.6% disagreed, and 16.4% were neutral. The Likert score of 4.79 shows that the majority of students thought the teaching style in their department was based on traditional lecturing. When asked whether the teaching style was based largely on problem solving and critical thinking, 58.2% of the respondents agreed while 23.4% disagreed and 18.3% were neutral. The Likert score of 4.75 indicates that students were uncertain whether the teaching and learning was based largely on problem solving and critical thinking. These results indicate that the majority of students are accustomed to traditional lecturing more than critical thinking and problem solving.

Students were also asked whether they thought that the learning style was based on group work. Fewer than half of the respondents (46.2%) agreed with this statement, while 39.7% disagreed, and 14.0% were neutral. The Likert score of 3.99 indicates that students were roughly equally divided between those who agreed and disagreed that the teaching style was based largely on group work.

Fewer than half the students (43.6%) agreed that teaching style in their departments was “based on a combination of lectures and tutorials”, while 40.2% disagreed, and 16.0% reported neutral attitudes. The Likert score of 3.87 shows that students were uncertain whether their teaching and learning style was based on lectures and tutorials.

Around a third of respondents (33.9%) agreed the teaching and learning on their course were based on lab work and experiments, while 54.2% disagreed, and 11.8% were neutral. The Likert score of 3.26 indicates that a teaching style based largely on lab work and experiments was the least common approach among the graduate teaching programmes.

6.9 Role of Teachers/Supervisors

When considering the role of teaching staff, most students thought their teachers offered guidance on how to conduct a literature review, laid the foundations for their research work, and guided them on how to use information resources. Students also reported that teaching staff recommended journals and papers by noted authors. Fewer students thought supervisors and teachers assigned projects that required using information resources that were available in the library (see Table 6.9).

Table 6.9 Role of supervisors/teachers on graduate programmes

Role of supervisors/teachers	No. of responses	Likert Scores
Offer guidance on how to conduct literature searches	359	4.96
Lay down the foundation for my research work	360	4.93
Guidance on how to use information resources	358	4.84
Recommend journals and papers of their own and of noted authors	356	4.71
Assign projects that require using information resources available in the library	359	4.68

Students were first asked whether they thought their supervisors or teachers offer guidance on how to conduct literature reviews. Around two thirds (66.3%) agreed that their teachers play such a role, while 20.6% disagreed, and 13.0% were neutral. The Likert score of 4.96 indicates that the majority of graduate students thought their supervisors and teachers did offer guidance on how to carry out literature searches. With regard to the teachers’ role in laying down the foundation for the students’ research work, 63.0% agreed that teachers play this role, while 18.0% disagreed and 18.0% were neutral. The Likert score of 4.93 indicates that the majority of graduate students thought their teachers helped develop the foundations of their research.

For the statement concerning whether or not teachers “offer guidance on how to use information resources”, two thirds of the respondents (60.0%) agreed that teachers play that role, while less than a quarter (23.4%) disagreed and 16.2% were neutral. The Likert score of 4.84 suggests that the majority of graduate students thought their teachers did offer guidance on how to use information resources.

More than half the students (57.0%) agreed with the statement that teachers offer guidance by “recommending journals and papers of their own and of noted authors”, while 23.8% disagreed, and 19.1% were neutral. The Likert score of 4.71 shows that the majority of graduate students thought their teachers played a role in guiding their studies by passing on journals of their own and of other authors.

Students were also asked about their attitude towards the statement that teachers offered guidance by “assigning projects that require use of information resources available in the library”. For this statement, 58% agreed while 26.7% disagreed and

15.3% remained neutral. The Likert score of 4.68 indicates that the majority of graduate students thought that their teachers assigned projects that require using resources from the library.

6.10 Library Awareness

A seven-point Likert library awareness scale, a modified version of the scale developed and verified by Kampen (2004), was used to measure students’ perceptions of library use. Statements are listed in descending order according to the Likert scores recorded (Table 6.10).

Table 6.10 Library awareness scale

Library awareness statements	No. of responses	Likert scores
The library should provide more services for Masters and Doctoral students.	363	5.81
I understand how to begin my research in the library.	363	4.87
I'm aware that the library offers online search services for graduate students.	362	4.73
I would rather use the library online.	359	4.59
The library is easy to use.	363	4.47
I know what resources are available in the library.	366	4.40
I can usually find the resources I need in the library.	363	4.34
My knowledge of the library is limited to my area of interest.	362	4.34
The library's resources for my area of interest are satisfactory.	360	4.21
In general, I think my ability to use the library has had a negative effect on my research.	362	4.17
I am comfortable using the computers inside the library.	352	3.96
I can use interlibrary loans for access to materials not in my library.	358	3.84
It is difficult to locate materials I need in the library.	362	3.82
I am uncomfortable using the library's online catalogue.	357	3.54
I am uncomfortable using the library's website.	355	3.52
The library offers enough information skills training sessions for graduate students.	359	2.94

The Likert scores showed that, on average, graduate students were neutral towards most of the statements on library awareness (4.59 - 4.17). These statements covered ease of use of the library, knowledge of the available resources, use of computers in the library and use of the library's website and the online catalogue. Despite such neutral attitudes, the majority strongly endorsed the need for the library to offer more

services for graduate students (5.81); and also strongly agreed that the library was not offering adequate information skills training sessions for Masters and Doctoral students (2.94). The following section provides a detailed descriptive analysis of the library awareness statements, where agreement and disagreement range from “slightly” to “strongly”.

Some of the figures referred to in the following section (Figure 6.18 through Figure 6.32) are located in Appendix Two, for reasons of space conservation. The pertinent data from these figures are analysed in the text.

6.10.1 Perceptions about Library Services

The majority (79.9%) of respondents endorsed the statement “The library should provide more services for Masters and Doctoral students”, while 8.0% disagreed and 12.1% were neutral (Figure 6.18), resulting in a Likert score of 5.81. This suggests agreement among students that the library should provide more services for graduate students. A Mann-Whitney U-test showed that female students were significantly more likely to agree that the library ought to provide more services for graduate students (Median=7, N=241) than males (Median = 6, N = 121, U=11994.000, $p < 0.05$). These results suggest a more positive attitude by female students toward what the library offers, which might indicate that they make more use of library services than do their male counterparts.

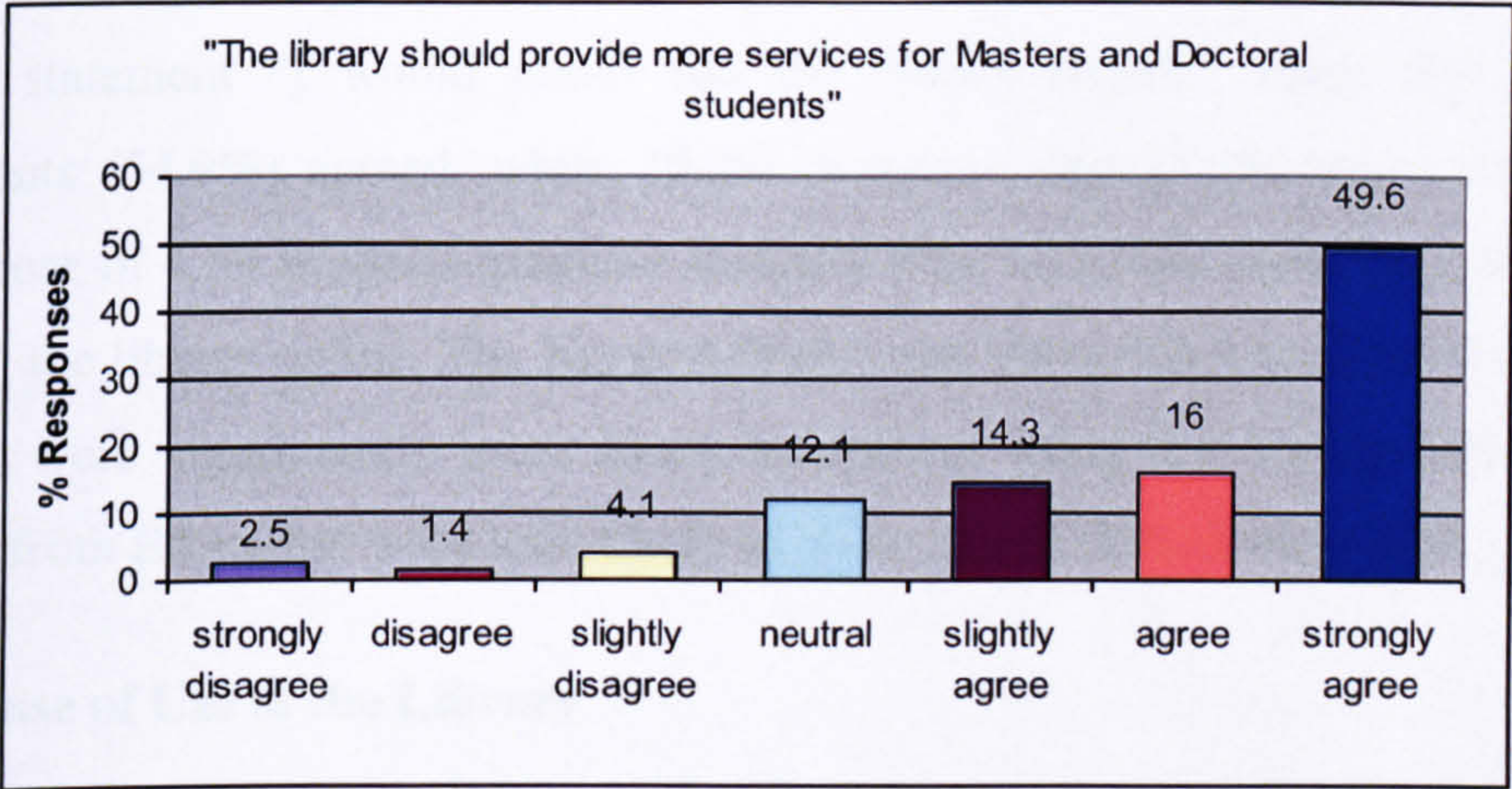


Figure 6.18 The library providing more services for graduate students

With regard to disciplinary differences, the Kruskal-Wallis test showed that students from Islamic Studies were statistically more likely than students from any other discipline to agree that the library should provide more services for graduate students; whereas Business Administration students were significantly least likely to agree with the statement ($\chi^2=30.366$, $df=9$, $p<0.01$). These results suggest that students from Business Administration are satisfied with the services offered by the library.

6.10.2 Understanding of How to Use the Library for Research

For the statement “I understand how to begin my research in the library”, 59.5% agreed, while 19.3% disagreed and 21.2% were neutral (Figure 6.21 in Appendix 7). The Likert score of 4.87 suggests that graduate students know how to begin their research in the library.

6.10.3 Awareness of the Library’s Search Services

Just under two thirds of respondents (60.6%) agreed that they were aware of the online search services offered by the library for graduate students, while 26.6% disagreed (Figure 6.22 in Appendix 7) and 13.0% were neutral, resulting in a Likert score of 4.73. This suggests that graduate students were aware of the library’s online search services.

6.10.4 Usage of the Library Online

For the statement “I would rather use the library online”, more than half the respondents (54.9%) agreed, while 29.2% disagreed and 15.9% were neutral. The Likert score of 4.59 suggests graduate students were uncertain about their preference for using the library online. The Kruskal-Wallis test showed that students from Social Sciences were significantly more likely to endorse using the library online; while students from Education were least likely to do so ($\chi^2=26.396$, $df=9$, $p<0.01$).

6.10.5 Ease of Use of the Library

Almost half of the respondents (48.5%) agreed with the statement “The library is easy to use”, whereas 23.4% disagreed and less than a third (28.1%) remained neutral (Figure 6.23 in Appendix 7). A Likert score of 4.47 suggests the majority of respondents were uncertain about their ease in using the library.

6.10.6 Knowledge of Resources Available in the Library

For the statement “I know what resources are available in the library”, half the respondents (51.6%) agreed, while 29.6% disagreed, with 18.9% remaining neutral (Figure 6.24 in Appendix 7). The Likert score of 4.40 suggests that graduate students were neutral about the resources available in the library.

6.10.7 Ability to Locate Resources in the Library

Half the respondents (50.2%) agreed that they could locate the resources they needed in the library, while 28.7% disagreed and 21.2% were neutral. The Likert score of 4.34 suggests that respondents were not sure whether they were able to locate the resources they needed in the library. The statement “My knowledge of the library is limited to my area of interest”, was endorsed by 48.1% of respondents; while 33.4% disagreed and 18.5% neither agreed nor disagreed (Figure 6.26 in Appendix 7). The Likert score of 4.34 suggests uncertainty among graduate students about whether their knowledge of the library was limited to their area of interest.

6.10.8 Satisfaction with Library Resources

Students were also asked about their satisfaction with the library’s resources in their area of interest. Fewer than half (44.2%) agreed with the statement, while one third (31.4%) disagreed and 24.4% were neutral (Figure 6.27 in Appendix 7), producing a Likert score of 4.21. These results suggest that graduate students were uncertain about whether they were satisfied with the resources available in the library.

6.10.9 Impact of Ability to Use the Library on Students’ Research

For the statement “In general, I think my ability to use the library has had a negative effect on my research”, a quarter of the respondents (26.8%) agreed while 55.8% disagreed and 17.4% were neutral (Figure 6.26). The Likert score of 4.17 suggests graduate students were not sure whether their ability to use the library has had a negative effect on their research. The Kruskal-Wallis test showed that Law students were significantly more likely to agree that the library had a negative effect on their research; while students from Islamic studies reported the lowest agreement rate among other disciplines ($X^2=30.317$, $df=9$, $p<0.01$).

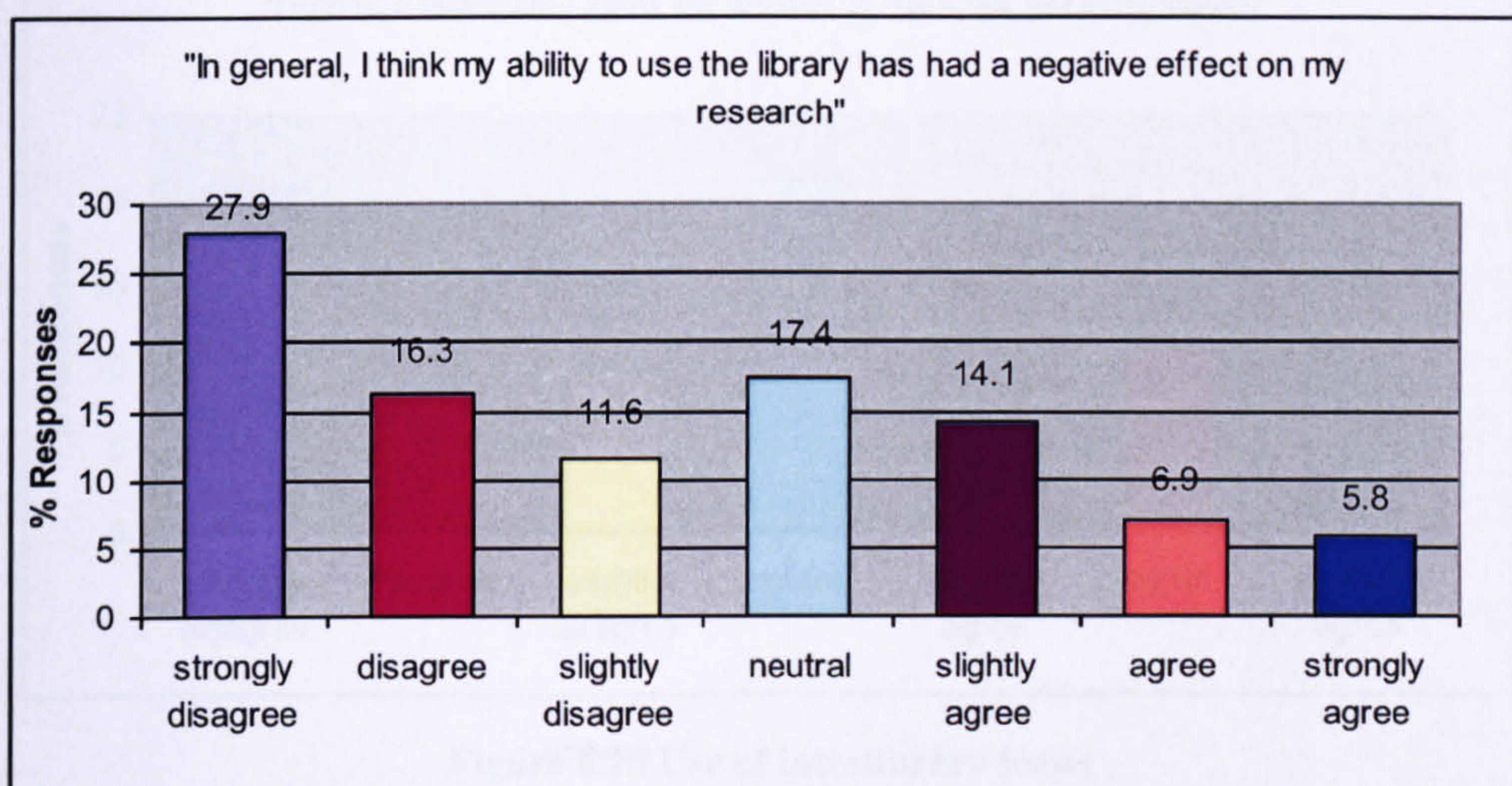


Figure 6.26 Library's effect on students' research

6.10.10 Usage of the Computers in the Library

When asked whether they were “comfortable using the computers inside the library”, 42.1% agreed, whilst a similar number, 41.4%, disagreed, and 16.5% were neutral (Figure 6.30 in Appendix 7). The Likert score of 3.96 suggests the majority of graduate students were neutral about whether they were comfortable with using the computers in the library. The Kruskal-Wallis test showed that Science students were statistically significantly the most comfortable in using the computers in the library among other disciplines; whereas Arts students were the least comfortable ($\chi^2=24.570$, $df=9$, $p<0.01$).

6.10.11 Access to Interlibrary Loans Service

When asked whether they had access to interlibrary loans, around 40.0% of respondents agreed that they were able to make use of the service, while 39.2% disagreed and 20.9% were neutral (Figure 6.28). The Likert score of 3.84 suggests that graduate students were almost equally divided between those who thought they could use interlibrary loans and those who thought they could not use the service. The Chi-square test showed that female students were significantly more likely than males to use interlibrary loan services ($\chi^2=5.029$, $df=1$, $p<0.05$).

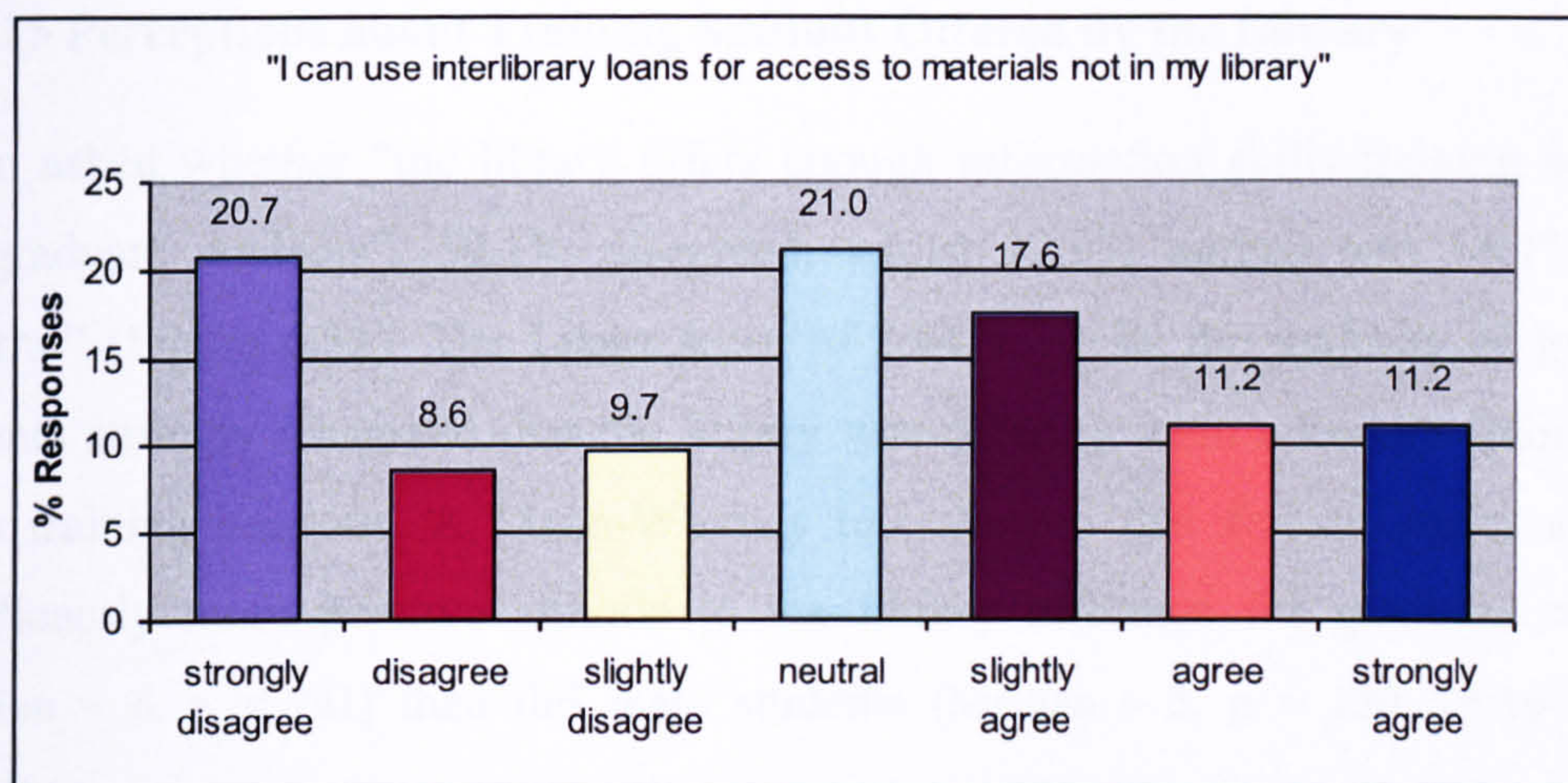


Figure 6.28 Use of interlibrary loans

6.10.12 Access to Materials in the Library

Just over a third (36.7%) of respondents agreed that it was difficult to locate the materials they need in the library, while 38.7% disagreed and almost a quarter of respondents (24.6%) were neutral (Figure 6.32 in Appendix 7). The Likert score of 3.82 suggests that the majority of graduate students were uncertain about the difficulty of locating the materials they needed in the library.

6.10.13 Ease of Use of the Library's Online Catalogue

For the statement "I am uncomfortable using the library's online catalogue", 30.5% of the respondents agreed whereas almost half (48.7%) disagreed, and 20.7% were neutral (Figure 6.33 in Appendix 7), resulting in a Likert score of 3.54. These results suggest that graduate students were neutral towards their level of comfort with using the library's online catalogue.

6.10.14 Ease of Use of Library's Website

One third (29.3%) of respondents agreed with the statement "I am uncomfortable using the library's website", while half (49.9%) disagreed and 20.8% were neutral, giving a Likert score of 3.52. This result suggests that graduate students were not really comfortable using the library website.

6.10.15 Perceptions about Training Sessions Offered by the Library

When asked whether “the library offers enough information skills training sessions for graduate students”, 59.1% disagreed, whilst 22.9% agreed and 18.1% were “neutral” (Figure 6.31). The Likert score of 2.94 suggests the majority of graduate students strongly disagreed that the library was offering them adequate information skills training sessions. A Mann-Whitney test showed that female students had a significantly more positive attitude to the library offerings for graduate students (Median = 6, n = 241) than did male students (Median = 5, n = 120, U=10602.000, $p<0.01$).

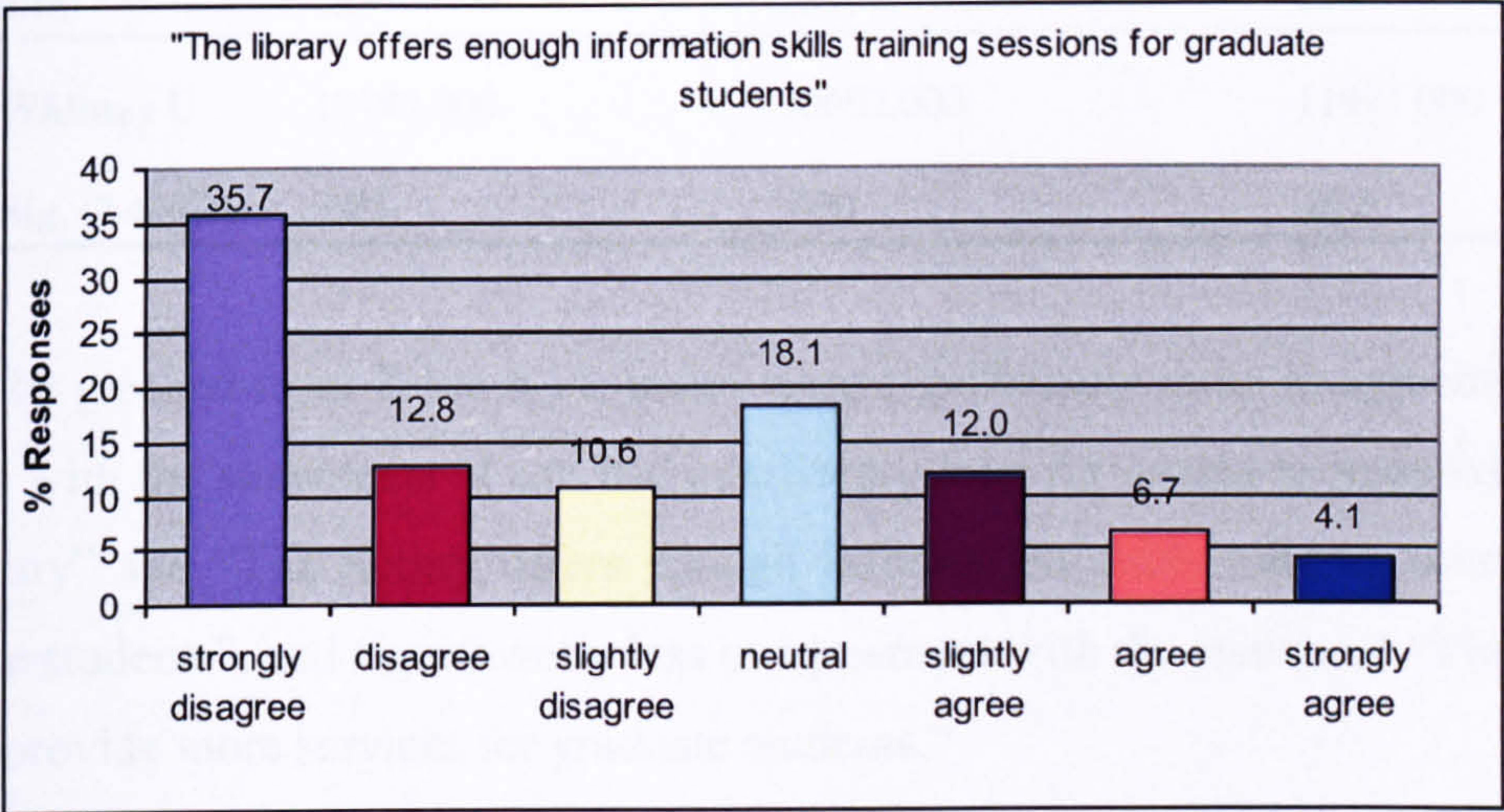


Figure 6.31 Library’s offers of information skill training sessions

Table 6.11 Mann-Whitney test for gender differences against library awareness

Mann-Whitney Test	Library awareness' statements		
	I can use interlibrary loan for access to materials not in the library	The library offers enough information skills training sessions for graduate students	“The library should provide more services for graduate students”
Median (males)	4	4	6
N (males)	117	117	117
Median (females)	3	2	7
N (females)	233	233	233
Mann-Whitney U	12181.000	10602.000	11994.000
Asym. Sig. (2-tailed)	.025	.000	.002

As can be gleaned from Table 6.11, males were significantly more in agreement than females with the statements “I can use interlibrary loan for access to materials not in the library” and “The library offers enough information skills training sessions for graduate students”, and significantly less in agreement with the statement “The library should provide more services for graduate students.”

The Kruskal-Wallis test showed that students from Medicine were significantly more likely to have a positive attitude than students from other disciplines towards what the library offers; whilst respondents from Islamic Studies showed a negative attitude, as they thought the library was not offering enough information skills for students ($x^2=30.317$, $df=9$, $p<0.01$), See Table 6.8. The medians for each discipline for the responses to the statements presented in Table 6.12 are presented in Appendix 8.

Table 6.12 Kruskal Wallis test results for majors against library awareness

Library awareness statements	Asymp.Sig	Chi-Square
Awareness that the library offers online search services for graduate students	.000	29.720
Understanding how to begin research in the library	.035	18.020
Feeling overwhelmed when using the library	.000	35.428
Comfort with using the computers inside the library	.003	24.570
The library providing more services for graduate students	.000	30.366
The library offering enough information skills training sessions for graduate students	.000	57.679
Preference to use the library online	.002	26.396
Negative effect of using the library on students' research	.000	30.317

6.11 Frequency of Use of Information Resources

In this section, graduate students were asked to indicate the frequency with which they use electronic and print resources. They were asked to choose from a seven-point Likert scale ranging from “never” to “always”. Table 6.13 illustrates frequency reports and Likert scores in descending order. For most respondents, the World Wide Web and search engines (e.g. Google) were the most frequently used information resources. Dissertations, theses and printed books also featured highly. Online databases and e-journals were reported as having an average use rate, whereas CD-ROMs were the least frequently used medium.

Table 6.13 Frequencies of using information resources

Frequencies of using information resources (percentages)

Information resources	No.	Alwa ys	Very frequent ly	Frequen tly	Occasion ally	Rarely	Very rarely	Never	Likert scores
World Wide Web	359	52.3	16.4	14.2	9.1	3.9	1.9	1.9	5.91
Search engines	361	45.1	23.2	13.0	8.0	3.6	4.4	2.4	5.75
Dissertations and theses	362	24.4	24.5	21.2	12.9	7.1	6.3	3.3	5.14
Books	363	24.0	24.5	21.5	13.2	7.2	6.3	3.3	5.13
Online databases	354	16.1	22.0	18.9	15.5	8.2	8.5	10.7	4.54
E-journals	357	14.5	18.2	20.4	15.6	11.2	9.8	10.0	4.39
CD-ROM	355	5.9	11.5	12.9	12.6	12.1	17.4	27.3	3.26

A Kruskal-Wallis test was conducted to find out whether there were significant differences between academic majors in terms of using the World Wide Web, search engines, electronic journals, dissertations, theses, books and online databases. Results revealed significant differences among the ten disciplines in terms of frequency of using the World Wide Web, search engines, e-journals and books (see Table 6.14); these differences are explained below the table.

Table 6.14 Disciplinary differences in using information resources

Disciplines	Theses/ dissertations	No	Books	No	E-journals	No	Search Eng.	No	The WWW	No
Medicine	189.13	27	181.28	27	261.96	26	202.80	27	171.96	26
Engineering	153.73	79	165.67	81	202.22	80	193.95	82	187.15	82
Science	180.88	32	198.69	32	206.58	31	195.26	31	188.52	32
Business Administration	164.17	46	148.11	45	184.76	44	214.32	44	207.14	45
Arts	184.29	38	216.50	38	153.71	38	161.72	37	174.26	37
Law	235.96	14	178.82	14	139.15	13	144.54	14	140.32	14
Social Sciences	156.77	49	161.32	49	192.95	50	192.40	49	205.29	48
Education	244.82	25	182.62	25	147.30	25	165.84	25	152.79	24
Islamic Studies	206.29	33	228.26	33	73.77	32	120.79	33	125.52	32
Joint Degree	220.82	19	210.34	19	168.92	18	153.26	19	184.18	19
Total		362		363		357		361		359

Kruskal-Wallis test results (Mean ranks recorded for using the information resources)

For both the World Wide Web and search engines, the test results showed that Business Administration students were significantly the most frequent users among other disciplines; whereas students of Islamic Studies were the least frequent users of the web. This might be because graduate students from Islamic Studies largely depend on printed books for their studies. In addition, the curriculum in that programme is taught in Arabic, and there are not adequate reliable web sources in this language. The test also showed that Medicine students were significantly the most frequent users of electronic journals among the disciplines; whilst Islamic Studies again reported the lowest agreement rate ($\chi^2=26.788$, $df=9$, $p<0.05$). This might be related to the nature of study in the College of Medicine, which requires that students keep up-to-date with advancements in the field.

The test showed that Islamic Studies students were significantly the most frequent users of books as an information resource, whilst Business Administration students were the least frequent users. For dissertations and theses, the test showed that Education students were significantly the most frequent users, while Engineering students used this resource least often ($\chi^2=22.210$, $df=9$, $p<0.05$). These results indicate that Arts students rely heavily on using print resources.

6.12 Factors Influencing the Information-seeking Behaviour

Students were asked about their perceptions of the influence of a list of factors related to their search and use of information resources, particularly electronic ones. They were asked to choose from a seven-point Likert scale, ranging from “not at all influenced” to “extremely influenced”. Reviewing the Likert scores of each factor in descending order, the most influential factors were access to the Internet, computers and printers (Likert scores 5.55-5.30). Computing skills and English language skills were also reported by a majority of respondents as being influential (5.24-4.93). Less influential factors were related to the use of interlibrary loans (3.82), (see Table 6.15).

Table 6.15 Factors influencing the information-seeking behaviour of students

Factors	No.	Extremely influenced	Influence d	Slightly influenced	Neutral	Slightly not influenc ed	Not influenc ed	Not at all influe nced	Likert Scores
Access to the Internet	366	44.7	16.9	14.5	9.6	5.2	3.6	5.5	5.55
Access to computers	366	40.2	19.7	13.9	12.8	4.8	3.3	5.2	5.48
Access to printers	361	31.0	21.1	21.1	13.6	5.3	2.2	5.7	5.30
Computing skills	359	32.9	22.6	15.6	12.8	5.0	3.9	7.2	5.24
English language skills	365	33.4	21.4	14.8	14.0	5.7	3.6	7.1	5.22
The need for password	363	28.4	13.2	19.6	18.5	8.3	5.2	6.8	4.93
Interlibrary loan	353	13.0	12.2	15.0	19.8	10.0	5.4	24.6	3.82

6.13 Patterns of the Information-seeking Behaviour of Graduate Students

The term “information-seeking behaviour” covers a broad range of activities. For this study, the researcher has broken the process into three non-linear methods: initiating search strategies, searching and locating. Using the Critical Incident Technique, students were asked to recall a recent incident when they needed information that required the use of a networked computer and Internet connection (see part 2, questions 11-19 in the students’ questionnaire, Appendix 1). The three methods are discussed in the following sections.

6.13.1 Initiating Search Strategies

Students were asked first about the purpose of their search for a particular incident. Results showed that the majority of respondents (69.2%) indicated that their main purpose for the search was to complete coursework. Those who said that term papers were the main reason for their search constituted 42.4%, while 20.0% said that they searched for the information to complete a comprehensive exam that they have to pass after two semesters in their graduate programmes, while 10.3% reported other reasons, including assisting other students, writing research papers, looking for primary resources related to a thesis or dissertation, and browsing for general

information (Table 6.16 - responses may not add up to 100% because these were all multiple choice questions).

Table 6.16 Graduates' reasons for seeking information

Purpose (multiple responses allowed)	Percentage of respondents	No.
Completing course work	69.2%	256
Term papers	42.4%	157
Comprehensive exam	19.5%	72
Other	10.3%	38

6.13.2 Searching for information

With regard to the sources used in the search, 322 respondents of the total 370 (87.0%) noted that they used search engines to look for the information. Almost half of all respondents (47.8%) indicated using electronic journals, followed by 43.8% who used the library's online databases. More than one third of the participants (139; 37.6%) reported using the university library website. A quarter of the respondents (24.9%) revealed that they used personal contacts in searching for information. Very few respondents (6.8%) chose "other resources" (Table 6.17). Asked about any computer or network problems faced while doing the search, two thirds of the respondents (60.9%) stated that they had faced problems, while 39.0% noted that they had not had any computer or network problems. The other problems elicited from students were:

- Access to the Internet;
- Slow speed of downloading files;
- Weak signals for Internet connection;
- Problems with printing;
- Difficulty in accessing some websites;
- Viruses;
- Lack of databases for Arabic sources;
- Failure with connections to databases in other universities;
- The library not providing membership username and password.

Table 6.17 Resources used for searching

Resources used	Percentage of respondents	No.
Search engines (e.g. Google)	87.0%	322
Electronic journals	47.8%	177
Library’s online databases	43.8%	162
University library’s website	37.6%	139
Personal contacts	24.9%	92
Other	6.8%	25

Students were also asked about their preference for types of information resources. Results indicate that around 64.9% preferred using electronic versions of the databases, whereas the remaining third still preferred print versions (Table 6.18).

Table 6.18 Types of resources chosen

Type of resource	Percentage of respondents	No.
Electronic versions of databases/journals	64.9%	240
Print versions of databases/journals	33.0%	122

Responding to the question of how they had found out about the resources, the majority (71.9%) mentioned previous search experience, followed by 38.6% who said that suggestions by a friend or colleague had helped them, while 33.8% said that a course had made them aware of the information resources available. Just 38 (10.3%) said they had found out about the information resources from a departmental website, and 7.3% chose other options, which included websites where they found information on electronic resources (Table 6.19).

Table 6.19 Source of awareness for finding the information resources

Source of awareness	Percentage of respondents	No.
Previous search experience	71.9%	266
Friend/colleague suggestion	38.6%	143
Course/session	33.8%	125
Departmental website	10.3%	38
Other	7.3%	27

On search outcomes, 69.0% expressed satisfaction (“slightly satisfied” to “totally satisfied”) with their search results. Less than a quarter of all respondents (20.6%) were neutral, while 10.31% indicated that they were not satisfied (“slightly dissatisfied” to “totally dissatisfied”) with their search. The Likert score of 5.03 indicates that students were generally satisfied with the outcomes of their searches.

6.13.3 Locating Information

Students were also asked to specify the place in which the searches took place. Results indicated that around two thirds of the respondents (65.9%) chose home. Half of the respondents (52.2%) said they conducted the search in the library, whereas 31.6% said they searched in their offices. More than a quarter of the respondents (26.5%) reported searching in college and computer labs (Table 6.20). Other places included coffee shops, centres of educational research in the College of Education and other research centres.

Table 6.20 Places where the search was conducted

Where the search was conducted	Percentage of respondents	No.
Home	65.9%	244
Library	52.2%	193
Office	31.6%	117
College/workstation	26.5%	98
Other	6.2%	23

A chi-squared test indicated that female graduate students were significantly more likely to choose the library as a place to carry out search (58.3% of females, N = 242) more than males (40.7% of males, N = 123, $x^2 = 10.143$, $df = 1$, $p < 0.05$). Moreover, male students were significantly more likely to prefer conducting their search in the office (39.8% of males, N = 123) more than females (39.8% of females, N = 242, $x^2 = 4.781$, $df = 1$, $p < 0.05$). Results also showed that female graduate students were significantly more likely to conduct their search at home (70.2% of females, N = 242) more than the male students (59.3% of males, N = 123, $x^2 = 4.353$, $df = 1$, $p < 0.05$).

Students were asked to indicate whether they had required help in their search. A majority (62.2%) indicated that they had received assistance from their friends or colleagues. Half of the respondents (50.0%) said they had received help from tutors or lecturers, whereas 37.3% referred to help provided by library staff and 4.9% indicated other sources (Table 6.21). The other sources of help included consultations with specialists in research and statistics; the use of various search engines such as Yahoo; and trying various search strategies.

Table 6.21 Sources of help when conducting the search

Source of Help	Percentage of respondents	No.
A friend/colleague	62.2%	230
Tutor/lecturer	50.0%	185
Library staff	37.3%	138
Other	4.9%	18

6.14 Factor Analysis6.14.1 Factor Analysis of the Information Literacy Scale

As mentioned earlier in this chapter, an exploratory factor analysis was conducted to determine the underlying dimensions of the variables used to measure information literacy. The scale was tested for its reliability, and the Cronbach’s alpha value was 0.807 for the overall scale. The method of listwise deletion was used to exclude respondents who did not check any of the items from the factor analysis. Principal component analysis was employed to extract factors, and four factors were retained by a Scree test and Kaiser’s criterion (eigenvalue>1). Statements with the highest

loading with a particular factor were grouped under that factor, and those that correlated less than 0.5 with a factor were not loaded.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is a test of the amount of variance within the data that could be explained by factors. As a measure of factorability a KMO value of 0.5 is poor; 0.6 is acceptable; a value closer to 1 is better, and the Bartlett's test indicates that the data is probably factorable if $p < .50$ (Brace, Kemp & Snelgar 2006). For the information literacy scale, the various indicators of factorability were very good, and the residuals indicated that the solution was a good one as the $KMO=.856$, and $p=.000$.

Subsequently, the factors were rotated using the Varimax rotation procedure. A four-factor solution accounted for 56.53% of the total variance and four components were elicited (see Table 6.22). These four factors were grouped into three broad themes: Factor One was named "Initiating search strategies, locating and using information resources". It consisted of seven items with factor loading $> .3$, which accounted for 23.5% of the total variance. The items with highest loadings in this factor were related to the respondents' perceptions of their confidence in defining the information they need, initiating search strategies and then limiting their searches. The items in this factor also measured the respondents' confidence in using electronic information resources, using the Internet, selecting information resources most appropriate to their needs, and selecting multiple resources simultaneously to carry out research.

Factor Two was named "evaluation and presentation of information", and it accounted for 13.791% of the total variance, with four items with high loading. Items in this factor addressed confidence in writing research papers and creating bibliographic records. In addition, this factor included confidence in evaluating information resources obtained from the web and determining how current these resources are.

Factor Three, which accounted for 12.136% of the total variance, was named "anxiety about information seeking". It included four items with high loadings, comprising "anxiety towards deciding where and how to find information needed", "anxiety towards being able to locate information resources using the library's catalogue", "uncertainty in identifying various sources of information", and "not being sure of how to determine how reliable the information sources are".

Factor Four was named “using print information sources”. It accounted for 7.095% of the total variance. The factor had two items loaded on it: the first related to “confidence in using various types of print resources”; while the second, though loading negatively, was related to being apprehensive towards criticising the information seeking process and its outcomes (see Tables 6.22 through 6.24).

Table 6.22 Total variance explained

Factor	Cumulative variance	Total variance	Eigenvalue
1	23.517	23.517	3.998
2	37.308	13.791	2.344
3	49.444	12.136	2.063
4	56.539	7.095	1.206

Table 6.23 Factor Loadings of Information Literacy Items

Statement	Component			
	1	2	3	4
I feel confident using Internet search tools (search engines, directories, etc).	.784			
I feel confident with defining the information I need.	.762			
When I think about using electronic information resources, I feel confident.	.751			
I am confident with using many resources at the same time to carry out research.	.689			
I am confident with selecting information most appropriate to my information need.	.642			
I am confident with limiting search strategies by subject, language and date.	.620			
I feel confident with initiating search strategies by using keywords and Boolean logic (and, or).	.610			
I know how to create bibliographic records for different kinds of materials (e.g. books, articles, web pages).		.744		
I know how to determine the currency of information sources.		.678		
I am confident with my ability to evaluate sources from the World Wide Web.		.609		
I am confident with writing a research paper.		.593		
I am unsure about being able to identify a variety of potential sources of information.			.699	
I feel anxious when deciding where and how to find the information I need.			.669	
I am apprehensive about being able to locate resources in the library using the library catalogue.			.635	
I am unsure about how to determine the reliability of information sources.			.559	
I am apprehensive about criticising the quality of my information seeking process and its outcomes.				-.582
I am confident with using different kinds of print sources (e.g. books, periodicals, encyclopaedias, chronologies).				.509

Table 6.24 Dimensions of information literacy

Factor 1	Factor 2	Factor 3	Factor 4
Initiating search strategies, locating and using information resources	Evaluating and presenting information	Anxiety towards information seeking process	Using print information sources
Confidence in defining the info needed	Knowing how to determine the currency of info sources	Unsure about being able to identify various sources of info	Confidence in using different kinds of print sources
Confidence in limiting search strategies by subject, language and date	Confidence in ability to evaluate sources from the www	Feeling anxious when deciding where and how to find the info needed	
Confidence in initiating search strategies by keywords and Boolean logic	Confidence in writing a research paper	Being apprehensive about locating resources in the library using its catalogue	
Confidence in using e-resources	Knowing how to create bibliographic records	Uncertainty about how to determine reliability of information sources	
Confidence in using Internet search tools		Being apprehensive about criticising the quality of info seeking process and outcome	Being apprehensive about criticising the quality of info seeking process and outcome
Confidence in using many resources at the same time to carry out research			
Confidence in selecting info most appropriate to info need			

These main factors were used for the proposed regression and for updating and verifying the study’s model.

6.14.2 Factor Analysis of the Library Awareness Scale

As with the information literacy scale, data from the library awareness scale was analysed by means of a principal component analysis, with varimax rotation. The various indicators of factorability were very good, and the residuals indicate that the solution was a good one. Four components with an eigenvalue >1.0 were found; items with the highest loading were chosen for each factor (see Tables 6.25 and 6.26). The components (factors) can be thought of as representing three main themes: component

1 – related to awareness of what the library offers and its use; component 2 – related to anxiety towards using the library; component 3 – related to the services offered by the library, and component 4 – related to online library use. These factors will be used in the proposed regression.

Table 6.25 Factor loadings for library awareness scale

Statement	Component					
	1	2	3	4	5	6
I know what resources are available in the library.	.832					
I understand how to begin my research in the library.	.830					
I am aware that the library offers online search services for graduate students.	.736					
I can usually find the resources I need in the library.	.609					
I am uncomfortable using the library's online catalogue.		.828				
I am uncomfortable using the library's website.		.767				
I know what resources are available in the library.		.611				
It is difficult to locate materials I need in the library.		.545				
When I use the library for information, I feel overwhelmed.		.531				
In general, I think my ability to use the library has had a negative effect on my research.		.498				
Library's resources for my area of interest are satisfactory.			.765			
The library is easy to use.			.616			
Library offers enough information skills training sessions for graduate students.			.479			
I would rather use the library online.				.759		
I am comfortable using the computers inside the library.				.607		
Library should provide more services for Masters and Doctoral students.					.836	
Library should provide interlibrary loan for access to materials not in my library.						.831
Library's knowledge of the library is limited to my area of interest.						-.424

Table 6.26 Four underlying components (factors) of library awareness

Component 1	Component 2	Component 3	Component 4
Awareness	Anxiety	Facilities	Services
Finding resources needed in the library	Feeling overwhelmed when using the library for information	Uncomfortable using computers inside the library	The library should provide more services for grads
Awareness that the library offers online search services for grads	Uncomfortable using the library’s online catalogue	The library offers enough information skills training sessions for graduate students	I would rather use the library online
Knowing what resources are available in the library	Uncomfortable using the library’s website	I can use interlibrary loan for access to materials not in the library	
Understanding how to begin research in the library			
The library is easy to use			

6.15 Predictors of Information-seeking Behaviour

Logistic regression analysis was conducted using SPSS version 16.0 to identify the key predictors of the information-seeking behaviour of graduate students. The goal of this analysis was to study the associations between each dependent variable representing elements of information-seeking behaviour, and all of the independent variables in the study’s theoretical model (gender, age, nationality, major, programme requirement, enrolment, stage of study, English proficiency, computer skills, use of study resources, information literacy, and library anxiety).

In this section, a series of logistic regressions were run for the set of questions that covered the information-seeking behaviour of graduate students (part two of the questionnaire). In these questions – constituting the dependent variables in the logistic regression - students were asked to consider a recent incident when they needed some information that required the use of a networked computer and Internet connection. The information needed should have been related to academic purposes. That information may have required the use of the Internet, search engines, the library’s databases, electronic journals, OPACs, or other sources. Questions revolved around:

- The place where the search was carried out (library, office, home, other);
- Experiencing computer/network problems (yes/no);
- Modifying search strategies (yes/no);
- Resources used to find the information (search engines, electronic journals library’s online databases, personal contacts, university library website);
- Sources that made students aware of the electronic resources used in the search (previous search experience, suggestion from friend/colleague, course/session, departmental website).

6.15.1: Q12a. The Place Where the Search was Carried Out (The Library)

A logistic regression was run for the first question, which covered the place where the students carried out their search to fulfil a particular academic task. For the first choice given to students (carrying out the search in the library), 206 cases were analysed, and the full model significantly predicted “carrying out search in the library” (omnibus chi-square $X^2=50.379$, $df=7$, $p<0.001$). Overall, 69.4% of predictions were accurate. Table 6.27 gives a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.27 Logistic regression key results for “carried out search in the library”

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Gender(1)	0.790	0.339	0.020	2.203	1.153	4.244
Programme			0.022			
PhD	-2.727	1.132	0.016	0.065	0.006	0.583
Higher Diploma	-1.634	1.164	0.160	0.195	0.069	2.446
Using university library website	0.174	0.081	0.032	1.190	1.024	1.403
Using printed books	0.290	0.098	0.003	1.337	1.103	1.617
F5. Library Awareness - “The necessity for the library to provide services for graduate students”	-0.377	0.167	0.024	0.686	0.509	0.970
F6. Library Awareness - “knowledge of the library is limited to students’ area of interest”	0.547	0.170	0.001	1.729	1.199	2.298
Constant	-2.365	0.613	0.000	0.091		

Gender (1), where “female” is the categorical independent variable, was found to be statistically significant ($p < 0.05$). Looking at the B and the Exp (B) values, the results showed that the odds (Exp (B)) for females are 2.20 higher than the odds for males. This indicates that female students are more likely than their male counterparts to carry out a search in the library.

Results also showed that studying for a PhD was statistically significant ($p < 0.05$). The B and the Exp (B) values indicate a negative association between “studying for a PhD” and “doing the search in the library”, with the odds for a PhD being .065 times lower than the odds for a Masters. This indicates that PhD students are less likely to carry out their search in the library than are Masters students.

Frequency of using the university library website was found to be statistically significant ($p < 0.05$). It has a positive association with Q12a, indicating that the more frequently students think they use the library website, the more likely they are to carry out their search for information in the library. For the frequency of using printed books, results showed a statistically significant relation ($p < 0.05$). This indicates that the more frequently students think they use printed books, the more likely they are to conduct their search in the library.

Analysis also found the fifth factor on the library awareness scale to be significant. This factor relates to students’ perceptions of the library services provided for graduate students. Results showed that the more students believe that the library should provide more services for graduate students, the less likely they are to conduct their search in the library. The sixth factor is related to limited knowledge of what the library offers. This indicates that the more students think their knowledge of the library is limited to their area of interest, the more likely they are to conduct their search there.

Figure 6.32 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (12a). (P=Positive relationship; N= Negative).

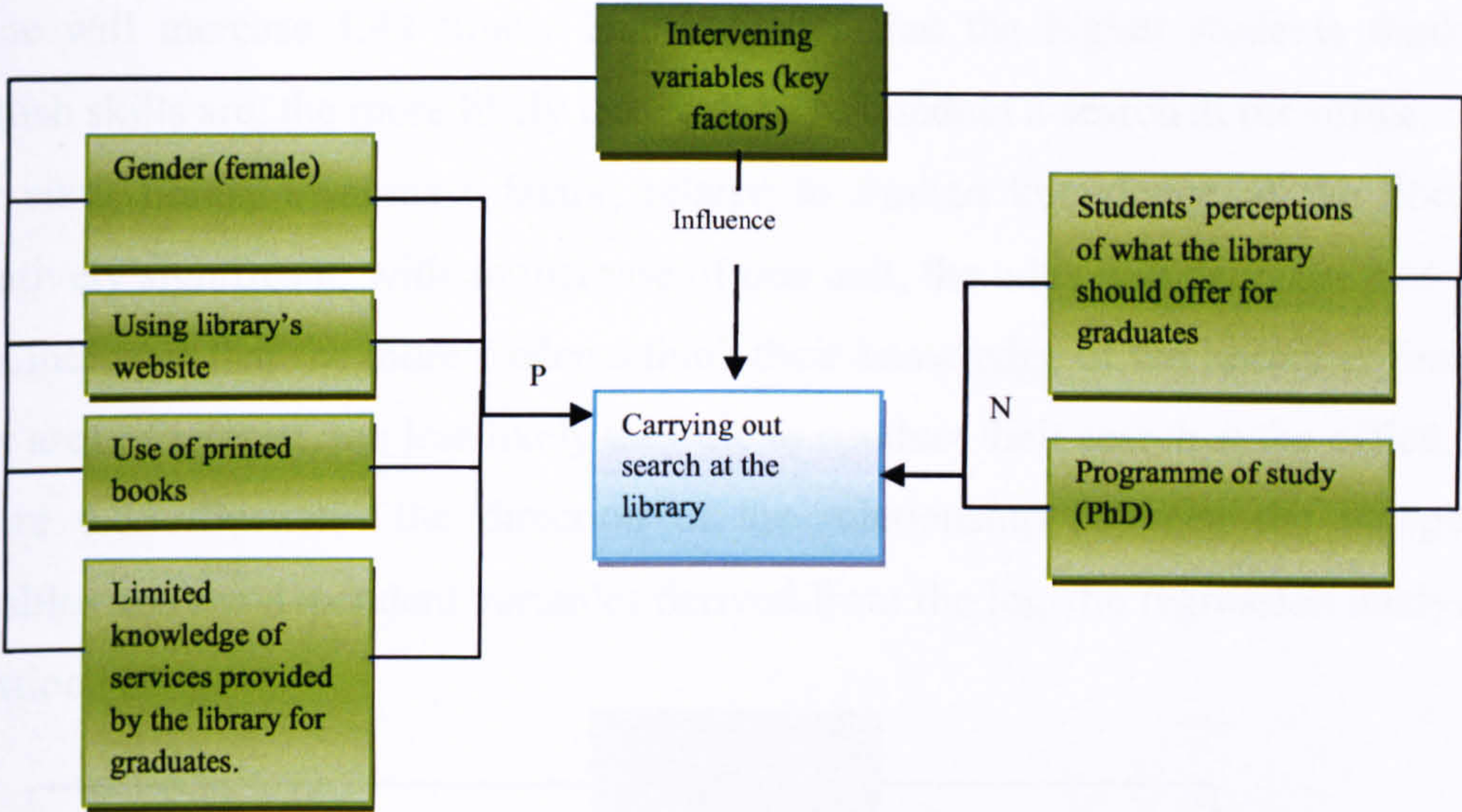


Figure 6.32 Significant Factors Affecting “Carrying Out Search at the Library”

6.15.2: Q12c. The Place Where the Search was Carried Out (The Office)

A logistic regression was run for Q12c (carrying out the search at the office). A total of 206 cases were analysed, and the full model significantly predicted “carrying out search at office” (omnibus chi-square $X^2=44.941$, $df=4$, $p<0.001$). Overall, 70.9% of the predictions were accurate. Table 6.28 depicts the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.28 Logistic Regression Key Results for Q12c

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Enrolment (1)	1.314	0.349	0.000	3.723	1.880	7.371
English	0.365	0.153	0.017	1.440	1.066	1.945
Library Awareness F6	-0.409	0.172	0.018	0.664	0.474	0.931
Constant	-4.6231	0.951	0.000	0.010		

Enrolment (part-time), English, skills in using Excel, and the sixth library awareness factor were found to be significant. The odds of responding to Q12c when choosing the second enrolment choice (part-time) were 3.72 times higher than for the first enrolment choice (full-time). This indicates that part-time students are more likely than full-time students to conduct their search at the office. For English proficiency,

when the English rating increases by one unit, the odds of conducting the search at the office will increase 1.44 times. This indicates that the higher students think their English skills are, the more likely they will be to conduct a search at the office.

The sixth library awareness factor, related to limited knowledge of the library, is negatively significant: with an increase of one unit, the odds will decrease 0.66 times. This indicates that the more students think their knowledge of the library is limited to their area of interest, the less likely they are to conduct their search at the office.

Figure 6.33 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (12c).

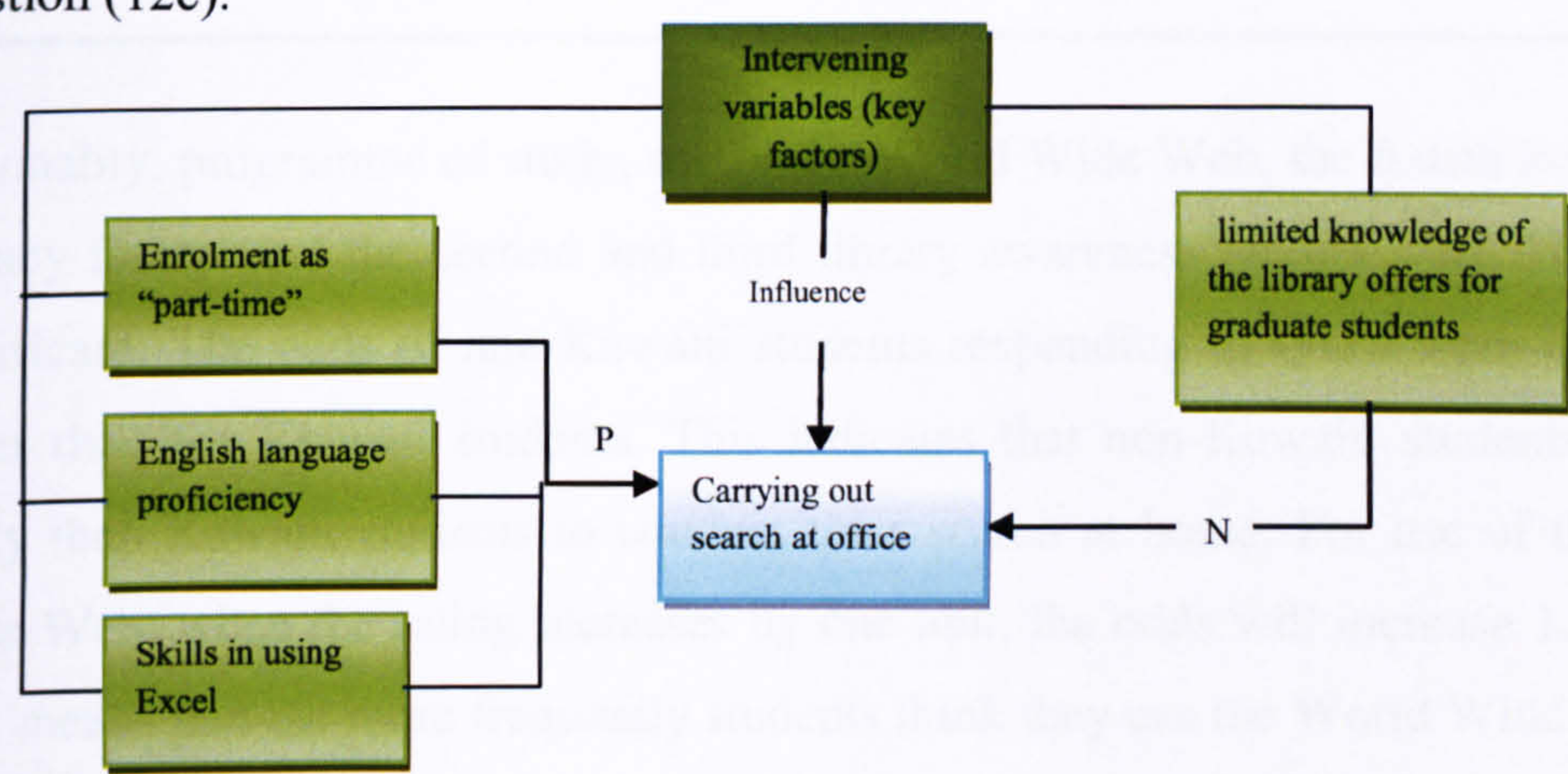


Figure 6.33 Significant Factors Affecting “Carrying Out Search at the Office”

6.15.3: Q12d. The Place Where the Search was Carried Out (At Home)

Logistic regression was also run for Q12d (carrying out the search at home). A total of 206 cases were analysed, and the full model significantly predicted “carrying out search at home” (omnibus chi-square $X^2=64.138$, $df=7$, $p<0.001$). Overall, 77.2% of the predictions were accurate. Table 6.29 gives detailed descriptions of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.29 Logistic regression key results for Q12d

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Nationality (1)	-0.853	0.408	0.037	0.426	0.192	.949
Studying			0.865			
Studying (1) PhD		12979.21	0.999	0.000	.000	
Studying (2)	.541	1.004	0.590	1.718	.240	12.286
Using WWW	0.462	0.121	0.000	1.587	1.254	2.056
Information Literacy F4	0.429	0.181	0.023	1.536	1.033	2.223
Constant	-1.700	0.725	0.032	0.183		

Nationality, programme of study, use of the World Wide Web, the fourth information literacy factor, and the second and third library awareness factors were found to be significant. The odds of non-Kuwaiti students responding to Q12d were 0.42 times lower than for Kuwaiti students. This indicates that non-Kuwaiti students are less likely than Kuwaiti students to conduct their search at home. For use of the World Wide Web, when the rating increases by one unit, the odds will increase 1.58 times. This means that the more frequently students think they use the World Wide Web, the more likely they will be to conduct their search at home. This is to be expected, bearing in mind the availability of the web and the absence of restrictions on access or need for a password.

The fourth information literacy factor (anxiety about finding and selecting information resources) is significant, and with a one unit increase, the odds will increase 1.53 times. This means that the more students feel they are anxious about finding and selecting information resources, the more likely they will be to carry out their search at home. Figure 6.34 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (12d).

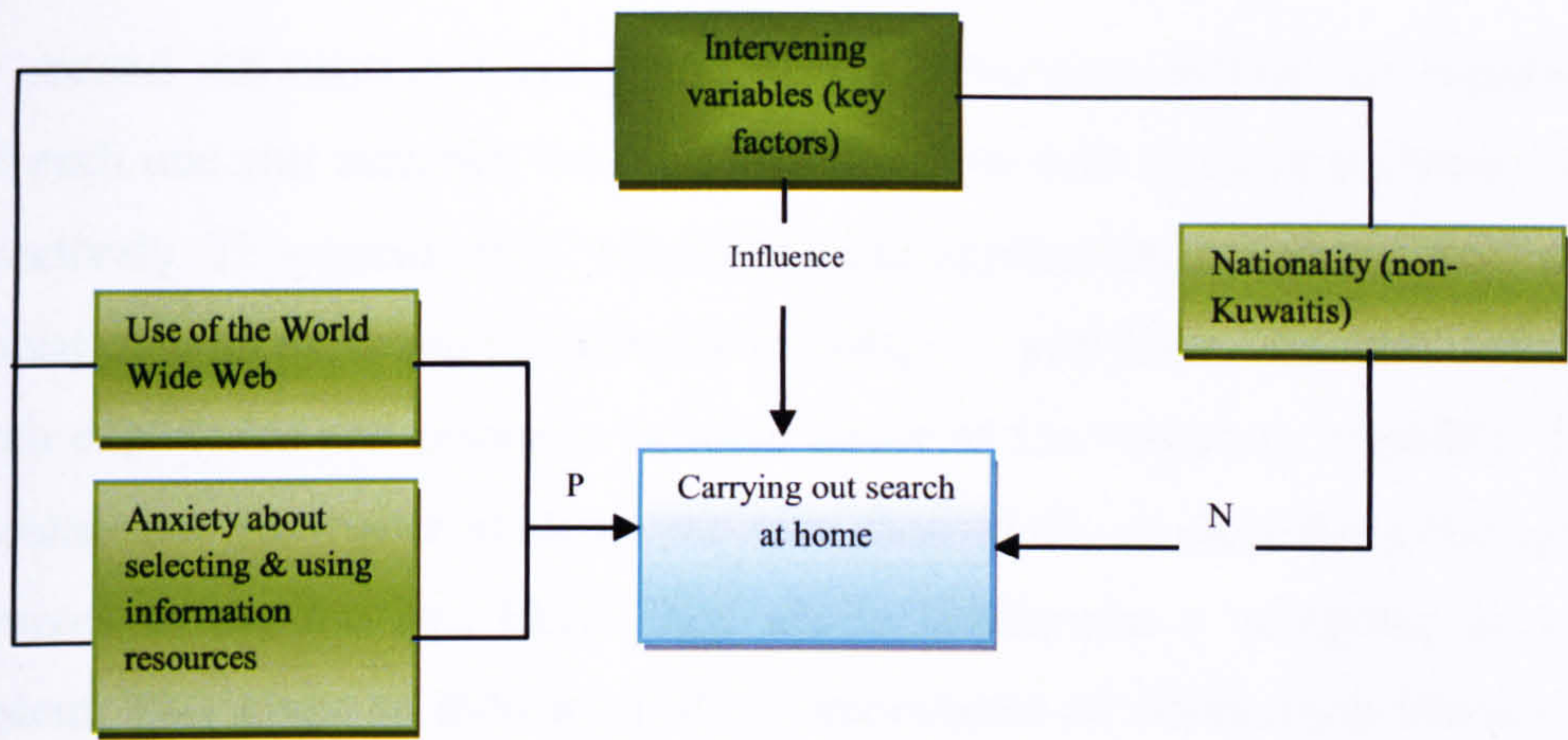


Figure 6.34 Significant Factors Affecting “Carrying Out Search at Home”

6.15.4: Q13. Experiencing Computer/Network Problems

In this question, students were asked whether they had experienced any computer or network problems while doing their search for a specific task. A total of 205 cases were analysed, and the full model significantly predicted “experiencing computer/network problems” (omnibus chi-square $X^2=44.014$, $df=6$, $p<0.001$). Overall, 70.2% of the predictions were accurate. Table 6.30 gives a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.30 Logistic regression key results of Q13

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Using printed books	-0.327	0.107	0.002	0.721	0.602	0.900
Teaching style (q22b)	-0.212	0.092	0.021	0.809		
Teaching style (22e)	-0.286	0.121	0.018	0.751		
Information Literacy F2	-0.765	0.2144	0.000	0.466	0.285	0.630
Library Awareness F2	0.634	0.217	0.004	1.885	1.127	2.384
	2.716	0.989	0.006	15.115		

Frequency of using printed books, teaching style, and the second information literacy and library awareness factors were found to be significant. The frequency of using printed books decreases the odds by 0.72 times. This means that the more often students think they use printed books, the less likely they are to experience a computer or network problem while doing the search.

The second information literacy and library awareness factors are significant, and with each one unit increase, the odds will decrease 0.46 times or increase 1.88 times, respectively. This means that “identifying the appropriate resources” had a negative association with experiencing network or computer problems, and with using previous search experience and results to become aware of the resources available. The result indicates that the higher students perceive their skills in identifying the appropriate resources to be, the less likely they are to experience a computer or a network problem. This gives an indication of the importance of information literacy skills on the way students use computers for their search. In addition, the results indicated that the more students think they are anxious about using the library, the more likely they will be to experience computer or network problems while doing the search. It might also indicate that the more likely students experience computer or network problems, the more likely they think they are anxious about using the library. Figure 6.35 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (13).

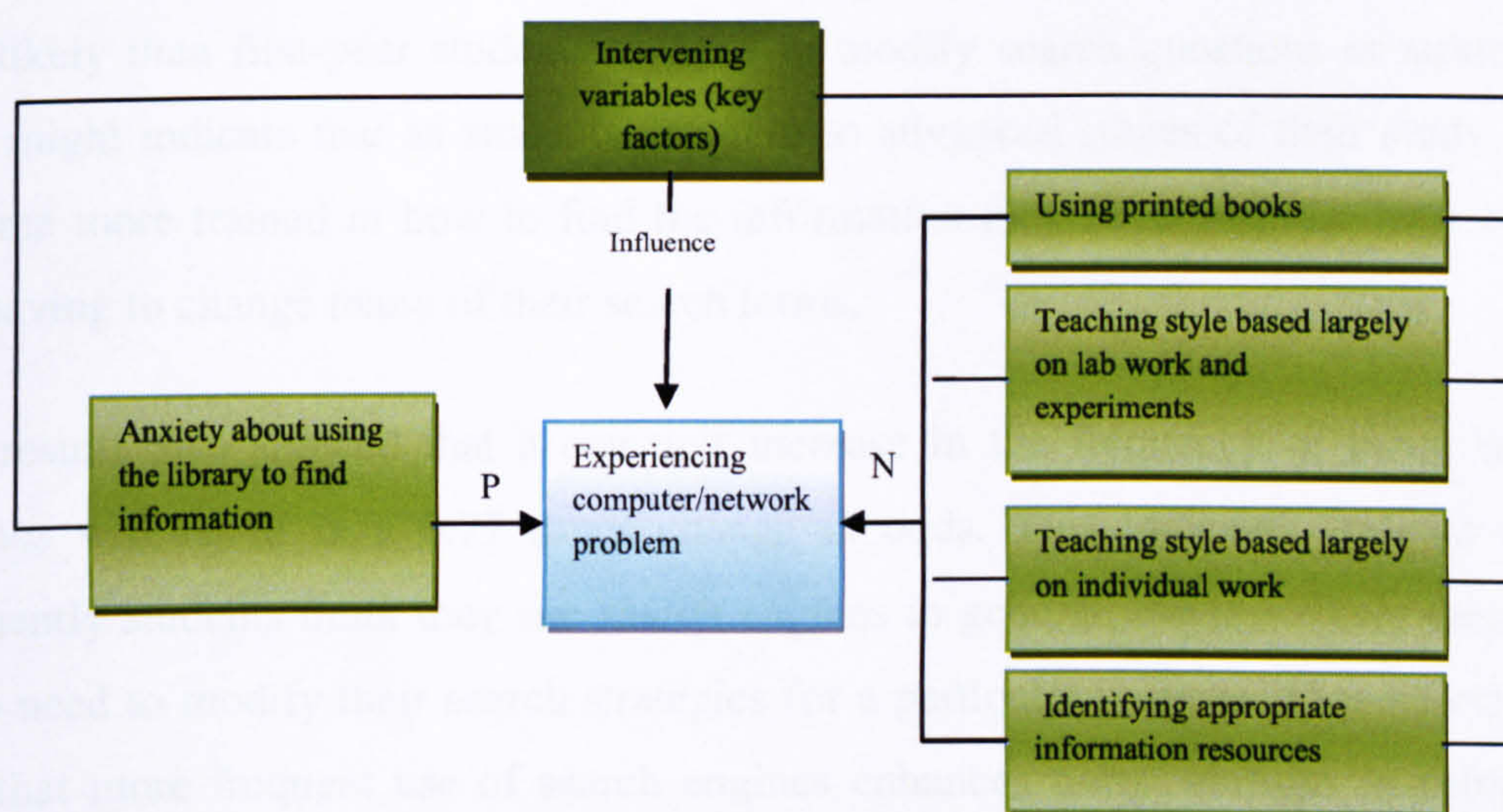


Figure 6.35 Factors Affecting “Experiencing Computer/Networking Problem”

6.15.5: Q14. The Need to Modify Search Question/Strategy

In this question, students were asked whether they needed to modify their search strategies while conducting their search. A total of 202 cases were analysed by logistic regression, and the full model significantly predicted the dependent variable (omnibus chi-square $X^2=41.282$, $df=7$, $p<0.001$). Overall, 68.3% of the predictions were accurate. Table 6.31 gives a detailed description of the values calculated for the

independent variables entered in the last step of the regression stepwise forward method.

Table 6.31 Logistic regression key results of Q14

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Nationality (1)	0.826	0.413	0.045	2.283	1.017	5.128
Third year	-1.127	0.507	0.026	0.324	0.120	0.876
Using search engines	-0.252	0.108	0.019	0.777	0.629	0.960
Using CD-ROMs	0.282	0.085	0.001	1.326	1.122	1.567
Teaching style (Q22e)	-0.359	0.112	0.001	0.698	0.561	0.870
Constant	2.838	0.923	0.002	17.081		

Question 9 relates to the stage of study programme and this was found to be significant, as were using search engines, using CD-ROMs, and teaching style. Compared to the first-year students, the odds for second and third-year students were 0.32 and 0.27 times lower, respectively. This means that third-year PhD students are less likely than first-year students to need to modify search questions or strategies. This might indicate that as students progress to advanced stages of their study, they become more trained in how to find the information they need with the least effort, not having to change many of their search terms.

The results also showed that a one unit increase in the frequency of using search engines will result in a 0.77 times change in odds. This indicates that the more frequently students think they use search engines in general, the less likely they will be to need to modify their search strategies for a particular purpose. This reflects the fact that more frequent use of search engines enhances users' abilities in using the correct search keywords from the first trials. On the other hand, a one-unit increase in the frequency of using CD-ROMs will result in a 1.32 times change in the odds. This means that the more frequently students think they use CD-ROMs, the more likely they will be to need to modify their search terms or strategies. This gives an indication that the use of CD-ROMs, with their limited options, does not assist students in enhancing their search abilities.

Teaching style was also found to be statistically significant in this logistic regression model. A one unit increase in the variable “teaching style largely based on individual work” will lead to a 0.69 decrease in the odds. This indicates that the more students perceive their teaching style as such, the less likely they will be to need to modify their search terms or strategies. This might indicate that a learning style largely based on individual work might foster independent learning and lead to better information search skills. Figure 6.36 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (14).

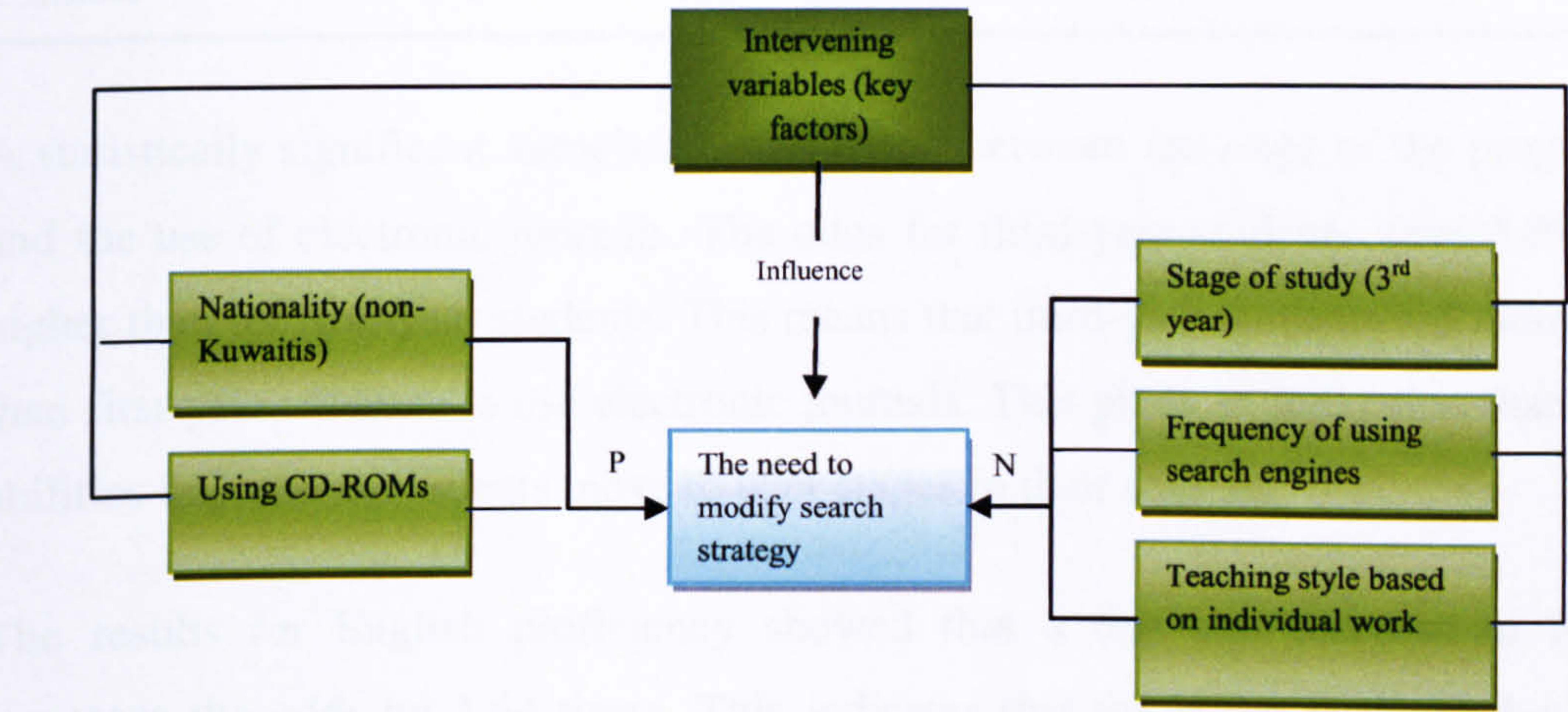


Figure 6.36 Factors Affecting “The Need to Modify Search Strategy”

6.15.6: Q17b. Using Electronic Journals to Find Information

Question 17 is a multiple-choice question asking what was used to find the information needed while conducting the search. Question 17b relates to “using electronic journals to find information”. A total of 207 cases were analysed by logistic regression, and the full model significantly predicted the outcome dependent variable (omnibus chi-square $X^2=101.712$, $df=9$, $p<0.001$). Overall, 78.7% of the predictions were accurate. Table 6.32 gives a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.32 Logistic regression key results of Q17b

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
English	0.449	0.179	0.005	1.648	1.117	2.197
Second year	-0.411	0.427	0.336	0.663	0.275	1.426
Third year	1.7741	0.746	0.017	5.895	1.425	26.247
Using electronic journals	0.741	0.132	0.000	2.097	1.566	2.574
University library website	0.318	0.105	0.002	1.375	1.116	1.669
Library Awareness F2	-0.653	0.225	0.004	0.520	0.334	0.776
Library Awareness F3	0.514	0.215	0.017	1.672	1.135	2.613
Constant	-5.956	1.151	0.000	0.003		

A statistically significant association was found between the stage of the programme and the use of electronic journals. The odds for third-year students were 5.89 times higher than for first-year students. This means that third-year students are more likely than first-year students to use electronic journals. This gives an indication that search abilities improve as students move to later stages in their studies.

The results for English proficiency showed that a one unit increase in English increases the odds by 1.64 times. This indicates that the better students think their English skills are, the more likely they are to use electronic journals. This reflects the fact that the majority of the available electronic journals are in English, and an efficient use of them does require a good knowledge of the language.

Frequency of using e-journals and the library website result in changes of odds of 2.09 and 1.37 times respectively. This indicates that the better students perceive their skills in using databases to be, the less likely they are to use electronic journals. The results also indicate that the more frequently students think they use electronic journals in general, the more likely they are to use the same medium for carrying out a search for a specific task.

The results also showed that a one-unit increase in the library awareness factor related to uneasiness about using the library will result in a 0.52 times decrease in odds. This indicates that the more students think they feel anxious about using the library, the less likely they are to use electronic journals to find the information they need.

As expected, the use of electronic journals requires that the students feel comfort and ease towards using the library. The third library awareness factor, related to adequacy of the library resources, was also found to be significant. This indicates that the more students think the library offers adequate resources, the more likely they are to use electronic journals in their search. This shows that the graduate students’ confidence with what the library offers does affect the way they make use of electronic journals. Figure 6.37 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (17b).

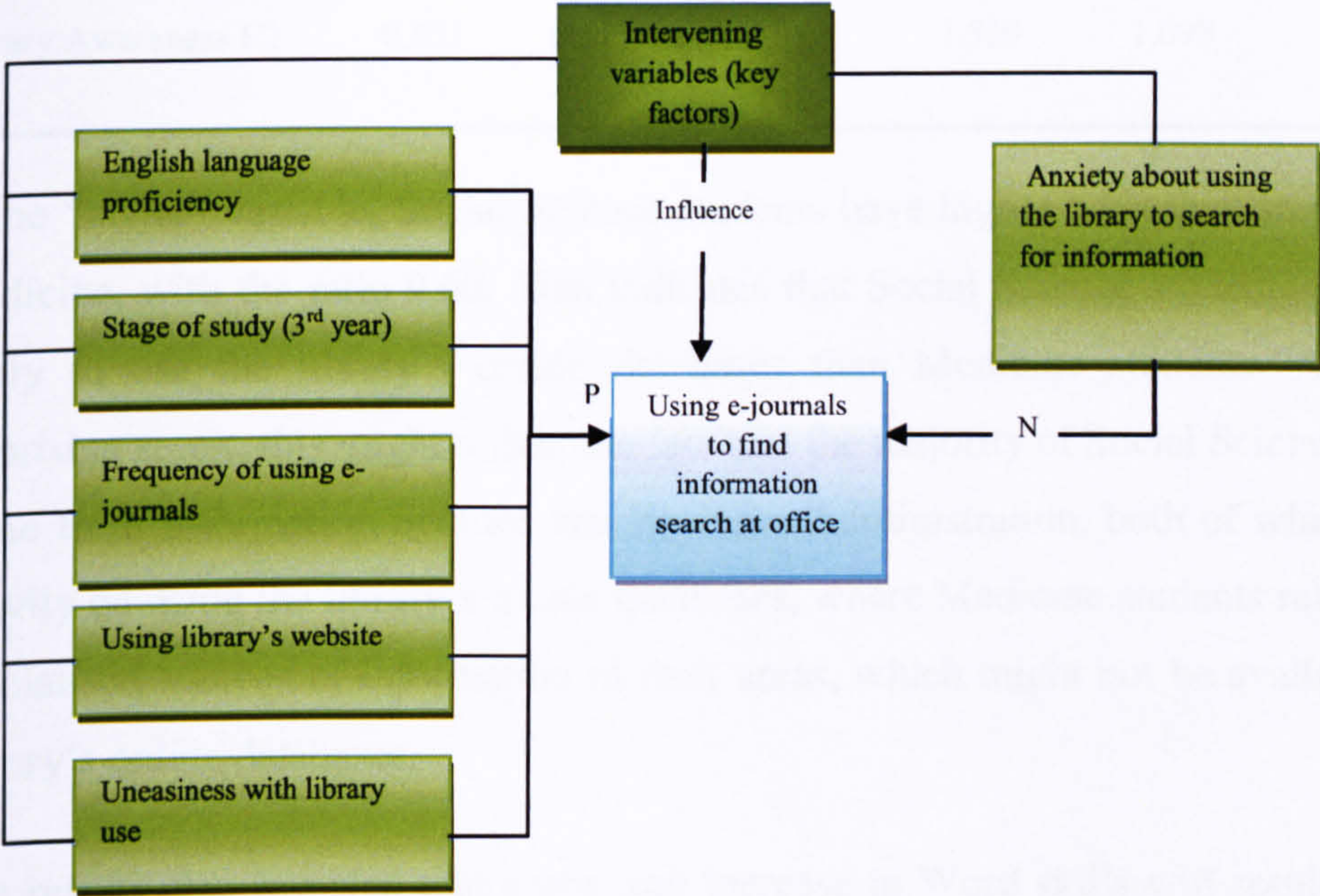


Figure 6.37 Factors Influencing “Using E-journals to Find Information”

6.15.7: Q17c Using the Library Online Databases

Question 17c relates to “using the library online databases to find information”. A total of 207 cases were analysed by logistic regression, and the full model significantly predicted “using the library’s online databases to find information” (omnibus chi-square $X^2=51.164$, $df=13$, $p<0.001$). Overall, 67.1% of the predictions were accurate. Table 6.33 gives a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.33 Logistic regression key results of Q17c

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Major (6)	2.262	0.776	0.003	9.607	2.098	43.986
Major (9)	0.419	0.806	0.496	1.520	0.313	7.384
Q11a Skills in Word	0.309	0.147	0.035	1.362	1.021	1.816
Frequency of using e-journals	0.356	0.102	0.000	1.428	1.169	1.745
Teaching style based on individual work	0.271	0.113	0.017	1.311	1.050	1.638
Library Awareness F2	0.431	0.173	0.012	1.539	1.098	2.159

In the “major” variable, Social Science students have higher odds than students from Medicine, with the ratio 9.60. This indicates that Social Science students were more likely to use the library’s online databases than Medicine students. Although a surprising result, this might reflect the fact that the majority of Social Science students come from Information Science and Business Administration, both of which depend heavily on using the library’s online databases, where Medicine students rely on other specialised sources of information in their areas, which might not be available in the library’s online databases.

The results also revealed that a one-unit increase in Word skills will result in a 1.36 change in the odds. This indicates that the better students perceive their skills in using Word to be, the more likely they are to use the library’s online databases. This shows that computer literacy does influence the students’ use of information resources, especially electronic ones.

The results also showed that a one-unit increase in the frequency of using electronic journals in general will result in a 1.42 change in the odds. This means that the more often students think they use electronic journals, the more likely they are to use the library’s databases. This is inevitable, as electronic journals are provided through the library’s databases. The result highlights the importance of using those databases in order to get access to the electronic journals. In addition, the results showed that the teaching style based largely on individual work will result in a 1.31 times change in the odds. This indicates that the more students perceive their teaching style as largely

based on individual work, the more likely they are to use the library’s online databases. The fourth library awareness factor, related to attitudes toward using computers in the library, will result in a 1.53 times change in the odds. This indicates that the more students think they are comfortable with using computers inside the library, the more likely they will be to use electronic journals for their search. This result gives an indication of the importance for students to feel at ease with using the computers in the library, which will lead to more efficient use of the information resources available.

Figure 6.38 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (17c).

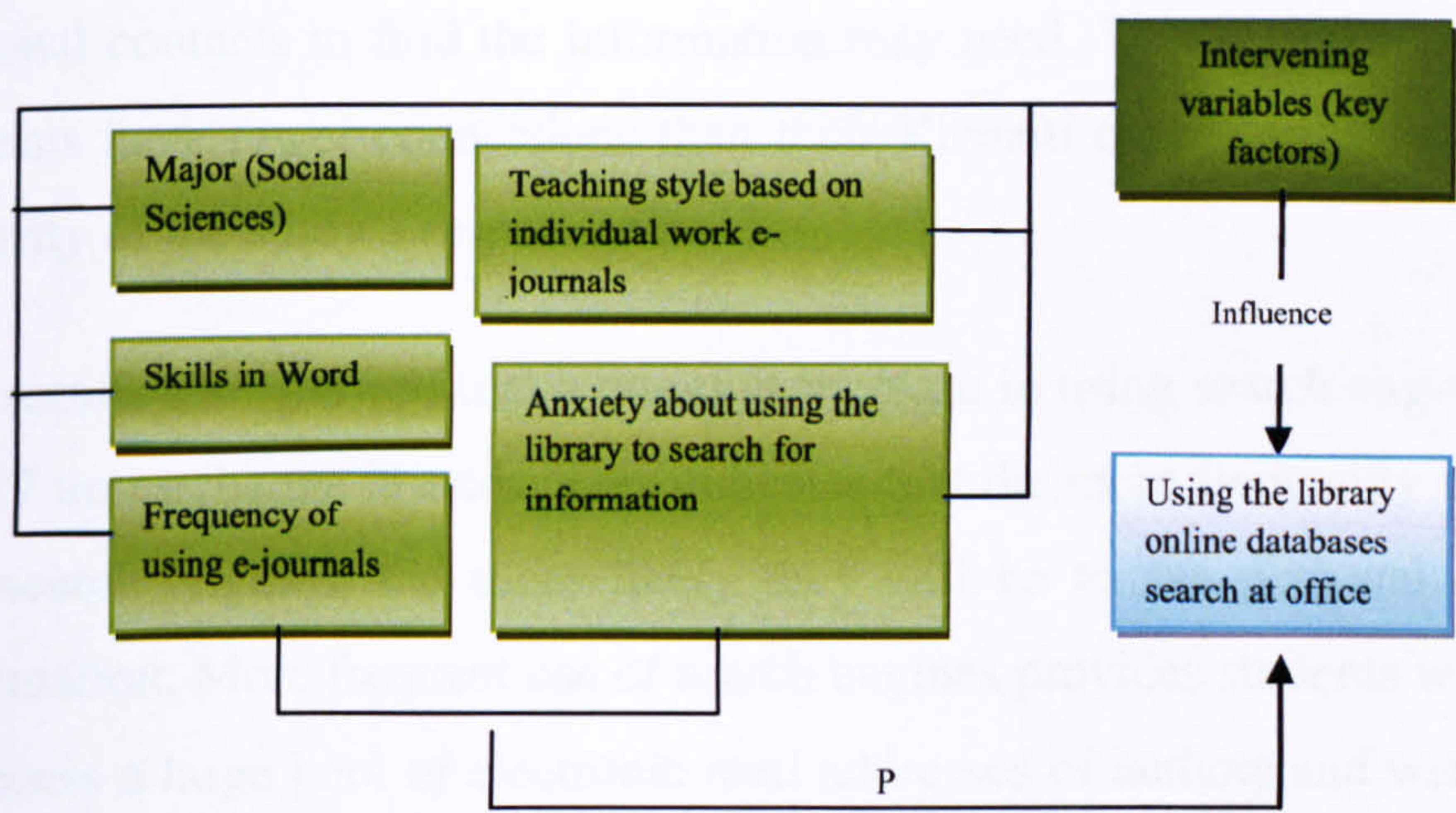


Figure 6.38 Significant Factors Influencing “Using the Online Database”

6.15.8: Q17d Using Personal Contacts to Find Information

Question 17d relates to “using personal contacts to find information”. A total of 207 cases were analysed, and the full model significantly predicted “using personal contacts to find information” (omnibus chi-square $X^2=46.842$, $df=7$, $p<0.001$). Overall, 80.2% of the predictions were accurate. Table 6.34 gives a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.34 Logistic regression key results of Q17d

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Nationality (1)	-1.217	0.519	0.019	0.296	0.107	0.819
Using search engines	0.519	0.181	0.004	1.680	1.178	2.395
Using e-journals	0.408	0.132	0.002	1.503	1.160	1.948
Using CD ROMs	-0.402	0.115	0.000	0.669	0.534	0.839
Using library's website	0.241	0.105	0.022	1.272	1.035	1.564
Information Literacy F3	0.554	0.229	0.016	1.740	1.110	2.728
Information Literacy F4	0.560	0.192	0.003	1.751	1.203	2.548
Constant	-5.241	1.208	0.000	0.005		

The odds for non-Kuwaiti students responding to Q17d are 0.29 times lower than for Kuwaiti students. This indicates that non-Kuwaiti students are less likely to use personal contacts to find the information they need. This is understandable, as those students have fewer connections than their Kuwaiti counterparts, who constitute the majority of the study's respondents.

The results also showed that a one-unit increase in using search engines will result in a 1.17 times change in odds. This indicates that the more frequently students say they use search engines, the more likely they will be to use personal contacts to find information. More frequent use of search engines provides students with opportunities to access a large pool of electronic mail addresses of authors and writers. The results also showed that a one unit increase in using electronic journals will result in a 1.16 times change in the odds. This indicates that the more often students think they use electronic journals, the more likely they will be to use personal contacts to find information. As with search engines, more frequent use of electronic journals provides users with the contact details of various authors in different disciplines.

The results of the logistic regression also showed that using the university library's website will result in a 1.27 times change in the odds, indicating that the more often students think they use this website, the more likely they are to use personal contacts. In contrast, use of CD-ROMs results in a 0.53 times change in the odds, meaning that the more often students think they use CD-ROMs, the less likely they will be to use personal contacts to find information.

The third and fourth Q21 factors were also shown to be significant: with a one unit increase in them, the odds will increase 1.44, 1.77, or 1.65 times. This indicates that the more students think they are anxious about finding and selecting information resources, the more likely they will be to use personal contacts to find the information they need.

Figure 6.39 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (17d).

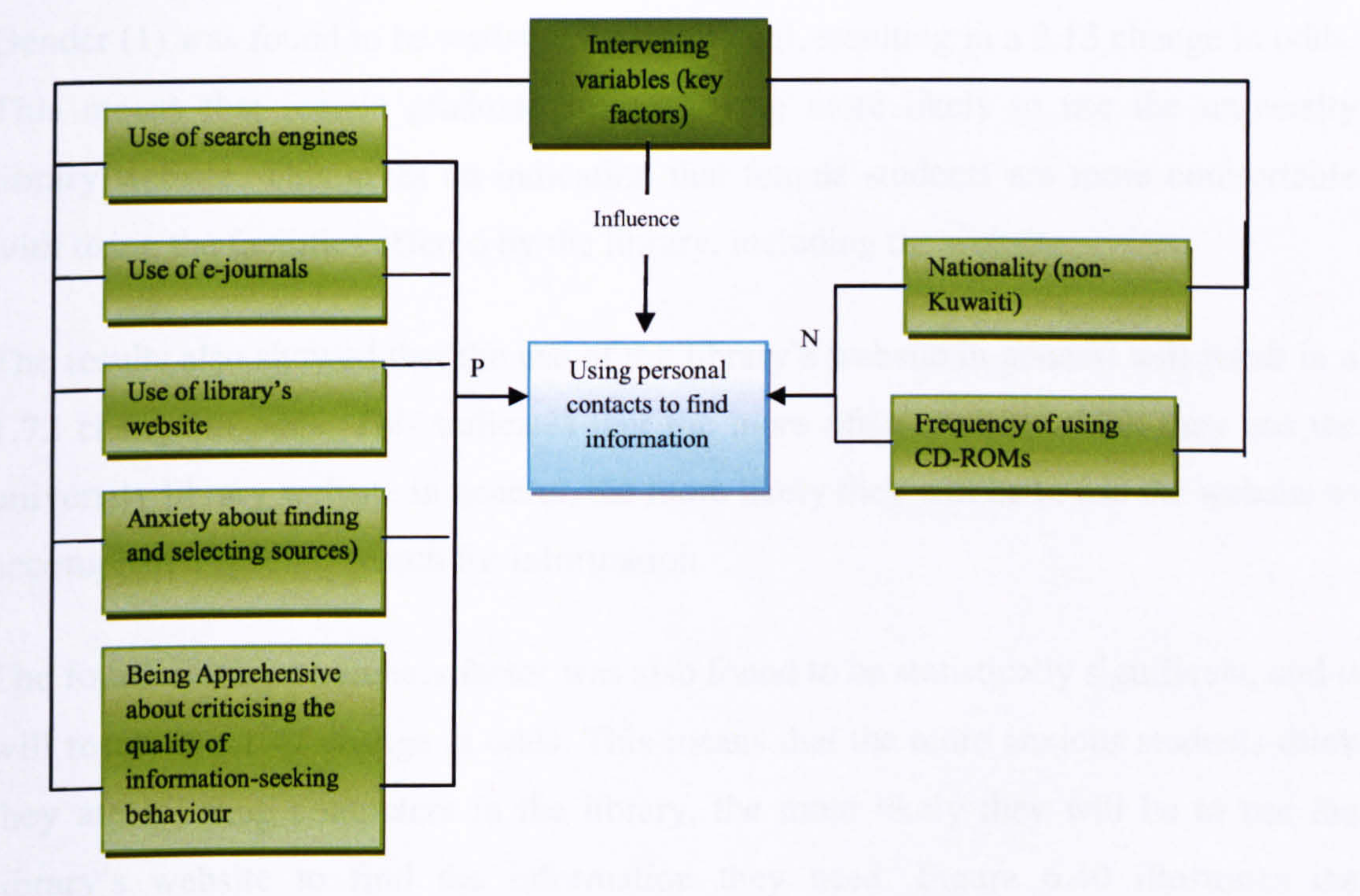


Figure 6.39 Factors Influencing “Using Personal Contacts to Find Information”

6.15.9: Q17e Using the University Library Website

Question 17e relates to “using the library website to find information”. A total of 207 cases were analysed by logistic regression. The full model significantly predicted the outcome (omnibus chi-square $X^2=54.361$, $df=3$, $p<0.001$). Overall, 74.9% of the predictions were accurate. Table 6.35 gives detailed descriptions of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.35 Logistic regression key results of Q17e

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Gender (1)	0.757	0.370	0.041	2.132	1.033	4.399
Q20f “Use of library’s website”	0.544	0.098	0.000	1.722	1.421	2.087
Library Awareness F4	0.388	0.179	0.030	1.474	1.038	2.093

Gender (1) was found to be statistically significant, resulting in a 2.13 change in odds. This means that female graduate students were more likely to use the university library website. This gives an indication that female students are more comfortable with using the facilities offered by the library, including the website.

The results also showed that the use of the library’s website in general will result in a 1.72 change in odds. This indicates that the more often students think they use the university library website in general, the more likely they will be to use the website to accomplish a specific search for information.

The fourth library awareness factor was also found to be statistically significant, and it will result in a 1.47 change in odds. This means that the more anxious students think they are in using computers in the library, the more likely they will be to use the library’s website to find the information they need. Figure 6.40 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (17e).

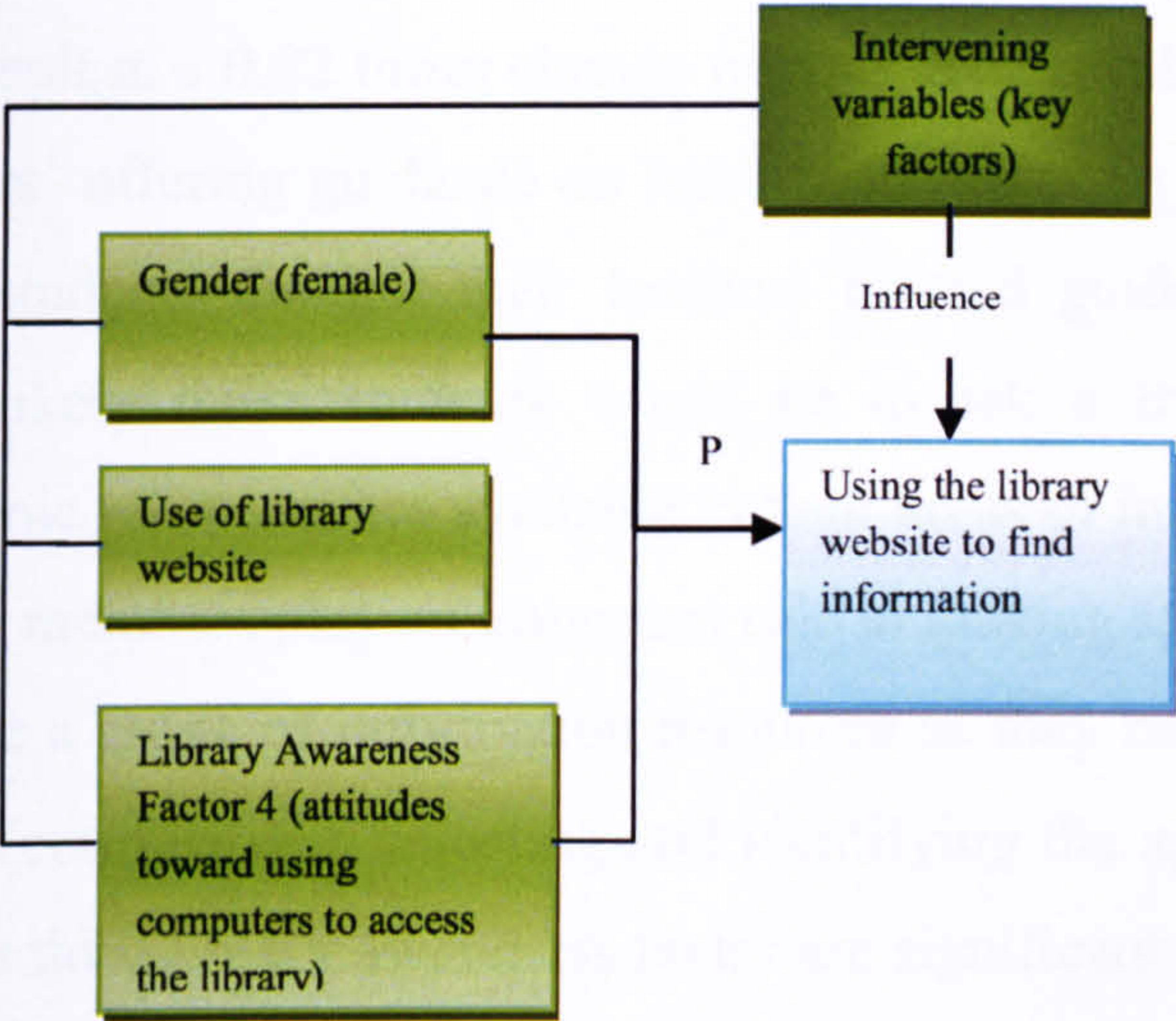


Figure 6.40 Factors Influencing “Using the Library Website to Find Information”

6.15.10: Q19b. A Friend/Colleague as the Source of Awareness of the Available Resources

Question 19 is a multiple-choice question related to what made students aware of the resources used in their search. Question 19b refers to a friend or colleague’s suggestion as the source of awareness. A total of 204 cases were analysed, and the full model significantly predicted the outcome (omnibus chi-square $X^2=22.231$, $df=4$, $p<0.001$). Overall, 64.7% of the predictions were accurate. Table 6.36 contains a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.36 Logistic regression key results of Q19b

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Using online databases	-0.191	0.079	0.015	0.826	0.708	0.963
Teacher offers guidance	0.187	0.092	0.043	1.206	1.006	1.445
Information Literacy F1	0.393	0.157	0.013	1.481	1.088	2.016
Library Awareness F2	0.448	0.161	0.005	1.566	1.143	2.145
Constant	-0.444	0.545	0.415	0.641		

The results showed that a one-unit increase in the frequency of using online databases will result in a 0.82 times change in odds. The results also found significant value for teachers' offering guidance on how to do literature searching. This indicates that the more students thought their teachers offered guidance on literature searching, the more likely those students would be to ask a friend or a colleague about what electronic resources are available in their areas of interest. This reflects the notion that faculty members play an important role in making students enthusiastic about locating as wide a range of information resources as they need. The first information literacy factor (comfort with selecting and identifying the appropriate source of information) and the third library awareness factor are significant: with a one-unit increase the odds will increase 1.48 times or 1.56 times, respectively. This indicates that the more students think they are comfortable with identifying the appropriate sources of information, the more likely they will be to ask a friend or colleague for help. In addition, the more students think that the library resources are adequate for their needs, the more likely they will be to ask for help from a friend or a colleague. Figure 6.41 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (19b).

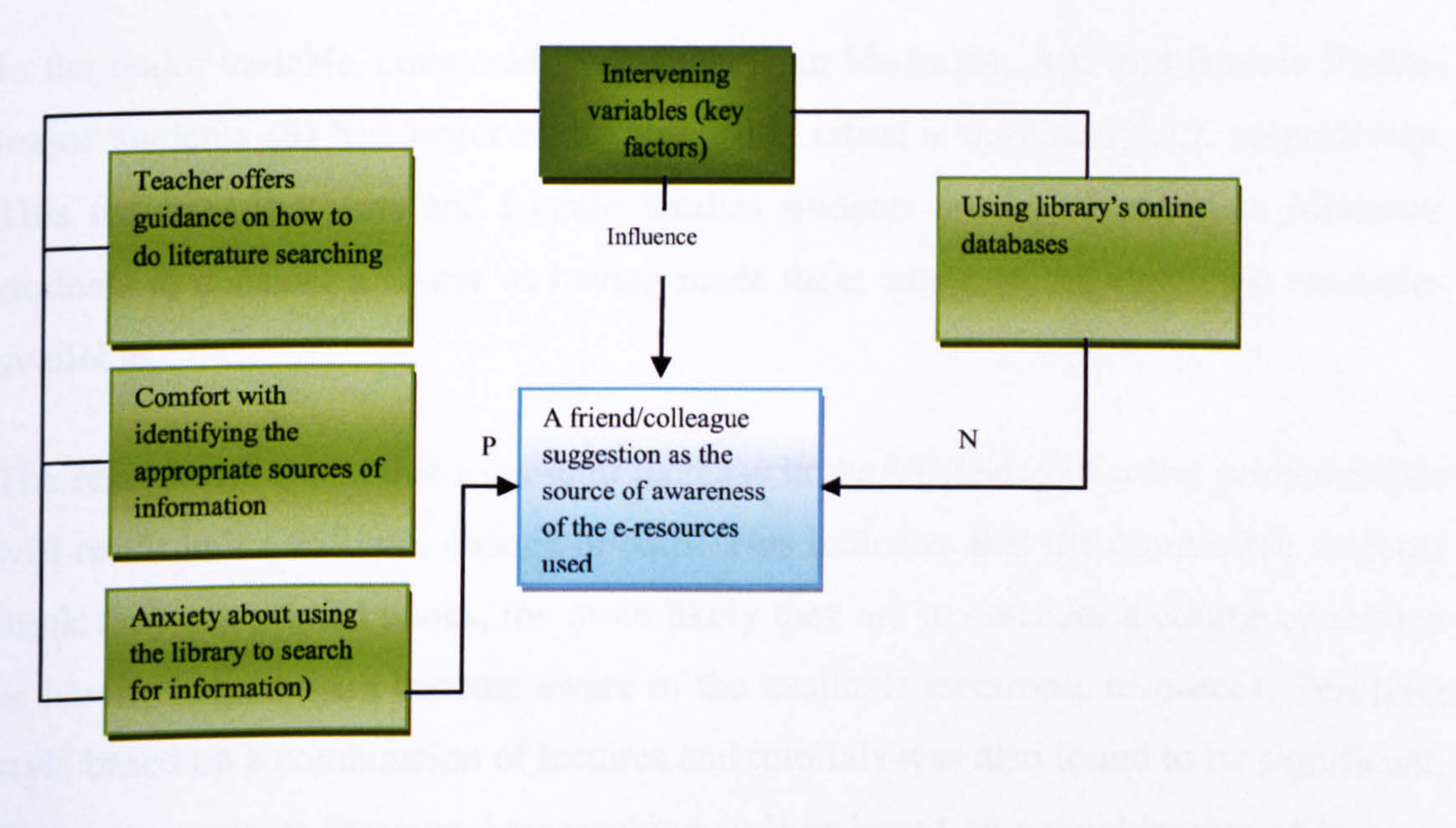


Figure 6.41 Factors Influencing “Using a Friend/Colleague’s Suggestion as the Source of Awareness of the E-resources Used”

6.15.11: Q19c A Course/Session as the Source of Awareness

Question 19c refers to a course or a session as the source of awareness of the resources used in the search. A total of 204 cases were analysed by logistic regression, and the full model significantly predicted “using a course/session as the source of awareness of the available electronic resources” (omnibus chi-square $X^2=41.763$, $df=11$, $p<0.001$). Overall, 69.1% of the predictions were accurate. Table 6.37 provides a detailed description of the values calculated for the independent variables entered in the last step of the regression stepwise forward method.

Table 6.37 Logistic regression key results of Q19c

Variables in the equation	B	S.E.	Sig.	Exp(B)	95% C.I. for OR	
					Lower	Upper
Major (4)	-1.762	0.713	0.013	0.172	0.042	0.665
Major (8)	-1.613	0.852	0.058	0.199	0.043	1.118
Major (9)	-1.004	0.809	0.215	0.366	0.075	1.722
Use of printed books	0.225	0.099	0.023	1.253	1.027	1.500
Teaching style	0.221	0.086	0.010	1.247		
Constant	-1.791	0.776	0.021	0.167		

In the major variable, compared to students from Medicine, Arts and Islamic Studies major students (8) had lower odds, with odds ratios = 0.17 and 0.19, respectively. This indicates that Arts and Islamic Studies students are less likely than Medicine students to consider a course as having made them aware of the electronic resources available.

The results also found that a one-unit increase in the frequency of using printed books will result in a 1.25 times change in odds. This indicates that the more often students think they use printed books, the more likely they are to consider a course or session as having helped them become aware of the available electronic resources. Teaching style based on a combination of lectures and tutorials was also found to be significant. The more students perceive their teaching style as based on a combination of lectures and tutorials, the more likely they are to think that a course made them acquainted with the available resources.

Figure 6.42 illustrates the direction of the relationship between the independent variables and the dependent variables derived from the logistic regression analysis for question (19c).

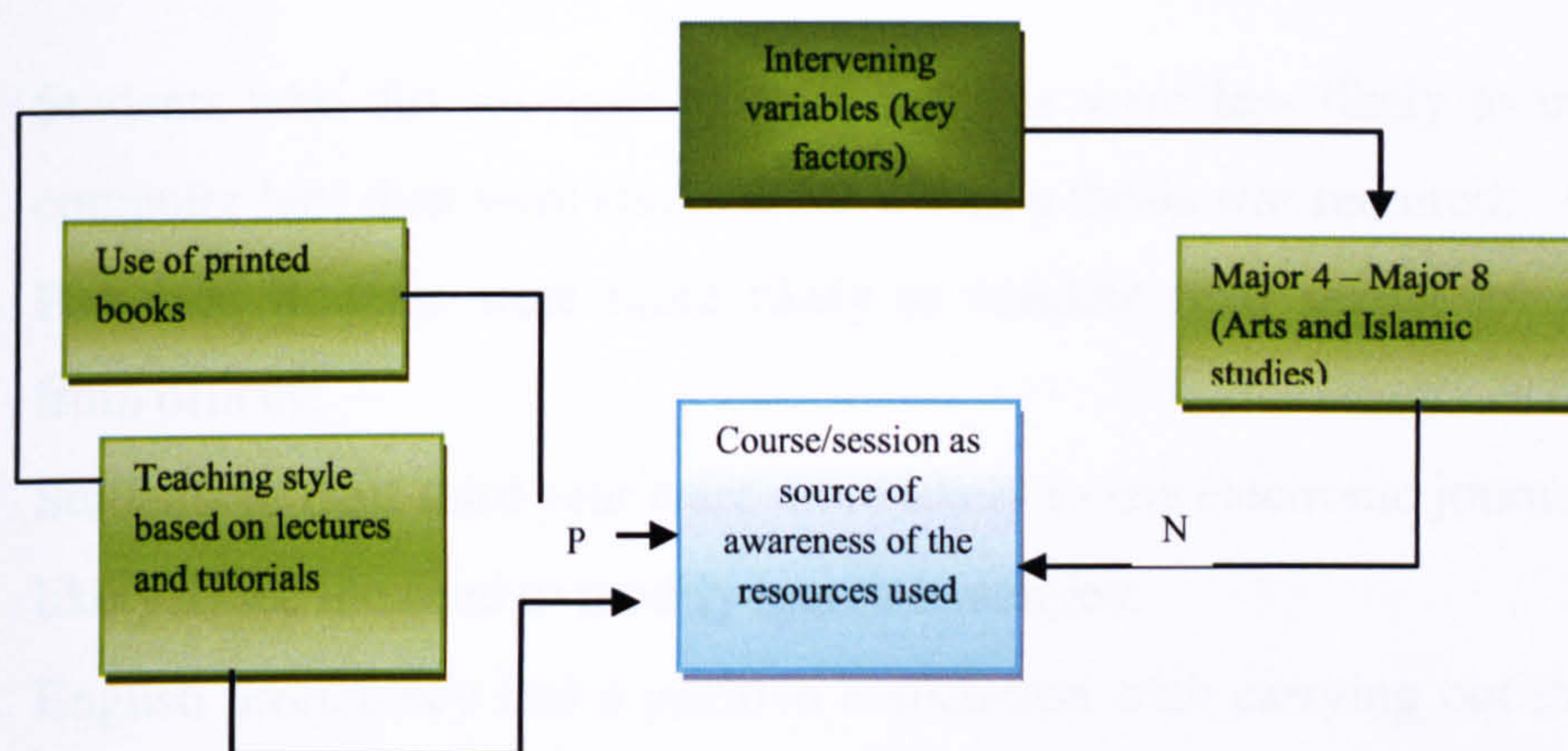


Figure 6.42 Factors Influencing “Course/session as Source of Awareness of the Resources Used”

The following section provides a summary and discussion of the results of the logistic regression, shown in the tables above, in relation to the study’s hypotheses.

6.16 Summary of the Results

6.16.1 Hypotheses Statements

H1: There is a significant relationship between students’ patterns of information-seeking behaviour and (a) Gender; (b) Nationality; (c) Age and (d) English proficiency.

Information-seeking behaviours were measured through a question in the survey instrument that asked students how they searched for information (at the library, using online search engines, etc.). The demographic characteristics of gender, nationality, age and English proficiency were measured by the demographic questionnaire. The hypothesis was supported, as the logistic regression analysis revealed the following significant relationships:

- Female students were more likely than male students to conduct their search in the library, and less likely to use the department website;
- Students between 31 and 50 years of age were less likely to use search engines to find information than students of other ages;

- Non-Kuwaiti students were more likely than Kuwaiti students to use electronic resources. Also, non-Kuwaiti students were less likely than Kuwaiti students to carry out a search at home and to use personal contacts to find information;
- Students who did not have to write a thesis were less likely to make use of computer labs than were students for whom a thesis was required;
- Part-time students were more likely to conduct their search for information from offices;
- Students in their third year were more likely to use electronic journals, and less likely to see the need to modify search strategies;
- English proficiency had a positive association with carrying out the search at the office, using electronic journals to find information, and using the library's online databases;
- Computer skills:
 - Skills in Word had a positive association with carrying out the search at a college workstation, computer lab and in the office. Skills in Word also had a positive association with using a department website to become aware of the e-resources available.

H2: There is a significant relationship between students' patterns of information-seeking behaviour and (a) Discipline; (b) Information Literacy; (c) Requirement to write a thesis and (d) computer skills.

Information-seeking behaviours were measured through a question in the survey instrument that asked students how they searched for information (at the library, using online search engines, etc.). The role related factors of discipline, information literacy, requirement to write a thesis and computer skills were measured by items included in the survey instrument. This hypothesis was supported, and the logistic regression analysis revealed the following significant relationships:

- Students from Social Sciences were more likely to use the online databases than were students from other disciplines;
- Factors from Information Literacy:
 - Factor 2 (*identifying the appropriate resources*) had a positive association with using personal contacts to become aware of resources, and a negative

association with using previous search experience to become aware of available resources;

- Factor 3 (*anxiety about finding and selecting information sources*) had a positive association with using personal contacts to find information, and a negative association with using electronic resources;
- Factor 4 (*apprehensive about criticising the quality of the information seeking process*) had a positive association with carrying out the search at home. Moreover, the more students think they are apprehensive about critiquing the quality of their information-seeking, the more likely they will be to use the department website to become aware of the electronic resources available.

H3: There is a significant relationship between students' patterns of information-seeking behaviour and Library Anxiety factors.

Information-seeking behaviours were measured through a question in the survey instrument that asked students how they searched for information (at the library, using online search engines, etc.). The psychological related factors of knowledge and awareness about the library resources, uneasiness about using the library, adequacy of library resources, attitudes toward using computers to access the library, and the notion that the library should provide more services for graduate students were measured by items included in the survey instrument. This hypothesis was supported, and the logistic regression analysis revealed the following significant relationships:

- Factor 1 (*knowledge and awareness about the library resources*) had a positive association with the use of search engines to find information;
- Factor 2 (*uneasiness about using the library*) had a negative association with the use of electronic journals;
- Factor 3 (*adequacy of library resources*) had a positive association with the use of electronic journals to find information;
- Factor 4 (*attitudes toward using computers to access the library*) had a positive association with carrying out the search at a college workstation or a computer lab;
- Factor 5 (*notion that the library should provide more services for graduate students*) had a negative association with carrying out the search at the library.

H4: There is a significant relationship between students' patterns of information-seeking behaviour and use of information resources.

Information-seeking behaviours were measured through a question in the survey instrument that asked students how they searched for information (at the library, using online search engines, etc.). The information resource factors of frequency of using the World Wide Web, frequency of using search engines, frequency of using electronic journals, frequency of using CD-ROM databases, frequency of using online databases, frequency of using the university library website, and frequency of using printed books were measured by items included in the survey instrument. This hypothesis was supported, and the logistic regression analysis revealed the following significant relationships:

- Use of information resources:
 - Frequency of using the World Wide Web had a positive association with carrying out a search at home;
 - Frequency of using search engines had a positive association with conducting a search for a particular purpose; with using personal contacts to find information; and with previous search experience and results making them aware of available resources;
 - Frequency of using search engines had a negative association with the need to modify search questions or strategies and a similar relation with using the library's online databases;
 - Frequency of using electronic journals had a positive association with conducting a search for a particular purpose, as well as a positive association with using the library's online databases and using personal contacts to find information;
 - Frequency of using electronic journals had a negative association with using search engines to find information;
 - Frequency of using CD-ROM databases had a positive association with the need to modify a search question or strategy;
 - Frequency of using online databases had a negative association with using personal contacts to find information for a particular purpose;
 - Frequency of using the university library website had a positive association with carrying out the search in the library;

- Frequency of using printed books had a positive association with carrying out the search at the library.

In addition to the above discussed hypotheses, there was a null hypothesis stating that there was no significant difference in patterns of information-seeking behaviour between faculty and students. This hypothesis was not supported as differences were found among the two groups, as shown in Chapter 7.

6.16.3 Summary

This chapter began by providing the demographic background of the graduate students who replied to the questionnaire. Results revealed that students thought they had sufficient skills in most of the computer applications, which is understandable due to the nature of graduate programmes, for which basic computer applications are necessary.

The self-efficacy information literacy scale revealed that graduate students were more confident with skills related to initiating search strategies, locating and using information resources. However, students were less confident in their abilities to evaluate the quality of the resources obtained from the web. The majority of respondents noted search engines as their first choice when they start searching for information resources for a particular academic purpose. They also expressed a preference for electronic versions of databases over the printed counterparts. With regard to where the search took place, most respondents chose home. Previous search experience was reported as the major source from which students conduct further research. Friends and colleagues were found to be the first resort for students when they needed help in their search. In general, students expressed satisfaction with their search outcomes, despite the difficulties reported in some of the open-ended questions related to problems with computer and/or network connections.

CHAPTER SEVEN - QUESTIONNAIRE ANALYSIS

Comparison of Faculty and Students

7.1 Introduction

This chapter provides a descriptive analysis of the data obtained from the sample of faculty members from Kuwait's College of Graduate Studies. Moreover, it presents a comparison of the information-seeking behaviour of faculty members and students.

7.2 Background of Faculty Members

Of the 80 faculty members who participated in this research, a majority were male (78.0%) and over 40 years old (96.0%). More than half of the participants were non-Kuwaitis (56.2%), while Kuwaiti faculty members constituted 42.6% of respondents. A large proportion of faculty respondents teach in the Science disciplines (36.2%), while the smallest proportion teaches Islamic Studies (3.8%). This small percentage is explained by the fact that it was hard for the researcher to get access to faculty members teaching in this area because of cultural issues. The Department of Islamic Studies is dominated by male faculty, and the college has two separate buildings: one for female students and the other for male students. Table 7.1 illustrates the distribution of faculty among the disciplines.

Table 7.1 Distribution of faculty among disciplines

Discipline	No of Respondents	% of Respondents
Science	29	36.2
Social Sciences	10	12.5
Engineering	8	10.0
Medicine	7	8.8
Arts	7	8.8
Education	7	8.8
Business Administration	5	6.2
Law	4	5.0
Islamic Studies	3	3.8
Total	80	100.0

In terms of academic background, the largest proportion of the faculty members (41.2%) received their highest degree in the United States, while the smallest percentage received their highest degree in Kuwait (1.2%). More than half of the faculty members (52.5%) had taught graduate courses for more than 10 years.

7.2.1 English Language Proficiency

For English proficiency, a seven-point Likert scale was used to elicit the faculty members' perceptions of their language skills. Results showed that 77.4% of the 80 respondents claimed they had good English skills, ranging from "above average" to "fluent"; only 5.0% thought their English skills were "average".

7.2.2 Computer Application Skills

Faculty members were asked to rate their computer literacy skills (applications) on a seven-point scale that comprised "no skills at all", "have some skills", "novice", "average", "above average", "good", and "expert". Applications were Word processing, Excel, databases, PowerPoint, and file management. Likert scores showed that faculty members believed they were relatively good at computer applications. They were most confident of their skills in word processing, with a Likert score of 5.76; and least confident with referencing software to prepare bibliographies, with a Likert score of 4.15.

7.3 Faculty Members' Perceptions of Students' Library Use

This section of the questionnaire was intended to elicit faculty members' perceptions of their students' use of the library and information resources. For that purpose, a seven-point Likert scale was adapted, based on a validated 20-statement instrument developed by Baker (1997). Using validated instruments has advantages. For example, the validated questionnaires will have been piloted and used before, and may therefore carry some extra authority for the readers (Gorard, 2004, p.102). The scale ranged from "1=strongly disagree" to "7=strongly agree". The results of calculated Likert scores for the faculty perceptions statements are listed in descending order in Table 7.2.

Table 7.2 Faculty Members' Perceptions of Students' Library Use

Statement	No.	Likert scores
Learning the processes necessary to use the library is an important skill for students.	79	6.15
Libraries ought to help students learn the process of finding information rather than finding the information for them.	80	6.14
Learning to use the library helps stimulate students' intellectual curiosity.	80	6.00
Library-based assignments can increase students' awareness of the world outside the classroom.	80	5.94
Faculty members should design assignments for their students that require library use.	78	5.91
One of my roles as an instructor is to motivate students to want to use the library and the range of electronic information resources available.	79	5.85
An important reason for students to learn to use the library is to become familiar with the literature in their subject field.	80	5.77
Learning to use the library is an important way to increase students' self-esteem and self-confidence.	77	5.75
Student plagiarism is an increasingly significant issue because the electronic information environment makes it so easy to plagiarise.	75	5.75
Good skills in using the library may also improve students' general communication skills.	80	5.51
Instructors should make graded assignments or find other ways to motivate students to use the library.	78	5.36
Students' lack of study skills (including writing and organising) makes it difficult for instructors to mandate library-based assignments.	78	5.19
It is the librarian's responsibility to ensure that the library has up-to-date information in my subject area.	78	5.18
For an instructor, making student library assignments is very time consuming.	79	4.89
Most students in my classes do not have the necessary skills to undertake library-based assignments.	79	4.52
The library is not valued by the administration as an important part of the college's educational programme.	79	3.80
The information resources available in the college library in my subject field are not adequate for me to make student library assignments.	80	3.75

The calculated Likert scores show that the majority of faculty members endorsed the statements stipulating the necessity of learning to use the library independently and that these library skills will increase the students' self-esteem, confidence and general communication skills (range of Likert scores= 6.15-5.94). In addition, a majority of faculty members agreed that they have an important role as instructors to motivate students to use the library by giving them library-based assignments (Likert scores=5.91 – 5.75). Despite these endorsement perceptions, a majority of faculty participants thought that making library-based assignments is time consuming and requires students to possess some skills (Likert scores=5.51-4.52). The majority of faculty members agreed that the library is valued by the administration as an important part of the college's educational programme, and that information resources available in the college library in their subject fields were adequate for them to make student library assignments (Likert scores 3.80-3.75).

7.4 Information Technology Training

Faculty members were asked whether they had received any training on means of conducting information research. Respondents were able to choose from multiple answers for this question: "specialist IT services session", "library training session", "receiving help from the library", "nothing", and "other". Figure 7.1 illustrates the distribution of faculty members based on their ranks and the types of training they reported having received.

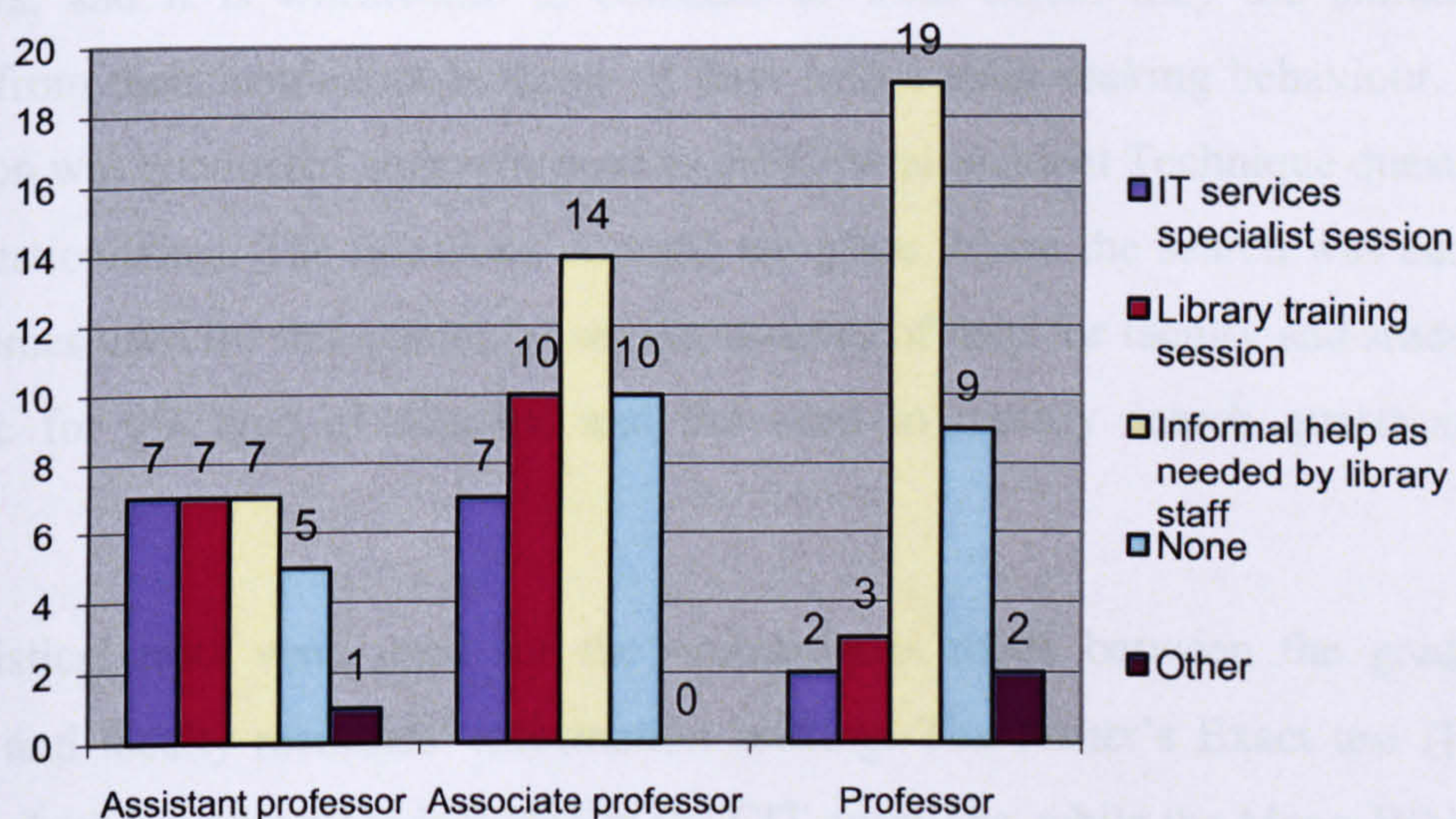


Figure 7.1 Distribution of IT training among faculty members

A series of chi-square tests was conducted to find out whether there were any associations between the demographic characteristics of faculty members and their perceptions regarding the information training they receive. The chi-square tests suggested that the selection of the answer “IT services specialist session” was significantly associated with faculty members’ academic rank. Assistant professors were more likely to receive IT services specialist training from their universities than were associate professors and professors ($\chi^2=7.402$, $df=2$, $p<0.05$).

The chi-square tests also showed that the response “library training session” was significantly associated with faculty members’ academic rank and skills in using databases and PowerPoint. Assistant and associate professors were more likely than professors to receive library training from their universities ($\chi^2=6.437$, $df=2$, $p<0.05$). Faculty members with better skills in databases ($\chi^2=4.113$, $df=1$, $p<0.05$) and PowerPoint ($\chi^2=6.160$, $df=1$, $p<0.05$) were more likely to have received library training from their universities.

7.5 Comparing the Information-seeking Behaviour of Faculty Members and Graduate Students

This section of the analysis makes comparisons between the information-seeking behaviour of graduate students and faculty members in terms of looking for information resources to fulfil academic tasks. Graduate students can be seen as future researchers, and it is worthwhile to consider to what extent they are similar or different from their instructors in terms of their information-seeking behaviour. The comparison was conducted with reference to the Critical Incident Technique questions in the questionnaires. The questions covered the place where the search was carried out, resources used for that particular search, sources of help for faculty and students, preference for the type of sources, and the need to modify search questions or strategy.

Two statistical tests were used for the comparisons made between the graduate students’ and faculty members’ information seeking. The Fisher’s Exact test (FET) fits categorical data like those included in the CIT questions, while the Mann-Whitney U test was used for the ordinal data. The outcomes of the tests are explained in detail below.

7.5.1 Searching For Information

In this section of the questionnaire, the Critical Incident Technique was employed to ask students and faculty members about a recent incident when they had to look for information to fulfil a particular academic task. The first question was related to the place where they carried out their search. As it is a multiple-choice question, a FET was used to compare the answers of students and faculty members. The test showed that 22.0% of faculty chose “Library”, as opposed to 53.0% of students (FET<0.01). This was expected since students tend to make more journeys to the library than do faculty members, who have tight schedules with their teaching and research tasks. In addition, 19.0% of faculty chose “College workstation/computer lab” to carry out the search, whereas 27.0% of students made that choice. Again, this reflects the fact that students are more engaged with lab work, as they attend graduate classes in college. On the other hand, 76.0% of faculty and 32.0% of students chose “Office” as the place to carry out their search (FET<0.01). Finally, 38.0% of faculty chose “Home”, as opposed to 67.0% of students (FET<0.01). All of these results are illustrated in Table 7.3.

Table 7.3 Location where the information search was carried out

<i>Where did you carry out the search?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Library	22	53	< .0001
College workstation/computer lab	19	27	.156
Office	76	32	< .0001
Home	38	67	< .0001
Other	4	7	.445

The second question was related to what resources faculty members and graduate students used to find the information they needed. The results of the FET suggest that there are significant differences between the responses of faculty and students, who chose among “Search engines”, “E-journals”, “Libraries”, “Online database”, “Personal contacts”, and “University library website”. Faculty members (68%) were more likely than students (48%) to use e-journals (FET, p<0.01). Faculty members (66%) were also more likely than students (45%) to use the library’s online databases to find the information (FET, p<0.01). However, students (88%) were more likely than faculty members (77%) to use search engines (FET, p<0.05). In

terms of use of personal contacts (FET, $p < 0.05$) and the university library website (FET, $p < 0.05$), students (25%, 38%, respectively) accessed these resources more often than faculty members (13%, 24%, respectively) to find the information. These results are illustrated in Table 7.4.

Table 7.4 Approaches used to find information

<i>What did you use to find this information?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Search engines	77	88	.022
E-journals	68	48	.01
Library's online databases	66	45	.001
Personal contacts	13	25	.025
University library website	24	38	.02
Other	4	7	.327

The third question asked what sources of help students and faculty turn to when they need it. FET suggests that students (51.0%) were significantly more likely than faculty members (8.0%) to ask a lecturer for help (FET, $p < 0.01$). These results are illustrated in Table 7.5.

Table 7.5 Comparison between faculty and students - who they asked for help

<i>If you needed to ask for help, who did you ask?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Library staff	32	39	.359
A friend/colleague	61	63	.896
Lecturer	8	51	< .0001
Other	11	5	.107

The fourth question in the information-search questions asked whether respondents had experienced any computer or network service problems while they were conducting the search. FET suggests that students (39.0%) were significantly more likely than faculty members (24.0%) to have experienced computer or network service problems when doing the search (FET, $p<0.05$). These results are illustrated in Table 7.6.

Table 7.6 Comparison between faculty and students - computer/network problems

<i>Did you have any computer or network service problems when you were doing the search?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Yes	24	39	.014
No	76	61	.014

The fifth question was related to the preferred source type while searching for information. FET showed that 24% of faculty respondents chose “Print versions of databases/journals”, as opposed to 33% of students; and 76% of faculty chose “Electronic versions of databases/journals”, while 67% of students chose that medium. These results are illustrated in Table 7.7.

Table 7.7 Preferred source of information

<i>If given the option, how would you prefer to search for information?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Print versions of databases/journals	24	33	.134
Electronic versions of databases/journals	76	67	.134

The sixth question in the search for information section was related to whether faculty and graduate students needed to modify their search questions or strategies. There are significant differences between the faculty members’ and students’ answers. Faculty members (55.0%) were more likely than students (42.0%) to need to modify their search question or strategy (FET, $p<0.05$). These results are illustrated in Table 7.8

Table 7.8 Need to modify search strategy

<i>Did you need to modify your search question or strategy at all?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Yes	55	42	.042
No	45	58	.042

For the responses to question number seven, “What/Who made you aware of the electronic resources used in your search?”, the FET showed that there were significant differences between faculty and students, particularly in terms of choosing a “Course/session”. Students (35%) were more likely than faculty members (18%) to be aware of the electronic resources used in the search from the course/session (FET, <0.05). These results are illustrated in Table 7.9.

Table 7.9 Sources of awareness of e-resources

<i>What/Who made you aware of the electronic resources used in your search?</i>	<i>Faculty %</i>	<i>Students %</i>	<i>Fisher's exact Sig.</i>
Previous search experience and results	84	74	.063
Friend/colleague’s suggestion	33	39	.309
Course/session	18	35	.003
Departmental website	11	11	.842
Other	5	8	.482

7.5.2 Mann-Whitney U Test for the Ordinal Data

The Mann-Whitney U test was used to make the comparison between students and faculty members in terms of ordinal data, including their “satisfaction with the search” and the “frequencies of the general use of electronic resources”. The test suggests that the responses to the question, “How did you feel about the results of your search?” are significantly different between faculty and students. Faculty members (mean score=5.58) were more satisfied than students (mean score=5.03) with the results of the search (Mann-Whitney U test, p<0.01).

A query on the frequency of use of information sources was provided in both students' and faculty members' questionnaires. The question had an ordinal scale ranging from "Never" to "Daily". The result of the Mann-Whitney U test suggests that there are significant differences between faculty members' and students' responses to the question, "In general, how often do you use the following information resources to fulfil your academic needs?" Information resources listed included university library website, serials, print books, and dissertations/theses. Faculty members (mean score=3.81) were more likely than students (mean score=3.21) to use serials (Mann-Whitney U test, $p<0.05$). However, students (mean score=4.15) were more likely than faculty members (mean score=3.52) to use the university library website (Mann-Whitney U test, $p<0.05$). Students (mean score=5.13) were also more likely than faculty members (mean score=4.44) to use print books (Mann-Whitney U test, $p<0.05$). Additionally, students (mean score=3.94) used dissertations/theses more often than did faculty members (mean score=3.26) (Mann-Whitney U test, $p<0.05$). Table 7.10 illustrates those results.

Table 7.10 Mann-Whitney U Test Comparing Faculty and Graduates' Use of Information Resources

Q21 Frequency of using information resources	Faculty members		Graduate Students		Mann- Whitney U	
	Likert score	No	Likert score	No		Sig.
World Wide Web	5.83	76	5.90	359	13103.00	0.559
Search engines	5.59	74	5.75	361	12109.50	0.182
Electronic journals	4.84	77	4.40	357	12285.00	0.138
CD-ROM databases	3.06	68	3.26	355	11802.50	0.768
Online databases	4.61	71	4.54	354	12361.50	0.825
University library website	3.52	73	4.15	359	10651.50	0.011
Serials	3.81	69	3.21	139	3874.50	0.022
Printed books	4.44	75	5.13	363	10591.50	0.002
Dissertations, theses	3.26	76	3.94	362	11078.00	0.007

7.6 Summary

In this chapter, a description of the information-seeking behaviour of the faculty members of the Kuwait College for Graduate Students was presented, followed by a comparison between the behaviours of faculty and those of graduate students. The comparisons were carried out using Fisher's Exact test and Mann-Whitney's U test.

The results showed that the majority of the faculty members searched for the information at their office, whereas the majority of graduate students searched for information at their homes or at the library. Moreover, the majority of both faculty and graduate students used search engines to look for information, although students were slightly more likely than faculty to use this approach. On the other hand, members of faculty were more likely than students to use e-journals and library online databases to search for information.

Students were significantly more likely than faculty members to experience computer problems when conducting searches. Finally, while students and faculty members were equally likely to ask library staff or friends/colleagues for help, students were much more likely than faculty members to ask lecturers for help.

CHAPTER EIGHT - QUALITATIVE DATA ANALYSIS

8.1 Introduction

Qualitative data were collected from focus groups with graduate students from various disciplines, and from semi-structured interviews with faculty members and senior librarians in order to explore the factors influencing the information-seeking behaviour of graduate students. The recorded focus group discussions and interviews were transcribed and translated into English. The data was then analysed qualitatively. This chapter presents the results of the analysis and attempts to categorise the outcomes of the focus groups and interviews into interrelated themes.

ATLAS/ti V5.0 software was used to analyse the qualitative data, and a thematic approach was used to further analyse the coded transcripts. The analysis of the qualitative data included consideration of the respondents' comments and perceptions of their information-seeking behaviour, and the factors that had influenced their search for information.

The following major issues emerged from the analysis of the focus groups and interviews:

- The information literacy skills and training needs of graduate students;
- The use of electronic information resources by graduate students and faculty members;
- The role of faculty members in influencing the information-seeking behaviour of graduate students;
- The role of the library and librarians in influencing the information literacy skills of graduate students;
- Cultural issues influencing the information-seeking behaviour of graduate students.

These issues are discussed in detail in the following section. The participants quoted are referred to as shown in Figure 8.1.

Figure 8.1 Codes referring to participants in the focus groups and interviews

Graduate Students:
Arts and Humanities (AH), seven participants, referred to as: GAH1*, GAH2... GAH7 (G =graduate students)
Social Sciences (SS), eight participants, referred to as: GSS1 ... GSS8
Medical (ME), five participants, referred to as: GME1 ... GME5
Science (S), four participants, referred to as: GS1 ...GS4
Faculty Members:
Science (S), two faculty members: FS1 and FS2* (F =faculty)
Social Sciences (SS), four participants, referred to as: FSS1....FSS4
Arts and Humanities (AH), four faculty members: FAH1...FAH4

8.2 Information Literacy

8.2.1 Training Needs

Graduate students in the four focus groups were asked about their views on the university library’s efforts to raise students’ awareness of what resources are available. Lack of sufficient orientation was an issue that emerged repeatedly from these discussions. The majority of students from all disciplines indicated that they needed more instruction on how to use the databases, how to initiate search strategies and how to use keywords to retrieve necessary information. For example, two medical students indicated that they were not satisfied with the outcomes of the training they had received:

Even when they provide some instructions about the databases, they are not sufficient. We had one or two sessions on how to use these, but they were not detailed enough to allow us to make proper use of them. (GME1)

It would be nice if we were taught how to find and use information resources. It would save us lots of time in terms of trial and error. (GME2)

The majority of Social Science participants expanded on the issue of lack of orientation and also indicated the need for more training on how to conduct searches. Almost all the participants questioned why the academic library did not conduct more training sessions. They expressed the need for training either during the bachelor degree, or at the start of the graduate programmes. Surprisingly, even students from the LIS programme voiced the need for training on how to search for information resources efficiently. As one LIS participant explained:

I was not efficient when I started to search and could not get the articles that I needed. After taking the workshops on how to carry out searches, how to use Boolean logic, how to use descriptors, now I'm more efficient. Instead of wasting lots of time and ending up with 300 articles, I get only the ones that I really need now. (GSS1)

Another participant indicated that LIS students did not necessarily get adequate training just because they specialised in information, while another stressed that:

We don't want them to take it for granted that we know how to search properly, we need training. We are not professionals. Even the workshops that we had were not delivered by professionals. We expect these workshops to be delivered by one of the faculty members or experts in the field, and not by Masters students. (GSS5)

Four of the seven students from the Arts and Humanities group also noted the need for training, and expressed the hope that pre-session training would be improved. One participant said: *"We don't have any sort of orientation sessions in the library before we start our graduate programmes"* (GAH3).

In the focus group discussions there was a general feeling of lack of awareness of information resources, and the majority of participants expressed high levels of library anxiety when encountering the various information resources available for their fields. This finding is in line with data from the quantitative analysis, which suggested a statistically significant relationship between uneasiness with using the library, and the

use of electronic information resources, particularly electronic journals. Results showed that the more students reported anxiety towards using the library, the less they reported using electronic journals. This finding indicates the value of efforts to reduce levels of library anxiety in graduate students. Less library anxiety would inevitably lead to more comfort with and better awareness of what information resources are available, and this in turn may foster more efficient use of information resources.

Faculty members were asked whether they had received any advanced training on how to use certain databases, or on how to conduct searches in general. The majority of interviewees reported not having received adequate training. However, while some participants expressed the need for advanced training, others indicated that they did not need any training. It was surprising to find that some senior faculty members in Science lacked adequate searching skills in using Internet resources. For example, an assistant professor from Engineering said:

I'm not very good at collecting data from the Internet. I feel more comfortable going to the library and looking at physical documents. Maybe, in the coming years, when we have faster Internet speeds and sources are more freely available from home, I'll do more searches on the Internet and on databases. (FS1)

When the same faculty member was asked whether he had received any invitations to attend training workshops, he replied: *"No, not at all. They might send a memo; I guess they're not doing their job."* On the other hand, a faculty member from the Mathematics Masters programme and another from Arts and Humanities indicated that they did not need any training on information retrieval. One stated, *"No. I think beginner researchers are the ones who need such training"* (FS2).

However, some positive views were put forward. A faculty member from Social Sciences teaching on the Psychology Masters programme referred to the staff workshops offered by the Information Technology Unit at the College of Social Sciences:

I remember one of these workshops was about BSCO and how it was updated. Also, they showed us how to use the Internet to reduce the time looking for data. The library also offers similar sessions annually. We usually receive leaflets about these sessions from our departments. (FSS3)

A professor from Arts and Humanities, teaching on the English Literature Masters programme, indicated that he was not aware of any advanced training sessions for faculty members at Kuwait University. He went on to state that:

I think the assumption has been that we know or will learn quickly how to use those databases. I think it would be a good idea if the university offered a basic introductory course for all faculty members. (FAH1)

A professor from Social Sciences, teaching on the LIS Masters programme, pointed out that there were some training sessions available, but these were very basic. Another associate professor from the same department provided examples:

Many workshops are given by the Information Technology Unit in the College of Social Sciences- they offer various training sessions like searching the Internet, databases, and using models in teaching. Windows VISTA was also explained in a workshop, but the attendance was very poor. (FSS2)

Faculty members were asked whether any workshops were offered for graduate students to enhance their information searching skills. There was a mixed response, but the majority of faculty members thought that advanced training on information retrieval should be offered to graduate students. Among the more positive responses, an assistant professor from Social Sciences noted that:

The IT department offers students some training on how to use information resources in Psychology. We integrated those training sessions as part of the course. It's established practice now, whenever students take this research methods course, they take part in a training session, given by a specialist, on how to conduct searches. (FSS1)

Analysis of the interviews with the academic staff revealed that seven out of the nine did not feel the need for advanced training sessions on information retrieval. It seems that they took for granted that they had good information literacy skills. However, this perception is contradicted by the fact that two faculty members indicated that they were not fully aware of the databases offered by the library, two did not know how to access them, and three were not aware of search engines like Google Scholar.

Senior academic librarians were asked about the training sessions provided for graduate students on the use of electronic information resources. The head of Kuwait University Library and the other six senior librarian interviewees all referred to some type of training offered to graduate students, either in the form of workshops or through orientation hours. One senior librarian from the Law library even specified the database for which training was offered:

Yes, we offer training for students on using the databases, for example, in our library, this is specific for Law and introduces the Legal Collection, index to legal periodicals, and Mohamoon which is an Arabic database specialised for resources related to Islamic law. (SL3)

Another senior librarian indicated that some faculty members play a role in organising workshops for students:

There are some training sessions for graduate students on the use of the databases, organised in cooperation with faculty members or the graduate students. (SL5)

These comments show that training opportunities aimed at enhancing graduate students' information search skills do exist in the academic library. However, there are questions concerning whether these services are adequate or beneficial, and whether graduate students or faculty members are fully aware of them. Quantitative data showed that the less awareness graduate students had of the services provided by the library, the less likely they were to conduct their search for information there.

8.2.2 Awareness

Graduate students and faculty members were asked what had raised their awareness of the information resources that would be useful for their searches. Both students and faculty participants noted the advice of friends and colleagues. A medical student commented that: *"I knew about this [database] from one of my friends who had already finished her MA in Science; she knew all about it, and taught me" (GME3)*. Three Social Science students (out of eight) mentioned that coursework was the main source of knowledge of the available information resources in general and databases in particular. According to one participant the source of knowledge was, *"the course itself, some courses tell us to look in ERIC or LISA. The search depends a lot on personal experience and trial and error" (GSS3)*.

These outcomes support the data from the quantitative analysis, which suggested that using personal contacts and coursework as sources of awareness are significantly associated with students' use of electronic resources, as well as anxiety towards finding the information. Quantitative data showed that the more students reported being anxious about finding and selecting information resources, the more likely they were to use personal contacts and suggestions from friends and colleagues to find information.

Faculty members too drew on personal contacts and suggestions from friends or colleagues. Regardless of whether they taught in Science, Social Sciences, or Arts and Humanities, the majority of faculty members noted their preference for contacting specialists in the area, or colleagues, authors and friends when looking for information. The following quotes, from faculty members from Social Sciences and Science, illustrate this point, and the associated difficulties:

There was not a lot published about this topic. When I first read about it, it was in an Egyptian journal. I had to ask specialists in the area and had to use contacts via e-mails to get in touch with those specialists, but I didn't get any responses. (FSS5)

Another possibility is to contact the authors directly because they may provide me with a copy, if needed. It takes some time to get responses to e-mails. It takes a week or so, it's not immediate. (FS2)

Analysis of the interviews revealed that some faculty members lack technical skills in using information resources. Three were not fully aware of how best to use the databases, while two others did not know about some of the search engines. One faculty member from Engineering was not aware of the electronic databases available through Kuwait University Library, and mistakenly believed that he had to pay for all the articles he needed to view. Thus he noted that: *"I find it much easier to find the information online rather than having to go to the library"* (FS1). This indicates that he had not checked whether Kuwait University subscribed to some of the databases in his field. Surprisingly, two professors from Arts and Humanities were not aware of Google Scholar. One of them stated:

No, I use Google, the usual search engine. I can focus my search, first, I give some keywords and then I add something and navigate Google to obtain what I need, I usually got to Google....ha....., I'm not really aware of what Google Scholar is. (FAH2)

Analysis of the faculty members' interviews revealed several issues concerning their use of information resources, particularly electronic ones. The main issues were related to awareness of the information resources, and their availability and accessibility. Faculty members also revealed a general over-reliance on the Internet to look for information.

In summary, analysis of the focus group discussions and the interviews showed that graduate students and faculty members have different sources of awareness for the information resources they use. This outcome supports the quantitative data, which suggested that there were significant differences between faculty and students, particularly in that graduate students were more likely than faculty members to become aware of electronic resources from a course they had taken. This implies that it is important to integrate training sessions within the framework of courses to enhance the students' information retrieval skills, and thus enable them to make better use of the information resources.

8.2.3 Search Process and Strategies

Graduate Students

Analysis of the focus group discussions revealed that the search process varied among different disciplines, and even among students from the same field. For example, one medical student from a group of five indicated that she started her search by looking at the list of references from articles, while another stated that:

I start with the Internet to get access to some journals. If I need books, I use databases subscribed to by the university; they give us a password to use them. Some of these databases are hard to use. We face the problem that not all of the journals are full-text ones. Most of the articles I've found were only abstract. (GME3)

Social Science students adopted different strategies, depending on the nature of their programmes. For example, two graduate students from the Business Administration Masters programme indicated that when seeking information they relied heavily on the Internet and on some faculty members, who *"used to give us articles, but we didn't know how to search them by ourselves"* (GSS5). Another Social Science student, from the LIS programme, reported using a different process: *"I use Wikipedia as a starting point, to understand difficult terminology. I use this information, then I*

look at Google Scholar or LISA (Library and Information Science Abstract)” (GSS1).*

Three out of a group of four Science students mentioned that they usually start with search engines but also look at journal articles and do not rely a lot on books. For example, one commented:

We look at the general search engines; also, we use the experience of the lecturer himself who may have worked on a similar project before. I start with journals. I only use the books for background information. (GS4)

The above quotations show that graduate students from different disciplines adopt different search strategies when they look for information. This supports the findings of the quantitative data, which indicate that the academic discipline has an impact on the information-seeking behaviour of graduate students. For example, Social Science students were more likely to make use of online databases than students from other disciplines. This might be related to the fact that the majority of students enrolled in the Social Science Masters programme are also registered on part of the Library and Information Science Masters, for which knowledge of information resources is essential. Nevertheless, and as the results indicate, these students may not be receiving sufficient training in retrieving and using information.

Faculty Members

Nine faculty members were asked how they initiated their search strategies. Answers varied among staff across the taught graduate programmes. Descriptions of how they initiated their search process also differed, as some provided a general idea of what they did while others specified the details of their search process. Synthesis of the data analysis shows that the three major information resources used by faculty members were search engines, databases, and books. For search engines, five of the interviewees mentioned Google, while one faculty member from the LIS programme made reference to Google Scholar. Three faculty members from the Social Sciences and two professors from Arts and Humanities reported databases as the first point of search. However, academics within the same programme also adopted different strategies; some started with a database search while others began with search engines, as indicated in the following two quotes by faculty members from the LIS

programme:

I started with the Library and Information Science Abstracts (LISA) because I didn't expect to find anything in OPAC. I had already done research in this area and had some knowledge on where to find the information. So I did a comprehensive search about the subject in Emerald database and on the Internet. I use Google, especially when I need the full text and not only a citation. (FSS1)
First, I searched Google Scholar to find some citations; then I focused on two databases: ERIC and LISA. The problem I faced was that I didn't find many items related to the topic for which I'm conducting research. (FSS3)

Two professors, one from Education and the other from Arts and Humanities, reported that although they used the Internet, their first point of search was books and research papers.

Overall, analysis of the focus groups with graduate students and of interviews with faculty members supports the quantitative data, which suggested that faculty members were more likely to use the library's online databases, whereas students were more likely to use search engines.

8.3 Role of the Academic Library

The academic library is an essential element in shaping the information-seeking behaviour of graduate students. It is the major repository of information resources and services for both academic staff and students. When graduate students were asked about their views on the library personnel, the majority expressed a negative view, noting in particular the lack of reference librarians to offer help and guidance, especially in the afternoons and evenings. It is worth mentioning that most of the focus group participants were part-time students who work and can only attend the library in the evening.

Graduate students in the four focus groups were asked to what extent they were aware of what the library offers, and to what extent they make use of the available resources. Overall, the discussions revealed lack of awareness across the disciplines of the role of the academic library in terms of the information sources and services it can provide.

Graduate students enrolled in the LIS programme were the most knowledgeable in this area. This finding was predictable, since they had studied the library, services and resources during their coursework. On the other hand, two MBA students stated that they were not acquainted with what the library offers. One commented:

We feel there is a big gap between what you know and what we know; we need to learn a lot about information resources. Why don't we have the orientation or the instructions on the website? We know that it takes time and money to be able to design a course for that purpose specifically but that would be a start. (GSS7)

Three out of the seven participants from Arts and Humanities indicated that they had a negative stereotype of the academic library. One revealed that:

My concept of the library is that it contains shelves. However, I've discovered that the computers in the library are not there just to play "solitaire"; you can search for journals on them. I only found out about this when I had to assist a faculty member in his work. Although I've worked as a librarian in the College of Islamic Studies for a while, I haven't yet developed a clear concept of the library. (GAH4)

This lack of knowledge was also evident in relation to specific services such as the Online Public Access Catalogue (OPAC). Surprisingly, five out of the eight students from Arts and Humanities, and two from the Medical focus group did not know about OPAC. One admitted: *"You mention OPAC, but this is the first time I have heard about it. For a whole year, we did not even know where the library was" (GAH7).*

Faculty members were asked in the semi-structured interviews about their views of the academic library and librarians. Most of the nine interviewees expressed dissatisfaction with the status of the library in general and the personnel in particular. They noted a need for more experienced reference librarians with specialisms in different disciplinary areas. Most of the faculty members also noted that the current library staff lacks adequate qualifications. Some also stressed the need for more cooperation between them and the academic library in efforts to enhance the graduate students' information literacy.

The senior librarians were also asked about their perceptions of the services provided for graduate students. Some of them criticised the way the academic library promotes its services for graduate students, while the majority agreed that there was a need for

more specialised information literacy programmes to enhance the students' awareness of what information resources are available, and how to choose the most appropriate resources to meet their academic information needs.

The head of Kuwait University Library noted that:

I think there is something wrong with the promotion of these services. One of the roles of the library is orientation and promotion. You might have noticed that only LIS students are fully aware of these services due to their personal contacts with faculty members who know about the services and the nature of their studies. (SL1)

Despite this view, this senior librarian also noted that it was the responsibility of graduate students to find out what services the library offers and to develop their own information skills:

I also think that graduate students themselves need to make some visits to the library before they enrol in their programmes. There used to be some orientation sessions for them, but the library stopped these as the take-up was poor. Both parties need to act in a positive way, the reference librarian and the student, as well. (SL1)

8.4 The Role of Faculty Members

Students in the focus group discussions were asked about their views on the roles played by their teachers and supervisors with reference to their information-seeking behaviour. Analysis revealed that students' attitudes toward faculty members varied among the different disciplines. The discussion related to the offering of guidance, teaching styles, and the way in which teachers interact with students. These aspects are discussed below in detail.

The discussion revealed that the majority of focus group participants had a positive view of the role faculty played in offering guidance on how to conduct searches. Areas of guidance which participants noted included: how to conduct literature review, helping to locate articles, and organising orientation trips to the academic library. This positive attitude is illustrated by the following quotes from two Medical group participants:

In my case, because the subject was new and not a lot was written about it, we all started to search; even the supervisor and the co-supervisor started to look for information, just as students do. They then gave me the titles of what they had found, and asked me to carry on. They helped me a lot in terms of how to write a proposal and then how to develop it into a thesis. (GS3)

Yes, my tutor was very helpful, and most of the work I've done was based on his publications. He gave me lots of copies of articles and asked me to look at them. I found out about PubMed from him. It depends on the supervisor; some teach you how to look for resources, and others let you learn everything on your own. (GME3)

A female student from the Social Science group noted the role faculty members had played in helping students find out about what is available in the library: *'For example, one of our instructors took us around the library for one and a half hours, and showed us everything'* (GSS4).

However, a minority of participants noted a need for more effort from faculty members to enhance their information literacy and learning skills. One student from Social Sciences noted that:

I think there should be a systematic way for teachers to provide information on this; not just an ad hoc system. Each lecturer, before starting his course, should give a 3-hour introductory session on that with an assistant, but in a systematic way. They have to be systematic because this will have an effect on us. (GSS2)

The views reported above reveal a mixed picture of how graduate students perceive the role of faculty members in shaping their information-seeking behaviour. Nevertheless, there was general satisfaction, and few participants thought negatively about the teaching staff on their own Masters programme. These findings offer support for the quantitative findings, which suggested a significant association between guidance from staff on how to conduct literature review and the students' knowledge of what resources are available in their areas of interest. The findings suggested that the more students reported that their teachers offered guidance on literature searches, the more likely these students were to engage in information searches.

Another issue that emerged from focus group discussions was related to Information Technology and computer literacy in relation to the age of some members of faculty. Students' views on this differed according to their majors. For example, a student from Education complained that *"We have faculty members who are in their 70s; they don't use emails. In our department, we have two faculty members who are over 70"* (GAH7). However, a participant from the Science group commented more positively:

We also have a faculty member in the Science department who is over 70, but he is very open-minded and wants to learn about these things, so we can contact him by email. This kind of person will tell you that he, as a faculty member, also learns from you, as a student. (GS2)

For their part, faculty members were asked about their perceptions of how graduate students make use of information. The common finding across all the disciplines was that faculty members held negative views of how their students search for and use the range of information resources available to them. Seven out of the nine faculty interviewees reported an over reliance on the Internet, and considered that this made students reluctant to use databases, which contain more reliable resources. An assistant professor from Engineering indicated that some graduate students did not take the initiative to learn more about how to use the databases that the library subscribes to:

The only thing they do is that they go to Google and Yahoo. I don't think they know about the databases that need passwords or fees. I don't think that Kuwaiti graduates are much interested in very highly sophisticated resources like these. I think the information our students are getting is ten years older than what can be accessed in the Western universities like in the States or the UK. (FS1)

Supporting this view, a faculty member teaching on the LIS Masters programme noted that:

I have also noticed an over reliance on the Internet; and we keep telling students that two-thirds of your references must be from scientific papers, not just logs or online citations. They don't go to the library at all if they find the information online...the library is their last resort now. (FSS1)

In a similar vein, an assistant professor from the faculty of Science noted that graduate students' information search skills were poor, and stressed the need for more training to enhance information literacy skills amid the proliferation of electronic

information resources:

The problem with that is that they do not find an adequate number of resources when they only look on the Internet. Therefore, some of them come back saying that they did not find anything about the subject. I don't blame them, as, when they joined the programme, no one offered them a course on how to conduct effective searches for information. (FSS)

However, two out of the nine faculty interviewees had a more positive view on students' use of the Internet. For example, a teacher on the Mathematics and Computer Masters programme indicated that he does not place any restrictions on the way students use the Internet:

Students are completely free when it comes to choosing information resources. I have no concerns about copying because I give them original tasks so they cannot find similar ones. Students should not depend on one source but it's their responsibility to decide which sources to use. (FS2)

Some of the faculty members were concerned about the lack of true critical thinking in students' academic work. A member of the Arts and Humanities faculty indicated that:

Our status has to change in many ways: mentality, approaches, curriculum, personal connections, and getting privileges without effort, this system [at Kuwait University] in general destroys creative thinking. (FAH3)

The overall impression from the focus groups and the interviews was that faculty members play an important role in influencing the information-seeking behaviour of graduate students. Students generally had a positive view of that role. However, faculty members revealed a generally negative attitude towards the graduate students' information skills within the academic environment. These differing attitudes indicate a lack of mutual understanding between students and faculty members in terms of information-seeking behaviour, particularly in the electronic environment.

Another issue that emerged from analysing the qualitative data is the way in which graduate students perceive the teaching style of faculty members. Students were questioned about this in order to investigate any association between the perceived style of teaching and students' literacy skills. Issues discussed by focus group

participants concerned the way teachers or supervisors deliver their lectures, the communication between students and faculty members, and the use made of information technology in presenting lectures.

Two of the Social Science participants had negative attitudes towards the methods used by instructors to deliver their lectures. One commented:

Some faculty members are not focused, and they jump from one subject to another, which makes it hard for students to take notes. The outline of the course description and objectives are not clear for some of them. (GSS2)

The other mentioned the limited channels of communication between students and teachers: *“The department has assigned faculty members as our supervisors, but we need to contact them, to get in touch with them...We need their emails”* (GSS6). This idea was supported by another Social Science student, who explained how the absence of her supervisor had affected the timeline of her final submission:

I’m approaching the submission of my comprehensive exam paper, and I haven’t met with my assigned supervisor because he has not been in the country. However, one of the other faculty members volunteered to help me. (GSS4)

With regard to the teaching style of faculty members, some of the focus group participants revealed differences between faculty members from the same discipline, especially in the way they use IT. As one Social Science student indicated:

It depends on the faculty members; some do use advanced IT, but we find their lectures very boring. Others don’t use IT, but we find their classes very interesting. Some rely heavily on emails for sending grades and corrected assignments. (GSS2)

The comments above provide support for the quantitative findings that teaching style is significantly associated with students’ perceptions of their courses as the sources of developing their awareness of information resources. The questionnaire data showed that the more students perceived teaching style to be based on lectures and tutorials, the more likely they were to make more use of their courses to enhance their awareness of the available information resources.

Another issue that emerged concerning faculty members was their level of specialist knowledge. Participants from all four disciplines expressed some common, mostly negative, views. For example, one participant from Arts and Humanities indicated that

not all the instructors were capable of delivering lectures in the most effective way:

No matter how hard the teacher tries, he won't be able to transmit the message unless he gets help from speakers. Some teachers confess that they lack knowledge in some of the areas, and they get in touch with somebody specialised in the area to help them. (GAH7)

Two participants from the Science group believed that faculty members tend to use similar content or schemes of work on the Bachelor and Masters programmes, which are supposed to be pitched at different levels. One reported that:

I had the same incident; you register for a course called advanced but it is a similar course to the BA level. You discover that the lecturer uses the same notes and hasn't updated the course to make it suitable for the graduate level. (GS1)

8.5 Information Resources and Services

All the senior academic librarian interviewees indicated that their libraries provided specialised services for graduate students. For example, graduate students can borrow up to ten books for a month, whereas undergraduate students can borrow five books for two weeks. The library also offers interlibrary loan from the British Library and access to around 43 databases, although not all of them allow full-text retrieval off campus. In addition, passwords and user names are provided for faculty members and graduate students.

Graduate students were asked about the extent to which they make use of the library's resources and services. The majority of participants reported low usage and revealed that they use the library mainly as a quiet place to study. However, several students, most of whom were from Science, held positive views, indicating that they made good use of the books and journals available and that they found the librarians helpful. For example, one Science student commented:

In my area, they are very good; I have benefited from the journals and books available. The staff have provided me with lots of help. I used to work in the library part time, so they know me well. (GS3)

Faculty members too were asked for their views on the services provided by the library. The majority of the interviewees indicated that they were not satisfied with what the library offers. A number of faculty members noted the problem of lack of

books. For example, a participant from Engineering compared his experience in a university in the United States to his experience at Kuwait University. He noted: “At Texas University, where I studied for my PhD, there are two or three copies of every single book available even if it is a book from the 50s” (FS1). A professor from the English Literature Masters programme provided an example of an irrational acquisition of books in his area and pointed out that the library tends to have books about a certain author, but it is hard to find novels written by the author him/herself:

You really need someone there to rationalise acquisition, to start ordering collected works of all the major authors who we use on our courses; they should not be just authors who are used regularly. (FAH1)

Six faculty members were pessimistic about the future of information resources and the chances of getting highly qualified staff to work as reference librarians. A member from Social Sciences noted that:

Within the last 10 years, it has been more or less the same. They still lack the necessary information professionals – it is still bureaucratic and frustrating, the loan system, even services like photocopying are frustrating, there are too many restrictions, and offices are often closed. (FSS1)

Financial issues were also highlighted. For example, an assistant professor from Social Sciences raised the issue of financial allocations and expressed the need for more cooperation between various institutions in Kuwait:

There must be cooperation between PAET and AUK to have shared access consortia between libraries in the Arab world. When I was in Philadelphia, there were 7 universities in one consortium, and I had access to all of them. (FSS2)

Apart from resources and personnel, some faculty members stressed that cooperation between the academic library and faculty members was vital to enhancing graduate students’ use of electronic information resources. A participant from Social Sciences suggested some strategies for this cooperation, including the creation of a “research agenda” that would get librarians acquainted with the needs of graduate students. He also referred to a leadership problem, as indicated in the following:

We can get academic librarians acquainted with the needs of graduate students and get to know what areas of weakness they have in their information retrieval skills. However, there is also a

major problem with leadership in the library, there should always be more marketing of library services to students. (FSS4)

Three of the nine faculty interviewees regarded the location of the university library as a factor influencing its use. For example, an assistant professor from Engineering pointed out that the library is located at the end of the campus, making it inconvenient and hard to reach.

The role of the academic librarian was another recurrent theme in the interviews. The majority of faculty members had a negative view of the library personnel. Some considered that the problem was a lack of adequate experience or qualifications; whereas for others, the problem with the library personnel was related to the overall working environment and culture of the library. A participant from Engineering noted:

Unfortunately, the culture in Kuwait is that work finishes by 2 pm; it's like a part-time job. I think it would be much more useful if they worked till 5 and had a break between 2 and 3 pm. This was the best time for me to use the library when I was studying in the States. (FS1)

A faculty member from Social Science thought the librarians were under-qualified, and questioned their efficiency. This participant, along with others, noted that it takes a very long time to get what they need from librarians. For example, an assistant professor from Engineering stated:

If you want a book about glass, they might do the search and send you articles, but it takes up to 2 or 3 weeks to do so. We are in an era when people cannot wait; you want information instantly. Frankly, I don't trust the library so much and I don't have confidence in them so I buy books online from Amazon. (FS1)

A professor from Education commented: *"There are lots of facilities; the problem is with the personnel"* (FAH4). An Arts professor also stated, *"We mostly deal with junior staff that are not properly trained, and it's getting worse"* (FAH2).

8.5.1 Availability/Accessibility

Analysis of the interviews revealed a mixed picture concerning faculty members' opinions about the information resources available. One participant from the Engineering programme used his dissatisfaction with the available resources to

explain why he relied on the Internet to look for information:

We use the net to compensate for not having enough books about architecture. The easiest way is to go to Google or another search engine, and then we get the articles related to the topic. (FS1)

Similarly, an associate professor from the Social Sciences, teaching on the LIS Masters, stated that:

No, resources are not adequate. They are mostly collections of books and Kuwait University has stopped subscriptions to many journals. The only guide now is full-text retrieval and it is very limited, to Emerald, for example, otherwise, you can't retrieve it. (FSS2)

On the other hand, an assistant professor from the Psychology programme expressed satisfaction with the available resources for their field: *"Yes, they are adequate; the English resources especially are up to date and we get them through EBSCO" (FSS3).*

A second issue that emerged from the interviews with faculty members was related to access to the information resources, particularly the electronic ones. Five participants expressed negative views, while four showed a positive attitude. For example, an associate professor from the LIS programme referred to accessibility of databases:

For example, Medline is only accessible in the college of Medicine - if you're at X campus at Jaber Al-Ahmad Library, you won't be able to access Medline if you need it, which is particularly important if you are teaching a subject related to health. You need personal connections to get access to such databases. (FSS2)

A professor from the Arts and Humanities said that he could access the databases on and off the campus:

No, I usually do this here (office) so access to EBSCO is more or less automatic if you do it on campus. Also, off-campus at home, for faculty, we are given a list of passwords and IDs- these are not personal ids, you know; these are like KU's standing IDs that all faculty can use off campus, and that's extremely useful as well. (FAH4)

Similarly, a professor from the LIS programme stated that: *"The range of resources available is reasonably adequate, we have access to a number of LIS journals with full text" (FSS3).*

8.5.2 Usage

A majority of the graduate students in the four focus groups indicated frequent use of the Internet and of search engines, particularly Google. However, there were differences among the four groups. Students from Social Science had more knowledge of information resources, in addition to a better understanding of how to use the Internet for retrieving scholarly information. Three participants from this group also discussed the use of databases. One student from Library and Information Science said: *“My first choice are databases; I use Emerald, and ERIC” (GSS2).*

In contrast to the other groups, three Social Science students seemed knowledgeable about Google Scholar in particular. One participant noted: *“Oh, Google Scholar is great, and we make good use of its advanced features” (GSS3).*

All of the participants from the Medical group, and five out of the seven Arts and Humanities participants indicated a heavy reliance on the World Wide Web as the primary information source. However, despite a general awareness of how to use the Internet and search engines, some students said they did not know how to use databases. For example, a participant from Business Administration revealed that:

We haven't ever used those databases or journal articles. We have heavily relied on the Internet when doing our assignments, and when we started the MA programme we faced many difficulties. I mainly use Google because I don't know any other method. (GSS8)

A participant from the LIS programme justified the lack of knowledge on the part of students from other disciplines by indicating that they did not have adequate training on what resources are available or how to use them: *“I know that, in some MA programmes, there are not even guidelines on how to write a research paper” (GSS4).* These findings from the qualitative analysis indicate an overreliance on the Internet and search engines as a first resort for finding information, and a lack of ability to use databases to locate electronic journals. Discussions with graduate students revealed that the majority were not fully aware of the range of resources offered via the academic library. This supports the quantitative data, which indicated that the more students reported being anxious about using the library, the less likely they were to use electronic journals to find information.

Faculty members were also asked which sources they used most frequently to conduct their searches. Answers varied according to the discipline or subject taught, and it was evident that Social Science faculty members were more frequent users of databases than participants from other disciplines. An assistant professor from the LIS Masters programme stated, *"I used ERIC and LISA. They were helpful"* (FSS2). Another professor, from Education, said, *"I use ERIC and conduct the search in French"* (FAH2).

A professor teaching on the English Literature Masters programme described the databases that the library subscribes to as being straightforward to use, and reported being confident about using them:

It requires experience, like any other databases. One must be careful, though, not to waste time by bringing articles which are not full text and not just abstracts –I need full texts, and not just abstracts, but, once you've mastered it, these are basic steps.
(FAH1)

However, another professor from the same department had a negative attitude towards the databases available through the Kuwait University Library, noting that, *"No, they are not sufficient at all and do not always give you the full text; it's very frustrating"* (FAH2).

This indicates that even faculty members from the same discipline and of the same seniority have different attitudes towards the University's databases.

Regarding preferred information sources, a Social Science professor chose *"journal articles for my teaching and research, Google Scholar for citation. Text books are the last choice"* (FSS3). An associate professor from the Social Sciences provided a detailed account of the information resources he used for his searches:

I used LISA mainly, and because the topic was related to politics, I looked through political science databases, then searched Emerald to get some full-text articles and 70% of what I needed was there. I also found papers through the personal web pages of some scholars. (FSS5)

These findings from the interviews support the quantitative data, which suggested that faculty members were more likely than students to use the library's online databases, serials and electronic journals to find information, while students were more likely than faculty members to use search engines. The quantitative data also showed that

printed books, and dissertations and theses, were the information resources least used by faculty.

The above section has provided a thematic analysis of the perceptions of graduate students and faculty members on the usage of the information resources available to their fields. The sections below explore the views of the librarians towards the information resources provided through their academic libraries.

Seven senior librarians in Kuwait University Library administration were asked about their perceptions of the available information resources and their views on the future of the academic library amid the proliferation of information resources. Themes that emerged from the interviews with senior librarians revolved around two major issues: the current status of information resources, and the librarians' perceptions of the future of the academic library in Kuwait University. Five senior librarians expressed the hope that additional resources would be introduced, such as subscriptions to electronic books. The head of Kuwait University Library commented on such plans as follows:

There were some initial agreements through OCLC to get a subscription for one of the e-books databases; it was multi-disciplinary, at a reasonable price. Then we received news that it had been stopped. We have many e-books' offers by Springer or Elsevier*. (HL1)*

Senior librarians were also asked about the current status of the Kuwait University Library website as a vehicle for promoting awareness of the available resources. Five expressed satisfaction with the website. The head of the library noted:

We will add the catalogue of transcripts to the website, the new arrivals to it. We have also added news links. I think the website is adequate in terms of the catalogue. Students may also be able in the near future to renew their borrowed items online through the library's website. (SL1)

The importance of the website was also revealed by the quantitative data. The quantitative analysis suggested that the more frequently students reported using the library's website, the more likely they were to carry out searches for information. This finding indicates the significant role that a library website can play in promoting its sources and services to users.

Senior librarians were also asked whether statistics were available on the usage of electronic information sources. The majority of interviewees noted a lack of statistics on the actual use of electronic information resources at Kuwait University Library. However, the head of KU Library stressed the importance of having accurate statistics on the use of resources:

I think it is very important to evaluate the use of the databases to see how much they are being used and to inform decisions on whether to renew them every year. We are thinking of making a survey to evaluate the use of these databases.

We need some official data from surveys to show or to investigate whether there is a lack of awareness of the resources available in the library. (SL2)

The majority of senior librarians agreed that the statistics that were available refer only to the times of entry to the system (the computers in the library). A senior librarian referred to attempts to get better statistics, and indicated that there had not yet been a realistic estimate of how often students use these databases for academic purposes:

I asked vendors to provide means by which we can obtain statistics on use of databases. I haven't received an answer on that yet, and it's only for one database. Even the available usage statistics were provided with the help of vendors. I even asked reference librarians to observe the number of students using databases, as this might be an indication of how often they are used. We don't know whether they are making good use of the OPAC or the databases (SL2).

Senior academic librarians were also asked about their views on the current state of print resources in light of the over reliance on electronic media. One commented, "*I think that refereed journals will remain important and will be required despite the over reliance on open access interfaces such as Google Scholar*" (SL4). Others indicated that students still feel more comfortable with print resources, as noted by a senior librarian from the Law library: "*Most students still prefer to use print resources rather than electronic ones. The law student still prefers traditional resources*" (SL6).

On the other hand, the majority of senior librarians (six) expected that there would be an increase in users' demands for electronic resources. One stated that, "*There should be an increase in the budget of the library for having more resources, especially in*

light of the increase in the electronic databases available on the Internet'' (SL2).

The majority of participants expressed positive attitudes towards the future of Kuwait University Library. There was a common desire for the library to be completely automated, and for an increased dependence on electronic resources. One senior librarian commented, *"The academic library should be transformed into an electronic one, regarding all aspects of its resources, and services provided for faculty and students" (SL5).*

8.5.3 Barriers to Use of Information

In the focus groups and interviews, participants were asked about the barriers and problems they had faced when searching for information, in addition to any other factors that had influenced their information-seeking behaviour. Analysis of the focus group discussions showed that the majority of students across all disciplines faced problems in terms of their searches. Barriers to effective searching included language, knowledge of the resources, access, and availability. The problem of language was referred to by participants from all four focus groups. For example, a graduate student from Medicine indicated that she and her colleagues face the problem of finding articles which are not translated into English. This problem is discussed in more detail in Section 7.6 (Cultural Issues).

A senior Medical student participant was not aware of how to conduct a search for information in order to write a research paper. She stated:

Up to this point, I don't know how to do a research paper because we're clinicians and not academics. We do case reports to get promotions, but not research papers because they are very time consuming; you need resources and you need to be in college.
(GME5)

The majority of participants (18 out of 26) in the four focus groups agreed that they had faced difficulties searching for information when they first joined their programmes. A Social Science student noted that *"It is not easy; when we first started our graduate programmes, we didn't know how to search any of the databases" (GSS7).*

One student from Arts and Humanities referred to some of the problems encountered while searching for information, particularly when using different search strategies

with databases. The student indicated that she gets too many hits when she conducts the search electronically. A Science participant described problems related to accessing journal databases, noting that:

I have searched PubMed but we face the problem that some of the articles we need are only available in medical databases, so we have to go to the College of Medicine to access them. This is because the College of Science does not subscribe to many journals.
(GS2)

Another participant from the Arts and Humanities group, enrolled as a graduate student in Islamic Studies, indicated that most of the students in that Masters programme tend to adopt a very traditional way of searching for information:

We look for the word "commerce", for example, and see what list of books contains that word; then we get the classification number and search book by book. We also browse the entire table of contents. (GAH8).

Another problem raised was the reliability of the information resources. Six out of the total of 26 students in the focus groups noted that they found it difficult to determine the reliability of sources. For example, a participant in the Science group said, "*We cannot be sure that the information from the Internet is reliable; we need authentic, reliable scientific resources to back up our work*" (GS4).

The quotations above indicate that graduate students face problems while doing their searches and that they need more training on how to conduct efficient searches to avoid wasting time through trial and error. These findings support the quantitative data, which suggested that graduate students were more likely than faculty members to have problems while doing searches. The quantitative analysis also revealed that the better students perceive their skills in identifying the resources to be, the less likely they are to experience problems related to their search. This underlines the importance of enhancing the students' information literacy skills to minimise the problems they might face, and thus lead to more efficient information retrieval strategies.

Some faculty members cited "information overload" as a major problem. They noted that locating information remains manageable only as long as the researcher has the ability to select the most reliable sources of information out of the huge amount of

data available, particularly in the World Wide Web. For example, a professor from Education stated that:

There are more resources than we could dream of. Prior to having the Internet, it was very hard to find resources, unlike the situation now, where it is very easy either by gaining free access or by paying fees. There is an overload of information. Subjects need to be classified correctly. (FAH2)

This idea was expanded on by a professor from the Mathematics and Computer Science Masters programme, who pointed out that classification needs to be carried out by information professionals in their areas. An assistant professor teaching on the LIS Masters programme commented on the way some faculty members conduct searches, saying *“The information might be there, but we can’t find it, no matter how you refine your search, you still get too many hits” (FSS3).*

Overall, analysis of the focus groups with graduate students and the interviews with faculty members and senior librarians revealed a lack of understanding of the actual roles and duties of each of the three main components of the academic triangle: students, faculty members and the academic library. Graduate students, with their particular information needs, had a generally negative view of the library. Faculty members were generally dissatisfied with the services offered by the library, while academic librarians believe that they do provide the required resources but that they need more support from students and faculty members to enhance the use of library services.

The senior academic librarians were also asked about their perceptions of the role of librarians in influencing the students’ information search skills in general, and their use of electronic information resources in particular. One responded as follows:

I’ve been informed that some libraries face problems with the traditional card catalogue and, therefore, I asked them to produce a leaflet directing users to the OPAC, where they can do the search electronically. I also blame the reference librarian on the desk for not directing students to the services available. There is a major problem with the library personnel. (SL2)

8.6 Cultural Issues

The outcomes of the analysis of both the focus groups with graduate students and the interviews with faculty members and senior librarians show that organisational culture could influence the information-seeking behaviour of students and faculty members. Relevant cultural factors include issues related to language, censorship, segregation, and the overall teaching style at Kuwait's higher education institutions.

It was found from the group discussions with graduate students that most of the databases available to Kuwait University Library contain resources in English and thus, students who have poor English skills may have trouble using these effectively.

A participant from Social Science said:

If your English is weak, you'll have problems using the search terms. I don't face lots of problems because my English is good and I did fine using the instructions to learn how to use the databases.
(GSS3)

This comment supports the quantitative data, which suggested that English proficiency had a positive association with using electronic journals and the library's online databases. The better students perceive their English skills to be, the more likely they are to use these resources.

Participants in the focus groups also discussed problems associated with the teaching styles in their programmes, including the use of BA schemes of work for graduate level courses. These concerns are discussed at length in Section 7.4.1 above (Offering Guidance).

Censorship was another organisational cultural factor seen as affecting accessibility to information resources. Commenting on the laws of censorship which restrict access to some information resources, one Arts professor noted that:

You can't access paintings by Van Gogh, immediately; you'll be notified that access is restricted. Internet servers like Quality net exercise great restrictions. Sometimes it's shocking that you're not allowed to see certain works of art. You'll be prohibited from seeing any nude figures. It affects our searches, especially in cross-cultural studies or interdisciplinary works, which are hard to conduct when you can't even view works of art. (FAH2)

This professor also noted that the works of some authors were banned at Kuwait University Library for religious, political or social reasons. She said, *“If you want to search about sophism, you won’t find a single book for someone like Mohee El-dine ebn... it’s a taboo.”*

Segregation emerged as another issue related to the organisational culture of Kuwait’s higher education. Analysis of the interviews and the focus groups suggest that in some instances, male and female students were not allowed to book a room together in the library when they had a group project. As one Arts professor explained:

If you send mature working students as a group to the library for a research project, and you have a mixed group of males and females.... you’re looking at some potential gender issue problems as they should not be seen working together. (FAH1)

Since 1996, when a law was passed to segregate students in private schools and universities in Kuwait, liberals have protested. University professors have stated several times that *“segregating genders in campus has led to a big deterioration in the level of education in the country”* (Kuwait Times 2008). One activist questioned segregation on the grounds that Kuwait has been sending students on scholarships to co-ed universities since the 1950s:

How does the government allow students to go to co-ed universities in countries that are far removed from our culture and our traditions, while forbidding them from having that kind of education here in Kuwait? She asked. “Isn’t that a very big contradiction?” (Kuwait Times 2008)

Resistance to change was a recurrent theme in the interviews. One senior librarian commented, *“Due to the fear of change and not being able to cope with IT developments, I feel hesitant to move too quickly to using only the online services”* (SL1). The same senior librarian discussed the effect of the working culture in the library. She indicated that in a culture based on reward but not sanction, employees can keep their jobs as long as they come to work regularly. Therefore, the librarian indicated that many personnel get promoted, despite being uncreative and not having made any real contribution to the environment in which they work.

8.7 Summary

This chapter has presented a thematic analysis of the qualitative data obtained from the focus groups with graduate students and from semi-structured interviews with faculty members and senior librarians. The analysis produced in-depth information about the perceptions of graduate students on their information-seeking behaviour while engaging in academic tasks related to their coursework, projects and theses. In addition, the semi-structured interviews with faculty members have provided a comprehensive picture of teachers' perceptions of their graduate students' information literacy skills. The structured interviews with senior academic librarians working at Kuwait University Library administration have also helped the researcher to explore the extent of any cooperation between faculty members and academic librarians to fulfil the goal of enhancing students' information use and retrieval skills.

CHAPTER NINE - DISCUSSION

9.1 Introduction

This chapter integrates results from the quantitative and the qualitative outcomes of the study, and relates these to the aims and objectives of this research in light of what is known from the literature review about the information-seeking behaviour and information use of graduate students. Indications and implications are drawn from the results to inform the formulation of conclusions and recommendations, which are presented in Chapter Ten.

9.2 Background

This study explores factors influencing the information-seeking behaviour of graduate students. To this end, the Critical Incident Technique was used to investigate the patterns of information seeking among graduate students in Kuwait. Students were asked to recall a recent incident in which they had been required to look for information, and were asked questions concerning the place where the search was carried out, the problems experienced during the search, the extent to which they had to modify their search strategies, and the resources used to find the information. In addition, the graduate students were asked whether they had needed help with their search for information and if so, from whom they received it. Logistic regression was then applied to explore the underlying variables influencing the patterns of information-seeking behaviour of graduate students. The following sections discuss the findings drawn from this study in relation to outcomes from previous studies. The discussion will focus particularly on the factors which were found to be significantly associated with the information-seeking behaviour of graduate students as they search for information to fulfil a particular academic task.

9.3 Demographic Influences

This section discusses significant results concerning the background and demographic factors which were found to have an influence on the information-seeking behaviour of

graduate students when engaging in searches for information to fulfil a coursework requirement, prepare a project, or write a thesis.

9.3.1 Gender

The quantitative analysis of the questionnaire (through logistic regression) revealed that gender is a factor influencing some patterns of information-seeking behaviour of graduate students while searching for information related to their coursework. It was found that female graduate students were more likely than their male counterparts to conduct searches for information in the library. This indicates that female students have a more positive attitude towards using the library than males. This finding is in line with a study by Rowlands & Nicholas (2008), who found that gender is a strong predictor of some patterns of information-seeking behaviour. The authors found that female graduate students reported the highest levels of visiting the library in person and using its services.

In addition, a Mann-Whitney U-test showed that female students were more likely to endorse the idea that the library should provide more services for graduate students. The same test also showed that female students were significantly more likely to use interlibrary loan services than were male students. These findings indicate that females tend to make more use of library services than males. They are consistent with the findings by Steinerova & Susol (2007) that women were more likely than men to utilise the help offered by librarians, and that library catalogues were used more frequently by women. According to Steinerova & Susol, findings regarding gender differences can help in informing the design of services and systems and information literacy policies.

The Mann-Whitney U-test also showed that male graduate students were significantly more confident with initiating search strategies using keywords and Boolean logic than were their female counterparts. This finding is in line with Ford, Miller & Moss (2005), who found that males were associated with high levels of Boolean experience in their search, compared to low levels of Boolean experience among females. Similarly, Agosto (2001) found that men find it easier to use Boolean logic for query formulation due to their preference for logical and critical thinking. This result might indicate that male students are more comfortable conducting online searches and that they feel more

confident than female students when working with computers and online information resources. This may be related to the socio-cultural characteristics of gender which still leave women with more computer anxiety and feelings of lower self-efficacy (Enochsson 2005). In contrast, the results from the logistic regression showed that females felt more confident in using print resources than males. Interestingly, the quantitative analysis through the Mann Whitney U Test showed that female students were more confident about criticising the quality of their information-seeking process and its outcomes. This might be attributed to one of the epistemological perspectives found in the theory of Women Ways of Knowing (WWK): “procedural knowing”, which entails honouring and developing techniques and procedures for acquiring, validating and evaluating knowledge.

9.3.2 Age

The quantitative analysis (through logistic regression) revealed that students aged between 20 and 30 were more likely than older students to get help from a friend or a colleague when they search for information. This may be related to the fact that younger students have less experience with and knowledge of dealing with information overload. This finding has implications for educators planning to promote information literacy skills from an early stage of the bachelor degree, or prior to joining the graduate programme.

9.3.3 Academic Discipline

The quantitative results of the study revealed disciplinary differences in the information-seeking behaviour of graduate students. As mentioned previously in the quantitative results chapter, the information-seeking behaviour of graduate students was explored in relation to: the purpose of the search, the place where the search was carried out, sources used, the need to modify search strategies, seeking sources of help, problems faced while doing the search, and satisfaction with the search results. The following section discusses the disciplinary differences found in relation to these aspects of information-seeking behaviour.

The results of the questionnaire survey indicated that Social Science students were more likely to use the library online databases than students from other disciplines. In the context of Kuwait, this finding might be related to the fact that the majority of Social Science graduate students are enrolled on the Library and Information Science course, and thus have had courses on how to use various types of information resources. This finding is consistent with the study by Liu (2006), in which the majority of respondents from Social Sciences cited online sources as their first choice, in contrast to respondents from other disciplines such as Business and Computer Science. Hiller (2002) also found that faculty members and graduate students in the sciences-engineering and health were more likely to value journal and desktop delivery rather than visiting the library. This finding raises concerns for academics and librarians who seek to develop information literacy skills among students, particularly those from disciplines other than LIS. Moreover, the focus group discussions showed that graduate students enrolled in LIS and Information Science were the most knowledgeable about the library and the services it offers for graduate students; whereas students from other disciplines were less well acquainted with what is being offered. This has implications for considering information literacy programmes customised to the needs of each discipline.

Logistic regression showed that Science students were the most comfortable in using the computers in the library; whereas Arts and Humanities students were the least comfortable. This might be because Science students are more accustomed to using Information and Communication Technologies (ICT), and depend heavily on them for carrying out assignments or searching for resources.

The results of the questionnaire survey showed that students from Islamic Studies were more likely than students from any other discipline to endorse the idea that the library should provide more services for graduate students. This indicates that these students felt that the library was not offering them adequate resources. In particular, they thought the library was not offering enough information skills training. In contrast, students from Business Administration were least likely to endorse this idea. This might be because those students were satisfied with what the library offers, or it might be that they were not really aware of what is being offered to them. Results of the questionnaire survey also

revealed that students from Medicine were significantly more likely to have a positive attitude towards the services the library offers graduate students compared with other disciplines, indicating that medical students are satisfied with what the library offers.

Qualitative and quantitative data revealed differences among disciplines concerning various aspects of the search process. For example, Medicine students start their search by looking at a list of references, whereas Business Administration students rely heavily on the Internet and on faculty members. With regard to Social Science students, some start searching by looking at websites such as Wikipedia followed by Google; whereas others start with search engines. The majority of respondents to the questionnaire survey reported that they rarely started their search by browsing books.

For both the World Wide Web and search engines, the quantitative analysis showed that students from Business Administration were the most frequent users of these information sources compared to the other disciplines. This finding agrees with Liu (2006), who found that Business and Computer Science students tend to consult sources from the World Wide Web more heavily than do those in Social Sciences.

The analysis also found that students from Islamic Studies were the least frequent users of the World Wide Web. This might be because students from Islamic Studies depend heavily on printed books to complete their assignments and research, and because there are few relevant databases for this major available through the library website. There are still very few reliable Arabic indexed resources to meet the information needs of disciplines such as Law and Islamic Studies, in comparison to those available for Sciences and Social Sciences. The same finding emerged from interviews with faculty members, who complained of these deficiencies in Arabic academic online resources. This lack of Arabic indexes has implications for stakeholders, requiring the exertion of more effort to increase the quantity and improve the quality of the specialised Arabic resources needed in fields such as Islamic Studies and Comparative Literature.

A Kruskal-Wallis test showed that Medicine students were the most frequent users of electronic journals, whereas Islamic Studies students were the least frequent users. Focus group discussions revealed that Medicine students were heavy users of electronic

journals. This is probably due to the fact that Medicine students need to keep abreast of the literature in their field, which changes rapidly. This finding is in accordance with studies that have found that students in Sciences make most use of e-journals and databases compared to their counterparts in Arts and Humanities, who make least use of electronic resources (e.g. Gardiner, McMenemy & Chowdhury 2006; Ge 2005; Voorbij & Ongeing 2006).

Results from the questionnaire survey revealed that Islamic Studies students were the most frequent users of printed books, while students from Business Administration were the least frequent users of this resource. This reflects the heavy reliance of Arts and Humanities on print resources, an inference supported by the finding that Education graduate students were the most frequent users of dissertations and theses, whereas Engineering students were the least frequent users. This might be due to the fact that the Engineering Masters programme at Kuwait University is based on coursework, projects and exams, and does not require a dissertation, while Education students are required to write a thesis and thus may find it beneficial to refer to the available dissertations or theses. These findings are in accordance with many researchers, such as Gardiner, McMenemy & Chowdhury (2006), George *et al.* (2006) and Ge (2005), who found that graduate students from Humanities tend to rely more on print resources in their information-seeking process.

The qualitative results of the study revealed that the majority of participants use Google as their starting point for information searches; surprisingly, only a few LIS graduates mentioned Google Scholar. This finding is consistent with a study by Haglund & Olsson (2008), who found that few of the researchers participating in their study had any knowledge of Google Scholar. This indicates that students tend to use information resources which they perceive as easy to use and less time-consuming, rather than searching in specialised databases or in Google Scholar, which requires skills in using advanced search strategies.

The aim here is not to merely point to the disciplinary differences in the information-seeking behaviour of graduate students; it is to understand the ramifications of these

differences on the overall use of information resources to fulfil particular tasks. Disciplinary differences found in the context of this study raise concerns for the library regarding the necessity to differentiate between disciplines when implementing and designing services that support the use of electronic information resources. According to Bonthron *et al.* (2003), “disciplinary differences continue to exist, but that the type and nature of periodical publication needs to be considered as well”.

9.3.4 Degree and Enrolment

As explained in the context chapter, graduates enrolled as full-time students in Kuwait’s College of Graduate Studies are not in paid employment, whereas part-time students are often employees and only come to college to attend lectures. Interestingly, this study found that the type of enrolment (part-time or full-time) had a significant association with the place where the search was carried out: whether in the library, at home, or in the office. Logistic regression analysis showed that part-time students were more likely to conduct their searches for information at their offices compared to full-time students. Part-time students often searched for information from their offices at work, whereas full-time students enrolled at Kuwait’s Graduate College did not have that option, except for some disciplines like Medicine and Science, where the students also act as assistant tutors and have their own offices at their departments.

The qualitative results also revealed that a majority of part-time students complained about not having the time to visit the library, and that when they did visit in the evenings, they could not find librarians to support them if they needed help. Analysis of the interviews suggested that a majority of senior librarians think that students should act as independent researchers and get themselves acquainted with the library, even if they have to take time off from their jobs to do so. Employment status was found as a variable influencing information use in a study by Jiao, Onwuegbuzie & Lichtenstein (1996), who found that higher library anxiety was reported by students engaged in part-time employment. The authors also found this factor as an indicator of less opportunity for those students to visit the library. These findings suggest that librarians who wish to promote information literacy should consider establishing virtual tutorials on the use of the resources and services provided for graduate students. These would help in informing

students who are less likely to visit the library in person, such as part-time students and PhD students.

Logistic regression analysis showed that PhD students were less likely to search for information in the library than Masters and Higher Diploma students. This might indicate that PhD students have time constraints that prevent them from spending time in the library, especially considering that most of these students are already working.

9.3.5 Stage of Study

The stage of study was also found to be a significant factor influencing some patterns of the information-seeking behaviour of graduate students. Logistic regression showed that third year students were less likely than first year and second year students to need to modify their search strategies. The same statistical analysis revealed that third year graduate students were more likely to use electronic journals to find information than were second and first year students. This indicates that the further students progress through their programmes, the more likely they are to gain experience in conducting searches. However, analysis of the focus groups revealed that students gain experience through “trial and error”, as the majority of third year students complained that they had faced difficulties in finding the information they needed since joining the graduate programme. These findings indicate that students need information literacy training from an early stage in their higher education to accumulate life-long proficiency in information handling skills. This has implications for officials in higher academia who wish to promote information literacy. They need to consider providing training to students from an early stage, even before they join graduate programmes, so that they acquire advanced information-handling skills as they reach the stage of graduate studies. These findings are in line with an earlier study by Jiao, Onewugbuzie & Lichtenstein (1996), who found that first and second year students reported higher library anxiety than graduate students. The authors recommended that library instruction be introduced as early as high school level. They also recommended that universities and high schools should design and implement cooperative bibliographic instruction programmes for students in order to prepare those in high schools for becoming efficient users of information when they start college.

9.3.6 Nationality

The quantitative analysis (through logistic regression) showed that non-Kuwaiti students were less likely to use personal contacts to find information than Kuwaiti students, and that Kuwaiti students were more likely to ask a friend or colleague for help in the search if needed. This may reflect the type of social life in Kuwait, and the fact that Kuwaiti students have more opportunities to utilise personal contacts than non-Kuwaiti students, who constitute a minority on graduate programmes. The closer interpersonal contacts between Kuwaiti students may be attributed to the Kuwaiti social culture, which is characterised by close contacts with peers and relatives, particularly among males, who have regular gatherings in “Diwaneyas”, places in houses where males gather on a daily or weekly basis to discuss various issues. The findings suggest that there might be a need to foster more communication channels between Kuwaiti and non-Kuwaiti students in order to encourage collaborative learning in information literacy. These recommendations are in line with Yi (2007, p.671), who points out that academic librarians and educators need to fully understand the information needs, strategies and problems of international students to improve academic library resources, service quality and teaching efficiency.

9.4 Information Literacy

Exploratory factor analysis was used in the quantitative analysis of the graduate students’ survey to determine the underlying dimensions of the variables on the information literacy scale. The extracted dimensions were found to be related to either confidence in or anxiety in identifying, locating and using information resources and search strategies. The following section discusses the results of quantitative and qualitative analysis related to these factors, and how they influence the information-seeking patterns of graduate students.

9.4.1 Confidence in Identifying and Using Information Resources

The results of the questionnaire survey indicated that the majority of graduate respondents thought they were confident using a set of information literacy skills including: identifying their information needs, using electronic information resources, and using keywords to limit their searches. Qualitative data revealed that the majority of participants from all disciplines indicated that they needed more instruction on how to

use databases, how to conduct searches and how to use keywords to find the information they needed. These findings seem contradictory and may indicate that despite the respondents' reported confidence with information-seeking skills, most of them still face difficulties dealing with online information resources. This might be due to lack of experience with searching for information amid the information overload in various formats such as websites, e-journals, databases, open access articles and search engines. The findings are consistent with the study by Hoffmann *et al.* (2008), who found that graduate students from various disciplines including Sciences, Engineering, Health and Medicine, all wanted to learn strategies for finding information to keep up-to-date with studies in the literature.

Surprisingly, even students from the Library and Information Science Masters programme voiced the need for more training in information literacy skills; a need also stressed by a majority from Arts and Humanities. This implies an insufficient level of information literacy, which may be related to various factors, including a teaching system which does not support information literacy strategies, or the learning style of the students themselves, as they might be reluctant to improve their information literacy skills.

The quantitative results revealed that the majority of graduate students used search engines to look for the information they need, indicating a heavy reliance on search engines, particularly Google. This was not a surprise due to the ease of use of such search engines. However, what was unexpected was that the majority of students in the focus groups were not aware of Google Scholar, which reveals a lack of knowledge of the available information resources. The findings about the preference for using search engines such as Google are consistent with studies by Griffiths & Brophy (2005) and Haglund & Olsson (2008), who found that the majority of students in their populations used Google as their first choice when searching for information. However, the findings of this study are in contrast with Head (2007), who found that undergraduate and graduate students were not very reliant on search engines when seeking information to fulfil their academic tasks. The quantitative results also revealed that most of the students preferred to use electronic versions of journals. This is consistent with George *et al.*

(2006), who found that most postgraduate students in their study expressed preference for electronic journals and databases.

The quantitative analysis also showed that the majority of students thought they were confident in limiting search strategies by using Boolean logic; however, this confidence was not reflected in the focus group discussions, which revealed that some participants still find it difficult to use such search strategies, suggesting that students lack specific search skills. This latter finding agrees with Chu & Law (2008), who suggested that training of beginning PhD students should include specific search skills such as truncation and proximity search. As sound by Armstrong et al. 2001 (p.257), postgraduate students can still show a lack of skill in the use of electronic information resources and that although they “may be focused and persistent in their searching, they do not necessarily employ cohesive strategies.”

9.4.2 Anxiety about Finding and Selecting Information Resources

The quantitative analysis (through logistic regression) revealed that the more anxious students reported being about finding, locating and determining the reliability of information resources, the less likely they were to report using electronic journals. This indicates that a lack of the necessary skills in information searching had a negative influence on students’ use of electronic journals, which might mean that they are unable to access information on the latest developments in their fields. These findings are consistent with Chu & Law (2008), who found that research students had problems in finding the relevant information sources, and that they needed to achieve a competent level of expertise in information searching skills in order to locate information effectively.

Logistic regression also showed that the more students said they were anxious about finding, locating and determining the reliability of information resources in the library, the more likely they were to conduct their search for information at home. This might be related to the fact that this type of anxiety is reduced when students search at home. Being at the library might make them feel that they ought to be utilising the various resources available to them, which could create feelings of anxiety and of being

overwhelmed. However, at home students have a limited range of resources, most of which are Internet-based. There are questions concerning the reliability and credibility of these Internet-based resources, especially since there are still some restrictions on off-campus access to some of the databases available through the Kuwait University Library website. These findings have implications for academic librarians, suggesting that they should consider providing more off-campus accessibility facilities for students, to enable them to make the best use of the information resources available to them.

9.5 The Academic Library

Themes that emerged from quantitative and qualitative analysis on library anxiety can be classified into the following sub-themes: knowledge and awareness of the library resources, anxiety about using the library, adequacy of library resources, and using ICT in the library. These themes are in accordance with the five dimensions of library anxiety reported in the literature by Cleveland (2004): barriers with library staff, affective barriers, comfort with the library, knowledge of the library, and mechanical variables. The following sections discuss the results of each of the themes that emerged in this study in relation to recent studies on library anxiety.

9.5.1 Awareness of the Library's Resources and Services

Interesting issues emerged from the quantitative and qualitative analysis on the perceptions of graduate students towards their awareness of the library. The majority of respondents stated that they knew how to begin their research in the library and said they knew of what the library offered in terms of online search services. However, analysis of the focus group discussions revealed what might be described as "superficial awareness", as it was evident that the majority of participants were not sure whether they knew what information resources were available in the library.

The quantitative analysis also showed that the majority of respondents agreed that the library needs to provide more services for Masters and Doctoral students. In addition, the results revealed that students who thought that the library should offer more services for graduate students were less likely to carry out searches in the library. This indicates that

students' negative perceptions of what is being offered for them in the library negatively affect their use of it as a place to search for information.

Furthermore, logistic regression showed that knowing what the library offers for students, such as interlibrary loan, and the ability to make use of those services, are positively related to the use of electronic journals to find information. These findings suggest the importance of offering more orientation sessions and integrating them within the coursework of the graduate programme. This might encourage students to be more serious about gaining the lifelong skills they need, especially if course design requires students to do graded tasks that require the use of the library.

The qualitative analysis revealed that the majority of graduate students reported low usage of the library services, and that they used it merely as a quiet place to study. In addition, a majority of participants from various disciplines expressed concerns about the lack of adequate services provided for graduate students, both by the library and by their departments. These findings indicate a lack of awareness of the role of the library, which could be for several reasons. It may relate to the general stereotype in Kuwaiti society of the library as a place where shelves and books are kept. The education system has fostered this negative perception by not integrating library awareness sessions into the school curriculum. Students grow up and come to college with a negative preconception of the library. That negative perception is not confined to the physical boundaries of the library, but extends to librarians themselves. Qualitative analysis revealed that both graduate students and faculty members held a generally negative attitude about personnel working in the library. These indications are in line with Steinwachs (1999), who pointed out that librarians all over the world seem to suffer from a relatively low professional status, and if this low status is found in a culture with high power distance, where there is a high dependence on superior authorities, "it will be difficult for librarians to communicate effectively with senior managers or academics and to develop successfully the mediation function between cultures" (Steinwachs 1999, p.203). Based on that view, the author indicates the need to improve the professional status of librarians worldwide.

The question raised here in relation to the context of this research is: How can the status of librarians be improved amid the evolving information technologies? Resistance and fear of change was raised in interviews with senior academic librarians, who pointed that due to concerns over how librarians would cope with technological developments, the library administration was “hesitant to move quickly to an overall automated system in the library” (interview with librarian 2008). Another issue that emerged from interviews with senior librarians was related to the organisational work culture, which was described by one as based on culturally specific system rewards, where employees have no fear of losing their jobs, even if they are not performing well in their work duties.

9.5.2 Library Anxiety

The quantitative analysis (through logistic regression) showed that students who said they were anxious about using the library to find information were less likely to use electronic journals in their information seeking. Factor analysis revealed that anxiety about using the library was an underlying component of statements related to students’ perceptions of the library. Those statements covered not being comfortable with the library’s catalogue or website, having difficulty in locating materials in the library, and a general feeling of being stressed and overwhelmed when using the library. These findings suggest the need for the academic library to market its services more efficiently. This can be achieved by designing and implementing workshops, training sessions, exhibitions and virtual tours, all of which aim at maintaining a positive image of the role played by the academic library in enhancing students’ information literacy amid the developments in ICT.

The quantitative analysis also showed that the more students think they are library anxious, the more likely they are to experience computer or network problems. This indicates a strong correlation between library skills and computer-based skills, and that there is a need to integrate both in information literacy training programmes to ensure that students at the graduate level become expert in using information.

The qualitative analysis revealed lack of awareness of some of the services provided by the library, such as the Online Public Access Catalogue (OPAC). Some of the students in one focus group discussion had never heard of OPAC and did not know what it was. This indicates a gap between what students know and what is actually available in the library

from information sources and services. Once again, these outcomes imply the necessity for the academic library to market its services in a more efficient way.

The qualitative analysis also showed that senior librarians expected students at the graduate level to have the initiative to become more independent searchers and to be more curious in finding out how they can make the best use of the library. This finding is in accordance with Haglund & Olsson (2008), who found that researchers do not search for information in the way preferred by librarians; their searches seem unstructured and aimless, and they seldom use advanced search techniques. These findings raise concerns for librarians to rethink their roles amid continuous developments in information technologies: Are they to remain providers of information sources and services? Or should they act as intermediaries who facilitate access to and use of electronic information resources by, for example, allocating more funds for using new emerging information technologies?

The qualitative analysis revealed that the majority of senior academic librarians expressed hope that they would obtain bigger budgets for increasing access to information resources. Asked about their perceptions of the future of Kuwait University, the majority showed positive attitudes. One common desire expressed by all the participating librarians was for the library to be transformed to a complete automated system, and thus increase access to information resources.

9.5.3 Perceptions of Use of ICT in the Library

The overall perceptions of respondents was that access to the Internet, to computers and peripheral devices such as printers, were the most influential factors on student information-seeking behaviour. This finding also emerged from the focus group discussions, where the majority of participants from the various disciplines complained about lack of computers in the library and problems with printers, such as an inadequate number of machines, technical problems, and shortage of paper and ink. A majority of participants in the discussions noted that they had to bring their own paper for printing. In addition, most were not aware that they were eligible for touch keys with printing credits. This indicates that there is a gap in students' knowledge of what is being offered to them

by the academic library. In order to reduce this gap, communication should be enhanced between students and the library. Academic librarians should consider adopting effective policies to promote services for graduate students.

9.5.3.1 Use of the library's website

The quantitative analysis revealed that more frequent use of the library's website by students resulted in them conducting more searches for information in the library, and in a higher reported use of electronic journals to find the information they need. This indicates that the design and usability of the website influences the way students perceive the role of the library and the resources and services it offers. The library's website can serve as an excellent gateway for access to information on information literacy. These findings suggest the necessity of updating the website to make it more than merely functional, by adding to its online bibliographic instructions and providing more links to information resources, thus increasing accessibility.

According to Haglund & Olsson (2008, p.57), libraries spend large amounts of time and money to work on the structure and content of the library webpage, while few researchers use it as a starting point for information searching. Haglund & Olsson found that many researchers used their departmental web as a starting point, and the authors believe that the library should establish direct links to those departmental web pages. The importance of the maintenance of the library website was also stressed in a study by Bonthron *et al.* (2003) who indicated that library managers need to make decisions on allocating efforts into library homepages or into supporting faculty members in developing Virtual Learning Environments."

The analysis also revealed that preference for and comfort with using ICT in the library was positively associated with using the library's website to find information. This indicates that level of computing skills influences the use of the library's electronic technologies, such as its website. Thus there is a need for the university administration to consider providing more training courses and workshops for various types of computer applications for graduate students. They should also consider insisting on minimum levels of computer literacy for entry onto a graduate programme. These findings are

consistent with Collins & Veal (2004), who advocated the inclusion of library knowledge-based instruction with computer instruction to develop skills in accessing resources.

9.6 Faculty Members

One of the objectives of this study was to explore the information-seeking behaviour of faculty members who are enrolled in teaching and supervising graduate students. Employing both quantitative and qualitative measures, the researcher was mainly concerned with understanding the patterns of information seeking among faculty members, finding similarities and differences between them and graduate students in their general information-seeking process, and finally to pinpoint the influence of faculty members on the information-seeking behaviour of graduate students. Discussion of the results of the analysis is provided in the following sections.

9.6.1 Patterns of their Information-seeking Behaviour

The qualitative analysis of interviews with faculty members revealed that the three most frequently used information resources were search engines, databases, and books. Surprisingly, there were major differences in attitudes towards use of databases among faculty members of the same rank and from the same department. For example, two professors from Arts and Humanities, one of whom was from the Literature department, were asked about their most recent online search. One of them referred to a database as easy to use, while the other professor had a negative and a vague perception of what is being offered by the library and mentioned that she relied more on the Internet to find the information needed. The difference between the two might be related to gender, nationality or academic background. This indicates that gender might have an influence on the way faculty members used information resources. Nationality may also be influential, in that the faculty member who seemed more comfortable with using databases is Western and male and from Literature, while the professor who was less comfortable is Middle Eastern and female from Literature.

Use of databases as the first point of search was reported by three faculty members from the Social Sciences and two from Arts and Humanities. Analysis of the interviews also revealed lack of skills in using information resources. For example, some faculty members were not fully aware of how to use databases to search for and retrieve information. This finding indicates that there are still some faculty members who need more training on information retrieval.

9.6.2 Influence on Graduate Students

Analysis of interviews with faculty members showed that the majority were aware of the importance of fostering the information literacy skills of graduate students. Faculty members strongly agreed that they had an important role to play in encouraging students to use the library by giving assignments that require students to use it. This finding indicates the need to foster collaboration between faculty members and the academic library to implement information literacy programmes. It is consistent with a study by Luck & Thompson (2006), who noted the necessity for collaboration between faculty members and librarians to develop tools to enhance the information literacy skills of graduate students. In addition, faculty members strongly agreed that they played a major role in encouraging students to make use of the electronic information resources; yet at the same time they expressed concerns that the electronic information environment made it easy to plagiarise. These findings suggest faculty members need to encourage their graduate students to rely more on scholarly information resources, rather than using search engines, which host all types of information of dubious reliability. This finding is consistent with researchers such as Tomaiuolo (2005), who found that graduate students often prefer to rely on web sources, most of which are regarded by faculty members as unreliable. Tomaiuolo noted this heavy reliance on Internet sources despite what he described as efforts by faculty members and librarians to allocate more funds for scientific databases. An earlier study, by Hewitson (2002), also found that staff members expressed concern about plagiarism and about students' abilities to assess and critically evaluate the information they find on the web.

The quantitative analysis showed that graduate students rely heavily on getting help from a tutor or supervisor when they search for information. This indicates the significant role

played by faculty members in guiding students whom they teach or supervise. It also suggests that academics can help graduate students by sharing their experience in searching for information, which may encourage these students to become independent searchers of reliable information. This finding is in accordance with a number of studies, for example Serotkin, Fitzgerald & Balough (2005), Tenopir (2003), Barret (2005), and Kerin, Madden & Fulton 2004, who found that faculty members play an important role in recommending various information resources to help graduate students to fulfil their academic tasks. Bonthron *et al.* (2003) found that academic staff are the main influence on student use of electronic information services. Earlier in 2001, Armostrong et al. 2001 recommended that academic staff need to ensure that they offer students structured guidance on the use of electronic information resources for academic work.

9.6.3 Comparison with Graduate Students

One of the aims of this study was to compare patterns of information-seeking behaviour between faculty members and graduate students. Such comparison is vital considering that graduate students are potential researchers of the future and some of them are likely to become academics themselves. This indicates a reciprocal relation between the two sets of users, and a comparison between them is important to find out similarities and differences in their information-seeking behaviour.

Exploring any similarities and differences in the patterns of information-seeking behaviour among graduate students and faculty members can help to identify points of strength and weakness in the information use of both groups. This empirical comparison will provide implications for university administrators when they come to design and implement information literacy programmes in higher education. In addition, differences and similarities in the information-seeking behaviour of graduate students and faculty members may affect the attitudes of the university library towards designing and implementing support services intended to promote the use of information resources.

Barret (2005) aimed at identifying similarities and differences between graduate students and faculty members in Humanities. The author found that graduate students rely on subject experts at other universities for feedback and suggestions on the information

resources they should use to fulfil a specific academic task. Barret also found that, like faculty members, graduate students were comfortable with browsing, citation chasing and constantly reading within a subject.

In this study, the researcher adopted a quantitative approach to compare between faculty members and graduate students. The analysis showed that faculty members were more likely than students to use electronic journals and the library's online databases to find information. Students were more likely than faculty members to use search engines, personal contacts and the library's website to find information. These findings indicate that faculty members are more inclined to use reliable databases in their search for information, whereas students tend to rely more on quick and easy method. These results are understandable taking into account that faculty members need journals to keep up-to-date with developments in their field. The results also showed that students were more likely to look at dissertations and theses as a source of information. This is expected as in addition to using these as references, students need to gain an understanding of the structure, format and content of these documents, especially if their Masters programme requires submission of a thesis.

Results also showed that students were more likely than faculty members to ask lecturers for help when conducting a search. This might be related to the culture of Kuwait's educational system, in which students largely depend on instructions provided by lecturers, thus making them less independent researchers. This finding has implications for academics, who should consider developing new strategies in teaching which will promote creative thinking skills and allow students to be more independent researchers.

Comparison results also showed that graduate students were more likely than faculty members to have computer or network service problems when conducting searches. This might be related to the fact that faculty members have ready access in their departments to Information Technology professionals, on whom they can call for help. Interestingly, the test found that faculty members were more likely to need to modify their search strategies than graduate students. This might be due to the nature of faculty members' work, as they conduct more searches than students for various tasks related to teaching and research, and thus need to change their terms more often.

9.6.4 Faculty Members' Perceptions of the Library

The majority of the faculty interviewees expressed dissatisfaction with the status of the library in general and with librarians in particular. They noted a need for experienced reference librarians specialised in various disciplinary areas. Most of the faculty members also noted that the current academic library staff lack adequate qualifications. In addition, some of the faculty interviewees mentioned the importance of fostering collaboration between academic staff and the library to develop information literacy programmes for graduate students. This finding is consistent with Al-Abassi (2007), who found a lack of communication between the library and the academic departments, which could otherwise promote the use of electronic information resources; and with Luck & Thompson (2006), who pointed out the desirability of faculty members and librarians collaborating to design and implement programmes to enhance the information literacy skills of students and thus develop their use of information resources.

The quantitative analysis showed that faculty members agreed that the library is valued by the university administration as an essential element in improving the college educational programme. However, these positive perceptions were not reflected in the interviews. The qualitative analysis of the semi-structured interviews revealed that the majority of faculty members had a negative perception of the library, especially with regard to library personnel. The results indicate that faculty members and librarians were confused about their roles in enhancing students' information skills, suggesting lack of communication and insufficient knowledge about the significance of library-faculty collaboration in providing students with the information literacy training they need. These findings confirm those of Julien & Given (2003) who found a gap in the perceptions of faculty members and librarians about each other's role. The authors applied the social positioning theory of Rom Harre to explore the way librarians frame their relationships with faculty members and to examine the perceptions of librarians regarding faculty members' attitudes towards librarians and information literacy. The gap in the contact between faculty members and librarians was also reported by McGuinness (2003) who explored the status of information literacy education in the Irish Republic.

9.6.5 Training Needs

The quantitative analysis of the faculty members' questionnaire showed that assistant professors were more likely than associate professors or professors to receive training from their universities on using information technologies. This might be because the higher the academic rank of the faculty member, the less likely they are to think that they need training on using information technology. Chi-square tests also showed that faculty members with better computing skills in using databases and PowerPoint were more likely to have received library training from their universities. This indicates that training on using information technology has an effect on computing skills. It might also indicate that it is because faculty members have better computing skills that they receive more training. The implication for the university administration is that they need to consider providing IT training workshops or online tutorials for faculty members to enhance their use of information resources. Such knowledge and training of faculty members would influence the students whom they teach and supervise. These findings agree with studies by Kerins, Madden & Fulton (2004) and George *et al.* (2006), who found it important to ensure that the academic staff were aware of developments in new information sources and their use, so that they would point students towards potentially helpful information resources.

9.7 Cultural Issues

During the last decade, most of the studies that have investigated the impact of culture on the use of information have been cross-cultural researches, comparing students from various nationalities (for example; Liao, Finn & Lu 2007; Hughes & Bruce 2005). Cultural variables investigated by these studies have included language, race, country of origin, length of stay in the country and differences in teaching and learning style. The quantitative and qualitative analysis of this study unfolded cultural issues associated with the information-seeking behaviour of graduate students. These issues were related to English language skills, teaching and learning style, and censorship and segregation, all of which are discussed below.

9.7.1 English Language

English language competence was found to be a significant factor influencing some patterns of the information-seeking behaviour of graduate students. The quantitative analysis showed that students thought their level of proficiency in English was a highly important factor influencing their information-seeking behaviour (Likert score 5.22). In addition, logistic regression revealed that the better students perceived their English skills to be, the more likely they were to use electronic journals. This reflects the fact that the majority of the available electronic journals are in English, and so English skills are required to make effective use of them. These findings are consistent with studies by Hughes (2005) and Hughes, Bruce & Edwards (2007), who found that limited English vocabulary is a factor that causes difficulties in information use. One implication of this for educators is the need to ensure that graduate students have an adequate level of English skills in order to be able to make efficient use of the wide range of resources available to them, most of which are in English.

The fact that the majority of resources available on databases and on the Internet are in English highlights the need for The Arab League and Arab educational institutions and universities to consider ways of increasing the quantity and quality of Arabic indexes and databases in order to serve disciplines in which students and faculty members need Arabic resources for their research. The analysis of qualitative data showed that the majority of faculty members expressed dissatisfaction with the available Arabic databases. This language barrier was also found by Al-Abassi (2007), who recommended further investigations on possible support from interested parties to increase Arabic electronic resources to serve a wider community of researchers.

9.7.2 Teaching and Learning Style

Logistic regression revealed that students who thought that teaching in their programmes was based largely on lab work and experiments were less likely to experience computer or network problems while conducting searches than were students who perceived their instructors to use different teaching styles. This might be because programmes which depend heavily on lab work and experiments are more oriented to the use of ICT, which

is essential in their work. This implies the potential benefit of providing information literacy instructions to these students virtually, through online tutorials accessed via their departmental websites or the library website.

Interestingly, logistic regression showed that students who thought that their instructors' teaching style was largely based on lectures and tutorials were more likely to report that a course or a session had made them aware of the resources available for searching for information. This underlines the importance of integrating information literacy training into lectures and tutorials. These findings are in line with Hughes (2005) and Hughes, Bruce & Edwards (2007), who found that educational practices in the different teaching and learning styles constitute a significant challenge to students when they use online information resources.

As was mentioned earlier, graduate programmes in Kuwait are either thesis or non-thesis based, and these requirements vary across disciplines. Interestingly, this study found that having a thesis as a requirement has influence on some patterns of the information-seeking behaviour of graduate students. Logistic regression showed that students for whom a thesis was not required were more likely to get help from a friend or colleague than were students who were required to write a thesis. This indicates that having to write a thesis helps students develop independent searching skills and encourages them to gain experience in using various information resources. The quantitative analysis showed that graduate students who were required to write a thesis were significantly more confident with determining the currency of information resources than those who did not have to write a thesis. This indicates that writing a thesis enhances students' abilities to evaluate the resources they use, which will reflect on the quality and reliability of the resources they choose to locate the information they need. Another implication of the results is that having to write a thesis helps students to keep up with developments in their research areas. This positive influence suggests that making a thesis a requirement for all graduate programmes is important to help develop the information literacy of graduate students. This finding is in line with Eskola (2005) who found that the most developed information behaviour was associated with the work on a thesis, or in a major project.

9.7.3 Influence of Interpersonal Contacts

Quantitative and qualitative results revealed a heavy reliance by graduate students on contacts with friends, scholars and teachers as a strategy in their search for information resources. These findings are in accordance with those reported by researchers such as Haglund & Olsson (2008), Jamali (2008), George *et al.* (2006), and Foster (2005), who found that students' peers, academic staff, and library personnel all form personal networks that influence the way graduate students search for information. These findings suggest that fostering interactive programmes in the departments of graduate studies would allow more interaction between students and their peers, tutors, professors, and librarians. A set of recommendations on these social and academic activities are discussed in detail in Chapter 9 (Conclusions and Recommendations).

Segregation is another interesting issue that emerged from the interviews with some faculty members. In 1996, the Parliament of Kuwait issued a law on segregation of male and female students to take an effect in campuses of Kuwait University. This law was opposed by protesters from the liberal parties in Kuwait and by female political activists and faculty members, all of whom expressed concerns that segregation in higher academia has a negative effect on information-seeking behaviour. In this study, the analysis of the interviews with faculty members showed that some of them were disappointed that their students were not able to work together on a group project in the library, due to segregation restrictions.

9.7.4 Censorship of Information Resources

Censorship was referred to by some faculty members in relation to restrictions on Internet access to materials such as paintings or other visual items. These restrictions are due to laws which prohibit exposure to nudity or sexual images. In addition, there are also restrictions on books related to controversial issues such as atheism, or beliefs that are considered to be extreme. Some faculty members, mostly from Arts and Humanities, also complained that they could not access the works of some authors because the subject was considered a cultural or religious "taboo". Government authorities in Kuwait restrict access to Internet websites which they believe violate cultural, Islamic or political values.

For example, Kuwait's Ministry of Communication issued a memo to all Internet service providers in Kuwait asking them to block access to YouTube (Kuwait Times 2008). This is an example of how authorities can have an influence on access to information resources.

The focus group discussions with graduate students and the interviews with faculty members also revealed interesting issues not found from the survey analysis. Students from the Arts who are interested in comparative literature complained that there were restrictions on certain books which contained images of nudity, even though they are books essential for studies related to literature. These findings reflect what Steinwachs (1999) discovered regarding the influence of culture on what sources of information students can access and how they tend to use the information. Steinwachs pointed out that cultural factors may influence the way in which decisions are made in a certain society. In cultures with large power distances, the power is centralised and others may have difficulty in accessing information to fulfil their information needs. As Kuwait is considered a country with a large power distance, it might then be expected that the hierarchically superior authorities can control access to information resources in higher education institutions. Kuwait University is a governmental institution, therefore it is affected by decisions made by the government authorities responsible for issuing and implementing censorship laws for cultural, religious and political reasons.

9.8 Discussion of models adopted

There are several reasons for integrating components from the two models adopted in this research. Wilson's general model (1999; 2006) is well established in Information Science, while Urquhart and Rowley's (2007) is a more recent framework that suits the context of the electronic environment. In addition, the latter model has proved to be useful in providing a framework that proposes associations that can be tested (Urquhart & Rowley 2007, p.1189). The integration of two theoretical models in this research has proven to be useful in providing insights to explain the factors influencing the information-seeking behaviour within a higher academic context. The use of the models in this empirical research has yielded statistically reliable results. Wilson's model was

expanded by dividing the “Active Search” category into various patterns of information-seeking behaviour. These patterns were then used as variables in the statistical analysis. The expansion of active search patterns to suit the specific context of this research meant that the model used in the research was helpful in predicting the factors influencing the information-seeking behaviour in an academic context.

In their model, Urquhart and Rowley (2007) outlined specific sets of factors (macro and micro) that influence the information-seeking behaviour of students. This was useful in guiding the current research, as it provided a detailed analysis of components and suggestions for causative factors. In addition, the factors specified in the Information Behaviour Model are consistent with the variables investigated in this research, namely micro factors related to information literacy, discipline, academics’ information behaviour, support and training. The use of the two models suggested relationships that would be fruitful to explore, and guided the research by providing a working strategy.

9.9 Important factors

The analysis of the findings is shaped by the dimensions defined in the research model, and the results obtained in the logistic regressions to identify the key factors influencing the patterns of the information-seeking behaviour of graduate students when they engage in an academic search for information. Only the key findings in each dimension are considered as they show the factors most statistically significant in explaining students’ information behaviour. When applicable, the analysis also draws on focus groups with students and interviews with faculty members and librarians to reinforce the model. The results of the logistic regression revealed that the most important factors influencing the information-seeking behaviour of graduate students were related to the following dimensions: information literacy, library anxiety, discipline, role of faculty members, demographics, and English Language. The key factors can be categorised under barriers and enablers to information-seeking behaviour patterns. Important factors and barriers related to each of these dimensions are explained below.

9.9.1 Library awareness

The library awareness dimension appears to be one of the most important factors influencing the information-seeking behaviour process because it is statistically significant in predicting the outcome variables. This factor includes four items: anxiety about using the library to find information, limited knowledge of library resources, uneasiness with the library, and the use of the library webpage to locate the needed information. All of these factors appeared with high significance as barriers to an efficient utilisation of the library for research purposes. Another important factor revealed from the focus group analysis is related to the lack of communication between the library and graduate students.

9.9.2 Information literacy

Items related to information literacy constituted another important factor influencing the patterns of the information-seeking behaviour of graduate students. The key factors that were statistically significant in predicting some of the patterns of the information-seeking were related to anxiety about selecting and using information resources. The significance of this factor made it a barrier preventing efficient search for information. Being apprehensive about criticising the quality of one's information-seeking behaviour was also found as a barrier against efficient information-seeking process. Another key factor is related to evaluating and presenting information (in the final output such reports, assignments, thesis) and this was found to enable efficient use of computers when searching for information. Confidence with identifying appropriate sources of information was found as a positive factor. This item was found to be statistically significant in predicting how students seek sources to become aware of electronic information resources. These findings constitute part of the novelty of the model used in this study, and was validated through logistic regression.

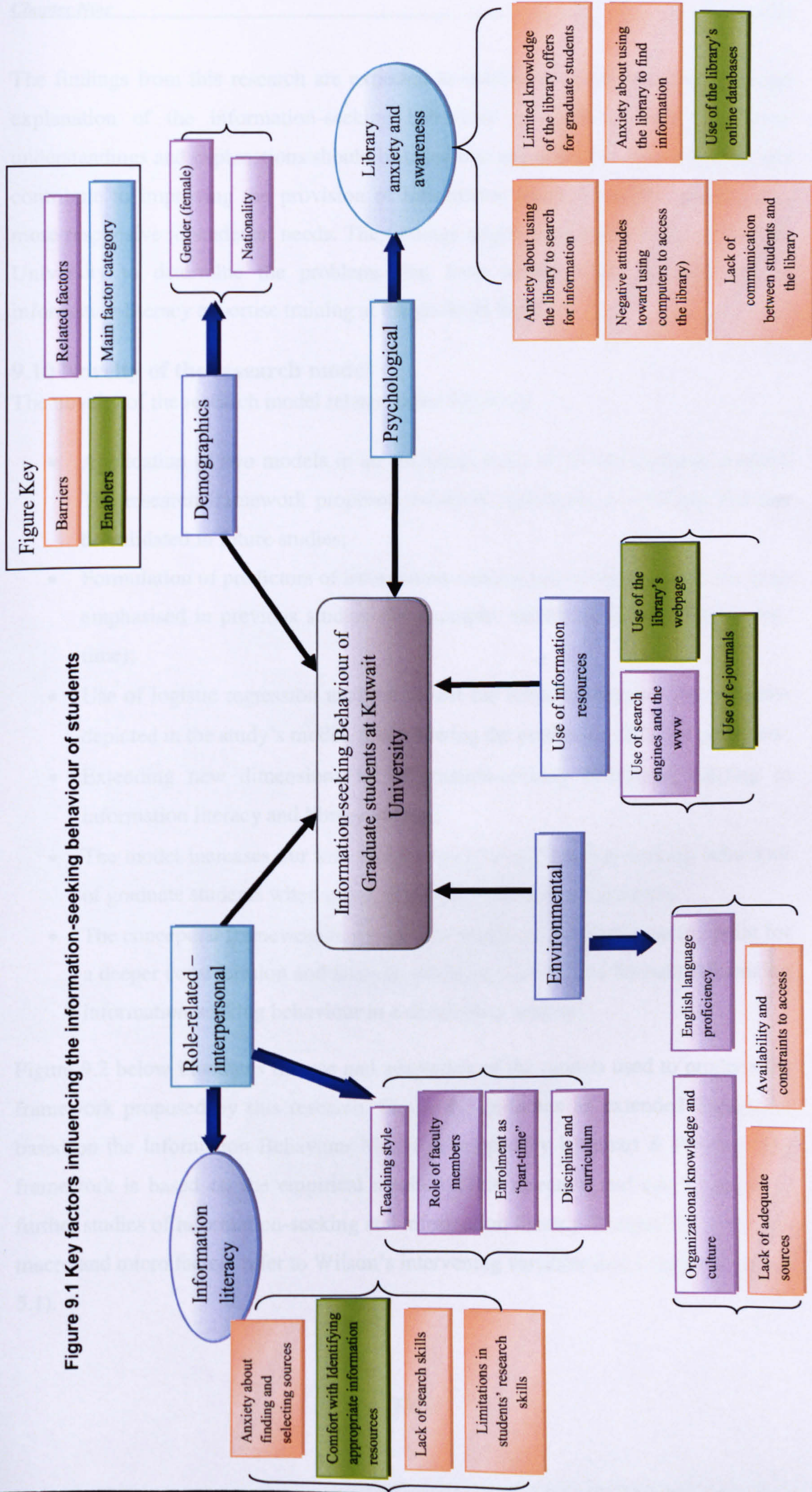
9.9.3 Other key factors

In addition to library awareness factors and information literacy, English Language skills factor was statistically significantly related to the use of electronic journals to find information. This is an important finding as it shows that English Language proficiency

enables the efficient use of electronic journals, which are mostly written in English. The focus groups with students also revealed that limitations in English skills is an important barrier to the use of online resources.

Gender was also an important factor in predicting information-seeking behaviour. Female students showed a more positive attitude towards conducting searches at the library, and were more frequent users of the library web page than their male counterparts. Enrolment, as a part-time or full-time, was very significant in predicting the place in which the student conduct searching for information, being at home, the library, office, or in other places. Frequency of using electronic journals was found to be an important factor predicting the use of the library online databases and the use of electronic journals (in particular) to find information. Use of the World Wide Web was also highly associated with conducting searches at home. Frequency of using the library's webpage was also found as a significant factor in using the webpage when searching for information. Figure 9.6 presents a whole picture showing the key (significant) factors in predicting the patterns of the information-seeking behaviour of graduate students (orange represents the barriers, green represents enablers and purple refers to key factors associated with the outcome variable).

Figure 9.1 Key factors influencing the information-seeking behaviour of students



The findings from this research are expected to contribute to an understanding and explanation of the information-seeking behaviour of graduate students. These understandings and explanations should be taken into account by decision-makers and contribute to improving the provision of information literacy training, making this more responsive to students' needs. The findings might also help officials on Kuwait University to determine the problems that have inhibited the enhancement of information literacy expertise training at the graduate level.

9.10 Novelty of the research model

The novelty of the research model relates to the following:

- Application of two models in an empirical study at the postgraduate context. The research framework proposes statistical significant associations that can be validated in future studies;
- Formulation of predictors of information-seeking behaviour that have not been emphasised in previous studies (for example, enrolment as part-time or full-time);
- Use of logistic regression analysis to test the relations between the variables depicted in the study's model, thus allowing the prediction of future outcomes;
- Extending new dimensions to information-seeking behaviour, relating to information literacy and library anxiety;
- The model increases our knowledge about the information-seeking behaviour of graduate students when using electronic information resources;
- The conceptual framework based on two models could be the starting point for a deeper consideration and analysis of the key factors and barriers influencing information-seeking behaviour in a developing country;

Figure 9.2 below illustrates the use and adaptation of the models used to produce the framework proposed by this research. Figure 9.3 proposes an extended framework based on the Information Behaviour Model developed by Urquhart & Rowley. The framework is based on the empirical results of this research, and can be tested in further studies of information-seeking and information literacy. It should be noted that macro and micro factors refer to Wilson's intervening variables (see Chapter 5, Figure 5.1).

Figure 9.2 Illustration of the adaptation of the models

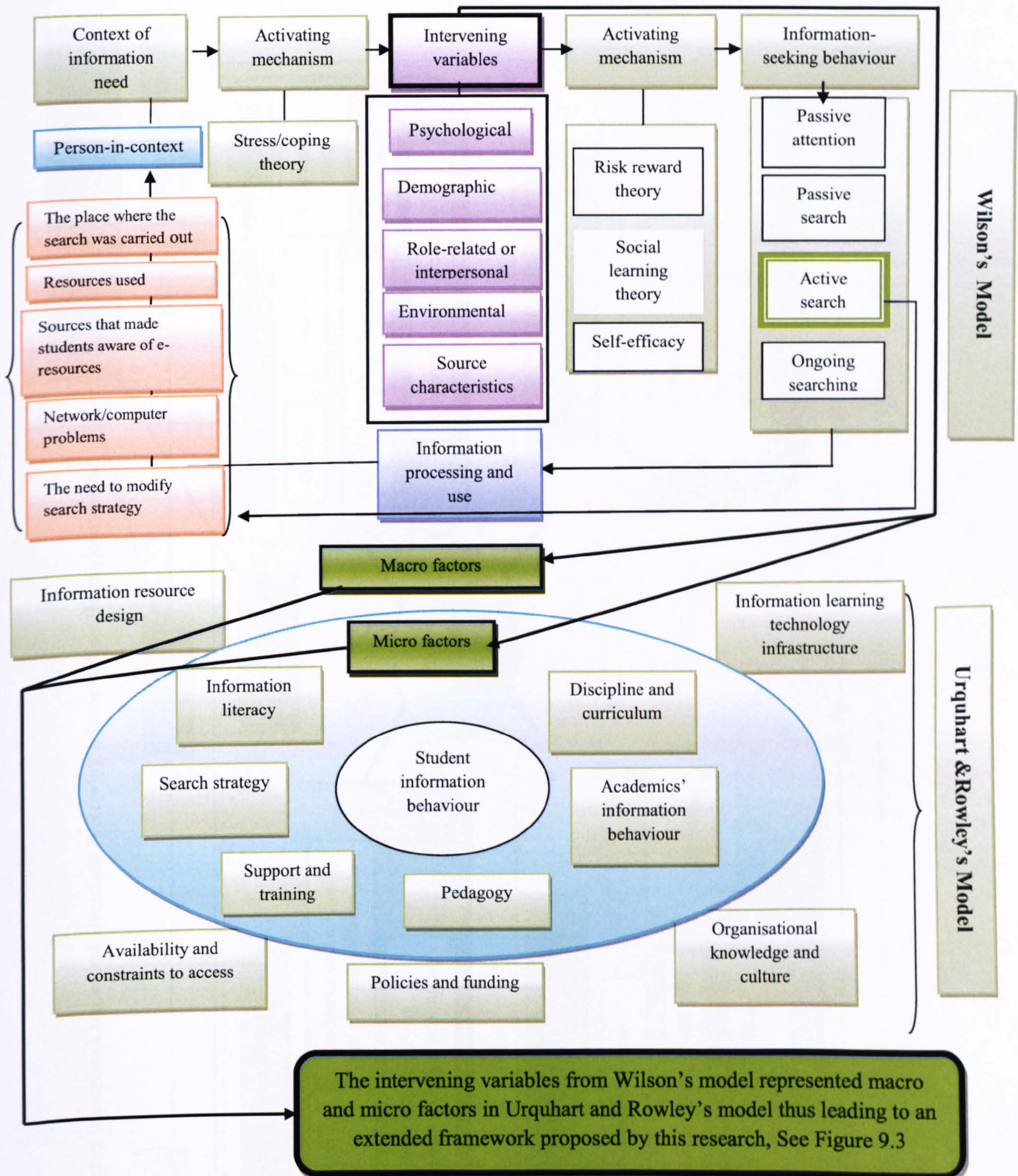
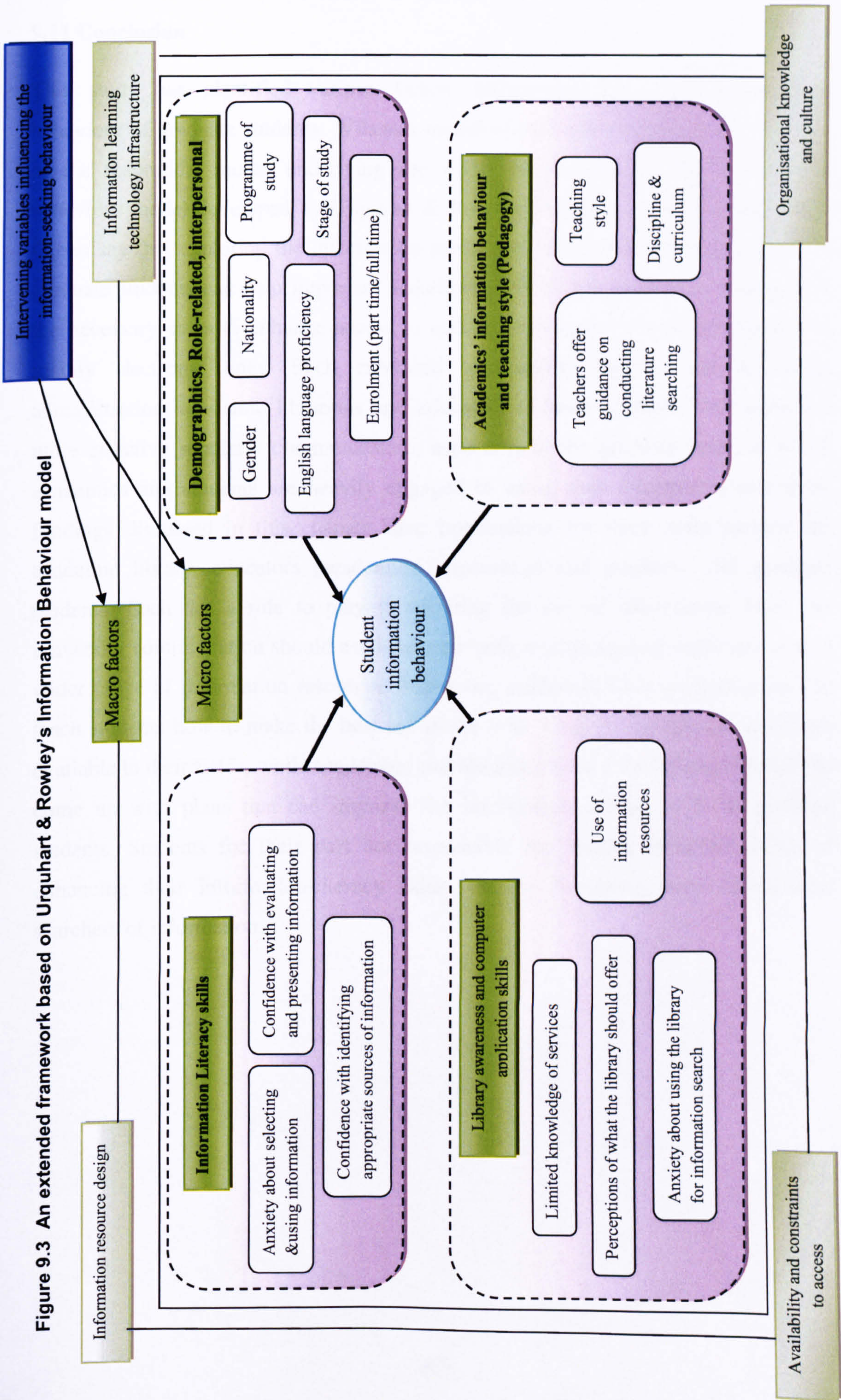


Figure 9.3 An extended framework based on Urquhart & Rowley's Information Behaviour model



9.11 Conclusion

This study has identified various factors influencing the information-seeking behaviour of graduate students. Wilson's model of information-seeking was adopted as the theoretical model underlying the study. In addition, another Information behaviour model developed by Urquhart & Rowley was used for this research. It is fair to say that exploring the information needs and information-seeking patterns of graduate students can help important stakeholders in higher academia to implement the necessary steps to enhance access to and use of various information resources, mainly electronic ones. Such enhanced accessibility requires the university administration, academic librarians and educators to build strategies that nurture a more effective scholarly communication, especially at the graduate level, at which academics and students are heavily engaged in using such information resources. Findings discussed in this chapter have implications for three main parties: the academic library, educators (academics: supervisors and teachers), and graduate students. Each has a role to play in fostering the use of information. First, the university administration should establish new policies that support better access to a wider range of information resources. Moreover, academics have a responsibility to teach students how to make the best use of the wide range of information resources available in their fields, while academics and librarians have a shared responsibility to come up with plans that can improve the information-seeking skills of graduate students. Students for their part are responsible for seeking effective means of enhancing their information-literacy skills, thereby becoming more independent searchers of information.

CHAPTER TEN - CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

This chapter draws conclusions from the research by summarising this study's goals and key findings and offering a set of recommendations based on those findings. In addition, this study's contributions to the field of information-seeking behaviour in higher academia are also discussed, as are the limitations of the study. Suggestions for further research are offered. The overall aims of this study were to explore the information-seeking behaviour of graduate students in Kuwait University and to identify the factors that influence such behaviour when students search for information related to their academic tasks, particularly when using online resources. In order to identify such factors, the following research objectives were identified: (1) to identify the information needs of graduate students; (2) to explore graduate students' knowledge of the range of available online information resources; (3) to identify graduate students' perceptions of their information literacy skills; (4) to examine the library anxiety of graduate students; (5) to investigate the barriers to students' efficient use of information; (6) to explore the influence of faculty members and academic librarians on students' information-seeking behaviour; (7) to provide recommendations for improving the information-seeking behaviour of graduate students. In order to meet the aim of the study, that is to investigate the various factors that might influence the patterns of the information-seeking behaviour of graduate students; this research adopted a mixed method, but largely within a constructivist theoretical framework. The aim and objectives of the research were met through the adoption of quantitative data analysis to reveal the significant influencing factors and to profile the patterns of the information behaviour within a graduate context. Qualitative data analysis complemented the quantitative analysis and helped in identifying how students interpret their behaviour, in addition to how they react to the problems and barriers they face while seeking for information.

10.2 Main Findings

This study produced a wealth of empirical data, which has been analysed in order to identify the factors that influence the information-seeking behaviour of graduate students within an academic context. Logistic regression has revealed that a number

of significant factors act as determinants of the patterns of students' information-seeking behaviour. These factors are related to the following intervening variables: library awareness, information literacy, organisational and environmental issues, source characteristics, and demographics. Conclusions in relation to these factors are explained below.

10.2.1 Library Awareness

One significant finding that emerged from this study is that graduate students showed uneasiness towards using the library and consulting its personnel. This anxiety reflects a broader negative perception of the role of the library in shaping students' information-searching patterns. Apprehensiveness about using the library to find information was also a barrier to using electronic journals. A strong negative correlation was found between library anxiety and computing skills. Anxiety about using the library to find information was significantly and positively associated with experiencing computer or network problems when conducting an online search. Therefore, it can be concluded that there is a reciprocal relationship between confidence with using the library and comfort with using ICT in order to make the best use of available library resources. Hence, it is important to ensure that students are equipped with the necessary computer skills and simultaneously to provide them with adequate information-technology tools that will enable them to access and use a wide range of information resources.

In summary, the following conclusions can be drawn from exploring the perceptions of graduate students towards the academic library:

- There is a general lack of awareness of what the library offers to graduate students;
- There is a general negative perception of the library by graduate students, which leads to under-use of its resources;
- There is evidence of library anxiety symptoms displayed by graduate students, which hinder efficient utilisation of reliable information resources;
- There is a shortage of communication between the academic library and graduate students.

10.2.2 Information Literacy Skills

The exploratory factors analysis revealed that the students' two main underlying perceptions of their information literacy were their confidence in identifying and using information resources and their anxiousness about finding and selecting appropriate information resources. The most obvious finding that emerged from the analysis of those two dimensions was that the majority of graduate students still face difficulties in finding the appropriate information resources, particularly when using resources that need advanced search strategies. Both quantitative and qualitative analyses have revealed a heavy reliance on using information resources that require the least effort (i.e., search engines, Internet web sites, and personal contacts). Simultaneously, focus group discussions have shown that the majority of participants voiced a need for training in using online databases and in using Boolean logic and truncation. It can be concluded from these findings that graduate students are overwhelmed by an information overload, which leads them to becoming anxious about finding the appropriate information resources. In support of these findings, logistic regression analysis has revealed that the more often students reported using online databases to search for the information they needed, the less likely it was that they would ask friends or colleagues for help, yet the more likely it was that they would ask librarians for help. These results support the conclusion that students face difficulties when using information resources other than general search engines.

Another significant finding to emerge from this study is that students heavily rely on using personal contacts when they search for information. Logistic regression analysis revealed that anxiousness in finding and locating needed information was a reliable predictor of using personal contacts to find the information. Surprisingly, the study also showed that even when students reported confidence about identifying their information needs and using search strategies, they still relied heavily on friends and colleagues as sources of awareness of relevant information resources. Hence, the following conclusions are drawn in relation to the information literacy dimension:

- There is a general lack of information literacy competence among graduate students;
- There is a general tendency among various disciplines to use information resources that require the least effort in using key words and search strategies;

- There is evidence of heavy reliance on personal contacts to find information as well as a dependency on search engines and web resources;
- There is evidence of limitations in graduate students' independent research skills.

10.2.3 Organisational and Environmental Factors

In the context of this research, organisational and environmental models encompass the influence of faculty members, teaching style, and cultural issues. Conclusions drawn from analyzing these issues are discussed below.

Faculty members: The role of supervisors/tutors in guiding the students through their information-seeking process was evident in this study. In relation to this, the majority of graduate students reported heavy reliance on teachers when they search for information. A comparison of faculty members' information-seeking behaviour with that of graduate students revealed that faculty were more inclined to use databases in their search for information than students, who usually relied on the web. It can be concluded that there is a reciprocal relation between students and their tutors; the latter can transfer knowledge, experience, and skills to the former. Such relationships can foster graduate students' information literacy skills if faculty members assign tasks that require the use of the library, particularly its databases. This implication relates to another finding of this study; faculty members expressed concern that the online information environment made it easy for students to plagiarise.

Teaching style: The findings suggest that requiring a graduate student to write a thesis in order to earn a Masters' degree was a reliable predictor of the information literacy skills of graduate students. The analysis revealed that students who produced theses were more confident in determining the currency and reliability of information resources. In addition, it emerged that writing a thesis was significantly associated with higher perceived confidence in identifying potential sources of information and in criticising the quality of the process and the outcomes of information-seeking behaviour. This finding implies that theses should be considered as academic requirements if programme managers want to develop the information literacy skills of their graduate students.

Cultural issues: This study has revealed that possession of good English language skills was significantly and positively associated with the use of electronic journals when searching for information related to academic tasks. An implication of this is the need to ensure that students in all disciplinary areas have sufficient levels of English Language skills so that they can properly utilise online information resources, most of which are presented in English. Focus-group discussions with graduate students and interviews with faculty members highlighted censorship issues related to banning books and blocking web sites due to certain restrictions related to religion or politics. Such blocks, according to participants, prevented students from accessing materials they needed in their academic tasks.

10.2.4 Source Characteristics

It emerged from the analysis that students' search for information was hindered by technical problems with networks or computers, problems in accessing journal databases, and issues related to passwords. Other barriers are related to the lack of journal databases for Arabic resources. Focus-group discussions confirmed a general dissatisfaction with the current ICT resources and services. The main conclusions from the findings relate to the following key issues:

- There is evidence of a lack of adequate personal computers and printers in the library as well as in academic departments;
- There is evidence of misuse of ICT in the library as was revealed by a majority of students in the focus-group discussions;
- There is a lack of Arabic databases and of online resources concerning Islamic Studies, Psychology, and Arabic-based disciplines;
- Graduate students in general faced problems related to the lack of individual email accounts and the use of passwords for off-campus information retrieval.

10.2.5 Demographics

Gender and nationality emerged as reliable predictors of some of the patterns of the information-seeking behaviour of graduate students. Females displayed better awareness of what the library offers and reported greater confidence in using the library to search for information. Males revealed more confidence in and comfort with using online information resources and advanced search strategies. These findings

might not provide direct implications for the library or for the academic staff, but they emphasise the gender differences in information-seeking behaviour; such differences should be taken into consideration when designing information systems and providing services for users.

Regarding nationality, the study revealed that Kuwaiti students were significantly more likely than non-Kuwaitis to use interpersonal contacts to find information, which reflected the social and cultural natures of Kuwaiti students. This has implications for the university concerning the importance of arranging social events that facilitate communications between students from different cultures and academic backgrounds. This would enhance the exchange of scholarly communications among students.

10.3 General Implications

Overall, the evidence from this study suggests that enhancing the information-seeking behaviour of graduate students in Kuwait requires a comprehensive, realistic approach that focuses on curricula, training, and research practices in all disciplinary areas. Additionally, providing better access to information and improving researchers' information literacy would improve the entire information-seeking process, which would lead to more effective searches. This would benefit graduate students both in their current studies and in their future work.

10.4 Recommendations

The mission statement of Kuwait University is to “endeavour to provide world-class education, and to remain committed to advancing, preserving and disseminating knowledge, in addition to preparing educated and qualified human resources in order to realize the society developmental needs” (Kuwait University webpage, n.d.). Concurrently, the mission of Kuwait University's library is to provide and promote access to information in all formats, to support academic programmes and scholarly research at the university, and to meet the information needs of the local community (Kuwait University Guide, 2007). Therefore, the library's goals and strategies for user education are in accordance with the goals and strategies described at the university's management level, faculty level, and discipline course level. In addition to the

university and its library, improvements in the faculty members' information-seeking skills would positively affect the skills of their students. This study found that teachers and supervisors have considerable impact on students who tend to rely on their tutors to find the information they need.

In consideration of those missions and the findings of this study, a set of recommendations are offered for enhancing the information-seeking behaviour of graduate students, particularly in the electronic information environment. These recommendations relate to information literacy training, library resources promotion and marketing, and information technology infrastructure. These are discussed below.

10.4.1 Information Literacy Training

Kuwait University, represented by its administration, academic libraries, or faculty members, may consider the following:

- Establishing resource-sharing agreements between Kuwait University and private higher education institutions in order to exchange experiences in the field of library science and information technology. This would enhance expertise in the latest information technologies and in adapting them to users' needs;
- Exerting more effort by the library to assess the information needs of graduate students; these needs should be considered essential when making decisions about what resources should be offered. This can be achieved by conducting online surveys and, as a prerequisite, by establishing institutional electronic mail accounts for the students;
- Offering hour-based courses in literature searching. This could be achieved through collaborative efforts between the library and various academic departments. Such a course should present an overview of each database and a demonstration of its functions, followed by a sample search and an explanation of its results;
- Assigning graduate students tasks that require use of the library. This can be accomplished by faculty members, and it will strengthen students' information-searching skills and expand their awareness of available sources of information;
- Integrating library instruction with students' courses in different disciplines;

- Offering individual training for faculty members by the library, teaching them how to make good use of the library and of online information resources. Several examples from the developed world may be adapted to Kuwait University. For example, California State University Bakersfield (CSUB) has a centre for faculty teaching and learning. Librarians can provide any help required by faculty members in using office computers to access information, exploring research sources in the professors' disciplines, using electronic databases, exploring library databases, designing new courses assignments that require use of the library, and accessing journals' tables of contents via the faculty members' electronic mail (current awareness service);
- Integrating computer skills training into information literacy programs in order to develop students' skills in accessing information;
- Introducing a thesis as an option to the assessment criteria. This study found that students who wrote theses were significantly more likely to have higher perceived information literacy skills. If all graduate programs in Kuwait had thesis requirements, then students could be more likely to receive sufficient training in research by the time they graduate. In order to do so, information literacy should be considered an intended learning outcome of the course being taken. This would benefit graduates when they enter academic careers, or work in other research-oriented fields.

10.4.2 Library Resources Promotion and Marketing

Kuwait University's library may consider the following action plans:

- Developing innovative marketing strategies to promote the services offered by the library to graduate students. This would promote communication between the library and the students, helping the students become aware of what services are available to them as a distinct user group. This would lead to efficient use of the library's information sources and services such as interlibrary loans, passwords and usernames, and extended book loans. A more efficient reference desk service should be provided by offering individual supervision and discipline-specific sessions for graduate students who need help in defining their topics and locating information. This would expand the students' knowledge of what is available in their fields and would

train them in purposive information-seeking behaviour, which would help them save time and become competent researchers.

- Arranging social events to promote the role of the library amid the proliferation of online information sources and services. This may contribute to deficiencies in information literacy. Currently, the university library administration holds an annual open day during which LIS professionals can invite experts to share their knowledge and expertise. Additionally, the library could invite faculty members from several departments, undergraduate and graduate students, information professionals, deans and vice deans of colleges, and heads of departments.
- Improving the social status of the library since users now have different expectations of the library and are now more inclined to use the Internet to search for information. This improvement can be achieved by engaging librarians in training sessions that keep them up-to-date with developments in the field. This will enable them to meet the challenges posed by new technologies and electronic databases in libraries.
- Digitising the collections of research at Kuwait University. This would provide institutional repositories in which academic and research students can store their published works, which could then be read online free of charge. This would improve access to scholarly research and would lead to a greater dissemination of knowledge.
- Expanding the library's opening hours and hiring additional staff in order to meet the needs of users who can only visit the library late in the evening or on weekends.
- Creating a more attractive atmosphere in the library by introducing cafes. This would make students more enthusiastic about using the library.
- Including the Gulf Cooperation Council (GCC), Saudi Arabia, Bahrain, Oman, Qatar, and the United Arab Emirates in the resource-sharing strategy. These countries have similar cultural backgrounds, which would facilitate the sharing of resources and expertise.

10.4.3 Information Technology Infrastructure

The academic library, in collaboration with the university administration, may consider the following:

- Improving the library's homepage by adding more functions such as links to training sessions or workshops that the library provides. Additionally, the materials that are accessed through the web page, such the titles of theses and dissertations in the university library, should be updated regularly.
- Creating a web-based tool to offer online information literacy training. The tool should provide links to educational web pages both internal and external to the university. The web-based tool could also provide a framework in which graduate students could complete assignments. Such tutorials can be helpful to large numbers of graduate students, especially those who do not spend enough time on campus.
- Expanding and updating current collections, especially electronic journals and databases in order to take advantage of the growing online information environment. This can be achieved by adding electronic Arabic and non-Arabic databases to the list of databases that are subscribed to by the library administration.
- Updating the technology infrastructure with the latest technologies; the number of computers should be increased, and faster Internet connections should be provided.

10.5 Contributions of the Study

This study is the first research that comprehensively explores the information-seeking behaviour of graduate students in Kuwait, which is a developing country. This study covers all the main stakeholders who are involved in the country's higher education: university administrators, faculty members engaged in teaching and supervising these programmes, academic librarians, and graduate students. This study is also the first research in Kuwait that focuses on graduate students as a distinct user group. In addition to exploring the patterns of their information-seeking behaviour, the study provides a wealth of data on factors that influence this behaviour. The study's conceptual framework could be the starting point for a deeper consideration and

analysis of the key factors and barriers in the information-seeking behaviour of graduate students. This has implications for the role that the governmental and academic sectors should play in promoting research in Kuwait's graduate programs and in other developing countries that share similar organisational cultures.

Additionally, this study adds to the body of knowledge about library anxiety. It is the first study to adopt the library anxiety scale developed by Kampen (2004) for postgraduate students specifically. The scale proved reliable and significant empirical data that was used in the logistic regression in order to find the key factors that influence students' information-seeking behaviour. This use of the library anxiety scale can form the basis for future studies on graduate students in different contexts.

The study also contributes to the literature on information literacy through its adoption of the self-efficacy information literacy scale developed by Kurbanoglu (2006). The scale proved reliable, and it helped the researcher explore students' perceptions of their information literacy skills. In the context of this study, the scale was used for a population of graduate students from various disciplines; this extended Kurbanoglu's original study, which only investigated students studying Library Science and Education. It should be noted though that the scale item that mentions confidence in using key words and Boolean operators need to be rephrased or removed. It was found from the Likert scale results that respondents were confident about the use of Boolean logic. However, it was evident from the focus group discussions that the majority of graduate students face difficulties in using these specific search techniques. The key factors that emerged from the scale were used in logistic regression in order to identify the significant factors that influence the information-seeking behaviour of graduate students.

The study contributes to the area of graduate students' information-seeking behaviour by using a mixed-methods approach of questionnaires (for students and faculty), focus groups (for students), and interviews (with faculty and senior librarians). The Critical Incident Technique was integrated into the questionnaires. Although this integration was adapted from a study by Urquhart (2003), the originality of this study lies in the fact that the outcomes were used as the dependent variables to be tested, through logistic regression, against a set of independent variables in order to identify the factors that influence patterns of graduate students' information-seeking behaviour.

Several influential factors emerged from the logistic regression analysis, and these can be further tested in higher education institutions in other studies. This would provide a more comprehensive understanding of the information-seeking behaviour of graduate students in an academic context. Such an understanding would help educators and librarians establish information literacy strategies that correspond to the needs of students and the ways in which they seek information.

10.6 Usefulness of the models adopted

The adoption of Wilson's general model of information-seeking behaviour as the conceptual framework for this study provided useful insights into determinants of the information-seeking behaviour patterns of students in a multi-disciplinary graduate context. For the purpose of this study, Wilson's model has been extended in order to predict the information-seeking behaviour of graduate students on the basis of a set of predictors (independent variables). The extended components of Wilson's model were the "active search" and the "intervening variables." Active search was extended into non-linear behavioural aspects: initiating search strategies, searching, and locating information. These were further broken down into specific patterns of information-seeking behaviour: place where the search was carried out, resources used, sources of awareness, and problems faced when conducting the search. The integration of the Information Behaviour framework developed by Urquhart & Rowley (2007) in this research's theoretical framework has provided empirical and reliable data through logistic regression analysis which revealed that factors related to library anxiety, information literacy skills, gender, nationality, enrolment, and accessibility to information resources are predictors of graduate students' information-seeking behaviour patterns. Understanding the influence of those factors, or determinants can be taken into consideration by Kuwait University and its academic libraries in order to locate the barriers that hinder its graduate students' efficient use of information resources. This, in turn, may contribute to improving the overall information search process, particularly when dealing with online information resources.

10.7 Limitations of the Study and Recommendations for Further Research

Based on the findings of this study, further research is required in order to explore a number of related areas. These are presented below.

- This study was limited to graduate students who were enrolled at the College of Graduate Studies at Kuwait University. Future research should consider students from graduate programmes at private universities in Kuwait. Investigating students from the private sector would help determine whether an institution's status is a variable that determines the patterns of its graduate students' information-seeking behaviour. At the time of this study, Kuwait University was the only higher education institution in Kuwait that offered graduate programs. Recently, however, a private university (the Australian University of Kuwait) began offering a Masters programme in Business Administration.
- This study has provided merely a cross-sectional view of the information-seeking behaviour of graduate students. Further longitudinal studies would be required to investigate changes in information-seeking patterns over time. This would help decision makers plan information literacy training programmes in accordance with users' information needs and information-searching skills.
- This study was limited to the information-seeking behaviour of graduate students, particularly when they utilised online information resources (e.g., electronic journals, library databases, the Internet, online catalogues, e-books). Future studies should investigate the influence of applications associated with Web 2.0 technologies such as blogs, Wikis (e.g. Wikipedia.com), social sharing services, social networks, and folksonomies and tagging (which comprise a "bottom-up approach to providing descriptive labels for resources, to allow them to be retrieved"; Godwin & Parker, 2008, p. 22). These studies would reveal the extent to which students are using Web 2.0 technologies to meet their academic information needs. This would reveal the influence of the ever-changing electronic information environment on the information-seeking behaviour of graduate students.

10.8 Concluding Remarks

By identifying the factors that influence the information-seeking behaviour of graduate students, this study has provided a wealth of information for stakeholders in higher education to utilise for developing strategies that would encourage graduate students to become more competent in their information-seeking patterns and that

would enhance their information-searching skills. Eventually, this may contribute to helping students become life-long independent critical thinkers. This, in turn, would promote research competency, improve the quality of Master's and Doctoral theses, and increase the number of articles published by researchers at the Kuwait College of Graduate Studies. This would improve the quality of research at Kuwait University, an institution that, along with other universities in developing countries, still needs to strengthen its research foundations so that it can compete at the international level on a more equal footing.

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APPENDICES

Appendix One

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A letter seeking permission for conducting survey on the information-seeking behaviour of graduate students enrolled in Kuwait's College of Graduate Studies.

To the general secretariat of Kuwait University

We would like to seek your co-operation for a research project undertaken by Nujoud Almuomen, a PhD student at Loughborough University. Her research aims to identify the factors influencing the information seeking patterns of graduate students in various disciplines and, in particular, their use of electronic information resources. As a staff member of Kuwait's College of Graduate Studies, she would like the opportunity to conduct a case study at your institution. She will, of course, make her results available to you at the end of her study which should be of benefit to your institution.

As an integral part of her investigation, Nujoud needs to survey master and doctoral graduate students and the academic staff engaged in teaching and supervising them. The survey is planned to be conducted during the period **April-June 2008**. It involves the completion of questionnaires by:

- graduate students distributed during lectures under the supervision of the instructor and collected at the end of the session.
- faculty members who will be asked to return them by a specific date via internal mail.

Each questionnaire will take approximately 10-15 minutes to complete.

In addition to the questionnaires, Nujoud would like to conduct short interviews with a number of faculty members from various fields and undertake focus groups with some graduate students. Participation in this project is voluntary; participants will have the opportunity to decline to answer any of the interview or focus group questions if they wish or to withdraw entirely at any time simply by informing the researcher. Confidentiality will be respected at all times. Data collected during this project will be kept in a secure place and will remain anonymous. Names, for example, will not appear in the thesis or any report resulting from this project.

We thank you in anticipation of your cooperation.

Yours faithfully,

Professor Anne Morris
Dr. Sally Maynard

Two handwritten signatures in black ink. The top signature is 'Anne Morris' and the bottom signature is 'Sally Maynard'.

Graduate students' questionnaire

Searching Information Resources

This survey is conducted as part of the research project of a PhD student from the Department of Information Science at Loughborough University. It aims to identify the factors influencing the information-seeking behaviour of graduate students engaged in coursework and research. Your contribution is highly appreciated and critical to the success of this research. All information provided will remain confidential as only the researcher has access to the surveys. For any enquiries or comments related to the survey, please contact me by e-mail at N.Almuomen@lboro.ac.uk

Part I. Background Information

Please tick (✓) in the appropriate box:

1. Please indicate your gender.

- ☐ Male
☐ Female

- ## 2. Age.

- ☐ 20-30
☐ 31-40
☐ 41-50
☐ 50+

- ### 3. Nationality

- ☐ Kuwaiti
☐ Non-Kuwaiti, please specify.....

- 7. Which of these fields best describes your major?** (Please tick one answer only)

- ☐ Medicine
- ☐ Engineering
- ☐ Science
- ☐ Business Administration
- ☐ Arts
- ☐ Law
- ☐ Social Sciences
- ☐ Education
- ☐ Islamic Studies
- ☐ Joint Degree

- 4. Is a thesis required to complete your programme?**

- ☐ Yes
- ☐ No

8. What degree are you studying for now?

- ☐ Masters
- ☐ PhD
- ☐ Higher Diploma

- ## 5. Enrollment

- ☐ Full-time
- ☐ Part-time

- 9. At what stage of the programme are you currently?**

- ☐ 1st year
- ☐ 2nd year
- ☐ 3rd year
- ☐ Other, please specify.....

- 6. How would you rate your English language proficiency?**

(Please circle the appropriate number)

No skills at all

fluent

1 2 3 4 5 6 7

- 10. How would you rate your skills in using the following computer applications?**

(Please circle the appropriate number)

No skills at all

expert

Word processing	1	2	3	4	5	6	7
Excel (Spreadsheets)	1	2	3	4	5	6	7
Databases	1	2	3	4	5	6	7
PowerPoint	1	2	3	4	5	6	7
File management	1	2	3	4	5	6	7
Referencing software	1	2	3	4	5	6	7

Part II Searching for information

Please consider a recent incident when you needed some information that required the use of a networked computer and internet connection. The information you needed should have been related to your coursework (For example, assignments, literature review, or research proposal). The task could have been as simple or as complex. The information need may have required the use of: the internet, search engines, library's databases, e-journals, OPACs, or other sources.

11. What was the purpose of the search?
(Please tick **all** that apply)

- ☐ Completing course work
- ☐ Term papers
- ☐ Comprehensive exam
- ☐ Other, please specify.....

12. Where did you carry out the search?
(Please tick **all** that apply)

- ☐ Library
- ☐ College workstation/computer lab
- ☐ Office
- ☐ Home
- ☐ Other, please specify.....

13. Did you experience any computer or network problems when doing the search?

- ☐ Yes
- ☐ No
- ☐ If yes, please give details.....

14. Did you need to modify your search question or strategy at all?

- ☐ Yes
- ☐ No
- ☐ If yes, please give details.....

17. What did you use to find this information?
(Please tick **all** that apply)

- ☐ Search engines (e.g. Google)
- ☐ Electronic journals
- ☐ Library's online databases
- ☐ Personal contacts
- ☐ University library website
- ☐ Other, please give details.....

18. If given the option, how would you prefer to search for information?
(Please tick **only** one)

- ☐ Print versions of databases/journals
- ☐ Electronic versions of databases/journals

19. What/Who made you aware of the electronic resources used in your search?
(Please tick **all** that apply)

- ☐ Previous search experience and results
- ☐ Friend/colleague suggestion
- ☐ Course/session
- ☐ Departmental website
- ☐ Other, please give details.....

15. If you needed to ask someone for help, who did you ask?
(Please tick **all** that apply)

- ☐ Library staff
- ☐ A friend/colleague
- ☐ Tutor/lecturer
- ☐ Other, please give details.....

16. How did you feel about the results of your search?
(Please circle the appropriate number)

Dissatisfied	Totally satisfied						
1	2	3	4	5	6	7	

20. In general, how often do you use the following Information resources for your studies?
(Please circle the appropriate number

	Never			Always			
World Wide Web	1	2	3	4	5	6	7
Search engines	1	2	3	4	5	6	7
Electronic journals	1	2	3	4	5	6	7
CD-ROM databases	1	2	3	4	5	6	7
Online databases	1	2	3	4	5	6	7
University library website	1	2	3	4	5	6	7
Printed books	1	2	3	4	5	6	7
Dissertations, theses	1	2	3	4	5	6	7

Part III. Information Literacy

21. To what extent do you agree or disagree with the following? *(Please circle the appropriate number)*

	Strongly Disagree						Strongly Agree
a. I feel confident with defining the information I need	1	2	3	4	5	6	7
b. I am unsure about being able to identify a variety of potential sources of information	1	2	3	4	5	6	7
c. I am confident with limiting search strategies by subject, language and date	1	2	3	4	5	6	7
d. I feel confident with initiating search strategies by using keywords and Boolean logic (and, or)	1	2	3	4	5	6	7
e. I feel anxious when deciding where and how to find the information I need	1	2	3	4	5	6	7
f. I am confident with using different kinds of print sources (i.e. books, periodicals, encyclopedias, chronologies)	1	2	3	4	5	6	7
g. When I think about using electronic information resources, I feel confident	1	2	3	4	5	6	7
h. I am apprehensive about being able to locate resources in the library using the library catalogue	1	2	3	4	5	6	7
i. I feel confident using internet search tools (such as search engines, directories, etc)	1	2	3	4	5	6	7
j. I am confident with using many resources at the same time to carry out research	1	2	3	4	5	6	7
k. I am unsure about how to determine the reliability of information sources	1	2	3	4	5	6	7
l. I know how to determine the currentness of information sources	1	2	3	4	5	6	7
m. I am confident with selecting information most appropriate to my information need	1	2	3	4	5	6	7
n. I am confident with my ability to evaluate sources from the World Wide Web	1	2	3	4	5	6	7
o. I am unsure about how to combine newly gathered information with previously obtained information	1	2	3	4	5	6	7
p. I am confident with writing a research paper	1	2	3	4	5	6	7
q. I know how to create bibliographic records for different kinds of materials (i.e. books, articles, web pages)	1	2	3	4	5	6	7
r. I am apprehensive about criticizing the quality of my information seeking process and its outcomes	1	2	3	4	5	6	7

Part IV. Teaching and learning style

22. How would you best describe the teaching style in your programme?

	Strongly Disagree						Strongly Agree
a. Based largely on traditional lecturing	1	2	3	4	5	6	7
b. Based largely on lab work and experiments	1	2	3	4	5	6	7
c. Based largely on a combination of lectures and tutorials	1	2	3	4	5	6	7
d. Based largely on problem solving and critical thinking	1	2	3	4	5	6	7
e. Based largely on individual work	1	2	3	4	5	6	7
f. Based largely on group work	1	2	3	4	5	6	7

23. To what extent you would agree or disagree with the following statements?

(Please circle the appropriate number.)

	Strongly Disagree						Strongly Agree
a. Guiding on how to use information resources	1	2	3	4	5	6	7
b. Laying down the foundation for my research work	1	2	3	4	5	6	7
c. Passing on journals, research papers of their own or of noted authors	1	2	3	4	5	6	7
d. Assigning projects that require using information resources available in the library.	1	2	3	4	5	6	7
e. Offering guidance on how to conduct literature searching	1	2	3	4	5	6	7

Part V. Library Awareness

	Strongly Disagree							Strongly Agree
a. I can usually find the resources I need in the library	1	2	3	4	5	6	7	
b. I am aware that the library offers online search services for graduate students	1	2	3	4	5	6	7	
c. When I think about my dissertation/thesis as it relates to the library, I feel stressed	1	2	3	4	5	6	7	
d. I know what resources are available in the library	1	2	3	4	5	6	7	
e. I understand how to begin my research in the library	1	2	3	4	5	6	7	
f. When I use the library for information, I feel overwhelmed	1	2	3	4	5	6	7	
g. I am uncomfortable using the library's online catalogue	1	2	3	4	5	6	7	
h. I am uncomfortable using the library's website	1	2	3	4	5	6	7	
i. I am comfortable using the computers inside the library	1	2	3	4	5	6	7	
j. The library should provide more services for masters and doctoral students	1	2	3	4	5	6	7	
k. The library's resources for my area of interest are satisfactory	1	2	3	4	5	6	7	
l. It is difficult to locate materials I need in the library	1	2	3	4	5	6	7	
m. The library offers enough information skills training sessions for graduate students	1	2	3	4	5	6	7	
n. My knowledge of the library is limited to my area of interest	1	2	3	4	5	6	7	
o. I would rather use the library online	1	2	3	4	5	6	7	
p. The library is easy to use	1	2	3	4	5	6	7	
q. There are too many possible sources of information	1	2	3	4	5	6	7	
r. I can use Interlibrary Loan for access to materials not in my library	1	2	3	4	5	6	7	
s. In general, I think my ability to use the library has had a negative effect on my research	1	2	3	4	5	6	7	

25. Overall, to what extent have you been influenced by the following factors related to use of electronic information resources?

	Not at all influenced							Extremely influenced
a. Access to the Internet	1	2	3	4	5	6	7	
b. Access to computers	1	2	3	4	5	6	7	
c. Access to printers	1	2	3	4	5	6	7	
d. The need for passwords to access information	1	2	3	4	5	6	7	
e. Interlibrary loan	1	2	3	4	5	6	7	
f. Computing skills (Word, Excel, Databases, PowerPoint)	1	2	3	4	5	6	7	
g. English language skills	1	2	3	4	5	6	7	

Thank you very much for taking the time to fill in this questionnaire. I plan to carry out group interviews related to this survey. If you are willing to take part in these, please provide contact details:

Name-----

Contact number-----

E-mail address-----

Appendix 3 - Faculty members' questionnaire

This survey forms a part of research being conducted by a PhD student at the Department of Information Science at Loughborough University. It aims to identify the factors influencing the information-seeking behaviour of graduate students engaged in coursework and projects. Your contribution is highly appreciated and critical to the success of this research. All information provided will remain confidential as only the researcher has access to the surveys. For any enquires or comments related to the survey, please contact me either by telephone at 7373610 or by e-mail at N.Almuomen@lboro.ac.uk Nujoud Almuomen, Department of Information Science, Loughborough University, United Kingdom.

1. Please indicate your gender.

- ☐ Male
☐ Female

2. Age.

- ☐ 20-30
☐ 31-40
☐ 41-50
☐ 50+

3. Nationality.

- ☐ Kuwaiti
☐ Non-Kuwaiti, please specify.....
.....

4. Which of these fields best describes your major?

(Please tick only one)

- ☐ Medicine
☐ Engineering
☐ Science
☐ Business Administration
☐ Arts
☐ Law
☐ Social Sciences
☐ Education
☐ Islamic Studies
☐ Joint Degree

5. How long have you been teaching graduate courses?

- ☐ Less than 5 years
☐ 5-9 years
☐ 10+ years

6. Where did you study for your highest degree?

- ☐ Kuwait
☐ Middle East
☐ USA
☐ Europe
☐ Other, please specify.....

7. Academic Rank

- ☐ Assistant professor
☐ Associate professor
☐ Professor
☐ Other, please specify.....

8. What graduate programmes do you teach?

(Please tick all that apply)

- ☐ MA
☐ MSc
☐ PhD
☐ Higher Diploma

9. How would you rate your English language proficiency?

(Please circle the appropriate number)

1 2 3 4 5 6 7

10. How would you rate your skills in using the following computer applications?

(Please circle the appropriate number)

	No skills at all							Expert
Word processing	1	2	3	4	5	6	7	
Excel (Spreadsheets)	1	2	3	4	5	6	7	
Databases	1	2	3	4	5	6	7	
PowerPoint	1	2	3	4	5	6	7	
File management	1	2	3	4	5	6	7	
Referencing software to prepare bibliographies	1	2	3	4	5	6	7	

Appendices

Part II. Searching for Information using electronic resources (Critical Incident Technique)

Please think about a recent incident when you needed some information that required the use of a networked computer and internet connection. The information you needed should have been related to your teaching and research. The task could have been as simple or as complex. The information need may have required the use of: the internet, search engines, library's databases, e-journals, Online Public Access Catalogues (OPACs), or other sources.

Please tick (✓) in the relevant box to your answer:

11. What was the purpose of the search?

(Please tick all that apply)

- ☐ Teaching
- ☐ Article or report for publication
- ☐ Proposal for funded research or project
- ☐ Bibliography or reference checking
- ☐ Other, please specify.....

12. Where did you carry out the search?

(Please tick all that apply)

- ☐ Library
- ☐ College workstation/computer lab
- ☐ Office
- ☐ Home
- ☐ Other, please specify.....

13. What did you use to find this information?

(Please tick all that apply)

- ☐ Search engines (for example, Google)
- ☐ E-journals
- ☐ Library's online databases
- ☐ Personal contacts
- ☐ University library website
- ☐ Other, please give details.....

14. If you needed to ask for help, who did you ask?

(Please tick all that apply)

- ☐ Library staff
- ☐ A friend/colleague
- ☐ Lecturer
- ☐ Other, please give specify.....

15. Did you have any computer or network service problems when doing the search?

- ☐ Yes
- ☐ No
- ☐ If yes, please give details.....

16. If given the option, how would you prefer to search for information?

(Please tick only one)

- ☐ Print versions of databases/journals
- ☐ Electronic versions of databases/journals

17. Did you find the information you wanted?

- ☐ Yes
- ☐ No
- ☐ Some of it

18. Did you need to modify your search question or strategy at all?

- ☐ Yes
- ☐ No
- ☐ If yes, please give details of what you did.....

19. What/Who made you aware of the electronic resources used in your search?

(Please tick all that apply)

- ☐ Previous search experience and results
- ☐ Friend/colleague suggestion
- ☐ Course/session
- ☐ Departmental website
- ☐ Other, please give details

20. How did you feel about the results of your search?

(Please circle the appropriate number)

Totally dissatisfied

Totally satisfied

1 2 3 4 5 6 7

21. In general, how often do you use the following information resources to fulfill your academic needs?

(Please circle the appropriate number)

	Never						Daily
World Wide Web	1	2	3	4	5	6	7
Search engines	1	2	3	4	5	6	7
Electronic journals	1	2	3	4	5	6	7
CD-ROM databases	1	2	3	4	5	6	7
Online databases	1	2	3	4	5	6	7
University library website	1	2	3	4	5	6	7
Serials	1	2	3	4	5	6	7
Print books	1	2	3	4	5	6	7
Dissertations, theses	1	2	3	4	5	6	7

Part III. Faculty perceptions of students' library use

22. Please indicate to what extent you agree or disagree with the following statements.

(Please circle the appropriate number from the following scale)

		Strongly Disagree						Strongly Agree
a	Libraries ought to help students learn the process of finding information rather than finding information for them.	1	2	3	4	5	6	7
b	Faculty members should design assignments for their students which require library use.	1	2	3	4	5	6	7
c	It is the librarian's responsibility to ensure that the library has up-to-date information in my subject area.	1	2	3	4	5	6	7
d	One of my roles as an instructor is to motivate students to want to use the library and the range of electronic information resources available.	1	2	3	4	5	6	7
e	Learning to use the library helps stimulate students' intellectual curiosity	1	2	3	4	5	6	7
f	Most students in my classes do not have the necessary skills to undertake library-based assignments.	1	2	3	4	5	6	7
g	Learning to use the library is an important way to increase students' self-esteem and self-confidence.	1	2	3	4	5	6	7
h	Library-based assignments can increase students' awareness of the world outside the classroom.	1	2	3	4	5	6	7
i	Learning the processes necessary to use the library is an important skill for students.	1	2	3	4	5	6	7
j	Instructors should make graded assignments, or find other ways to motivate students to use the library.	1	2	3	4	5	6	7
k	An important reason for students to learn to use the library is to become familiar with the literature in their subject field.	1	2	3	4	5	6	7
l	Good skills in using the library may also improve students' general communication skills.	1	2	3	4	5	6	7
m	For an instructor, making student library assignments is very time consuming.	1	2	3	4	5	6	7
n	Student plagiarism is an increasingly significant issue because the electronic information environment makes it so easy to plagiarise.	1	2	3	4	5	6	7
o	Students' lack of study skills (including writing and organising) makes it difficult for instructors to mandate library-based assignments.	1	2	3	4	5	6	7
p	The information resources available in the college library in my subject field are not adequate for me to make student library assignments.	1	2	3	4	5	6	7
q	The library is not valued as an important part of the college's educational program by the administration.	1	2	3	4	5	6	7

23. What information skills/information retrieval training have you received from your university?

(Please tick all that apply)

- ☐ IT services specialist session
- ☐ Library training session
- ☐ Informal help as needed by library staff
- ☐ None
- ☐ Other, please give details.....

24. If you have ticked one of the above, please give a brief description of what was covered by the training?

.....

Thank you very much for taking the time to fill in this questionnaire. Please return your questionnaire using the attached envelope as soon as possible. I also plan to carry out short interviews related to this survey. If you are willing to take part in these, please provide contact details below.

Name-----, E-mail address-----, Contact number-----

Appendix 4 - Focus Group Guide for graduate students

Part I : Introduction, aims and objectives

Part II: The researcher introducing herself to the participants and informing them that the discussion will be recorded in order to be transcribed in a later stage. Participants were also assured the confidentiality of the group discussion and that they can contact the researcher at any time in case they have any questions related to the key issues being discussed.

Part III: Opening Question

The aim of this focus group is to explore the patterns of your information-seeking behaviour when you engage in an active search for information to fulfill an academic task. There will be a particular focus on the use of electronic information resources and you will have the opportunity to raise any questions, or make comments during the discussions

Part IV: Key issues (questions) for the discussion

1. What type of projects or assignments you usually undertake in the graduate programmes ?
2. How do you usually start your search?
3. How do you keep yourself updated with latest developments in your fields?
4. What information resources do you use and for which purpose?
5. What strategies do you follow in retrieving articles?
6. What difficulties do you face when conducting searching for information?
7. What are your perceptions of the academic library and the librarians?
8. How do you perceive the role of your faculty members in your information-seeking process?
9. Do you have any comments related to the discussions?

Part V: Close up and thanking participants for their attendance

Appendix 5 - Semi-structured interviews with faculty members

Interview guide for faculty members engaged in teaching and supervising graduate students at Kuwait University

These interview questions form the qualitative part of the PhD research conducted by Nujoud Almuomen from Loughborough University. The interview is related to the information seeking behaviour of faculty members and their perceptions about the graduate students' use of information resources. In this project the critical incident technique is applied by asking the interviewees to tell about a very *specific situation* where they experienced problems while using electronic information resources, or a positive situation where they gained new knowledge.

Your contribution will highly be appreciated as it would add depth to the research.

First, please fill in the information in the following spaces

Name:.....
Gender:.....
Nationality:.....
Academic rank:.....
Major academic discipline:.....
Years spent in teaching graduate students:.....

Tell me about the most recent incident when you needed to search for :

1. Information resources for a specific academic purpose (e.g, coursework or research paper) – what was it about?
2. How did you get started? Can you also talk about the steps taken that did not work out?
3. Did you use particular databases, where they helpful?
4. What criteria did you use for choosing the resources? (e.g, relevance-currency-language,..etc)
5. What factors played the most important role in your information-seeking process? (e.g., accessibility to the internet-connections-IT issues, etc...)
6. Would you do any part of the search process differently if you had another chance?
7. Are there adequate sources of information for faculty members in your area of specialization?

Appendix Five

8. What resources do you most use when searching for information?
 9. Have you received any advanced training or orientation sessions from the university on information retrieval skills? If so, please describe the issues covered by the session.
 10. What do you think about your graduate students' use of electronic resources in general? And how do you think they can get the benefit of such resources?
-
11. Is there anything else about your academic library experience that we haven't discussed and you like to comment on (perceptions, problems, difficulties, negative and positive points)?

Thank you very much for taking the time to answer the questions.

Appendix 6 - Structured interviews with senior academic librarians

Your participation in this survey will be highly appreciated; as it will add depth to this ongoing research investigating the key factors influencing the information-seeking behavior of graduate students at Kuwait University. Your answers are confidential.

First, please fill in the information in the following spaces

Name:.....

Gender:.....

Nationality:.....

Title:.....

Major academic discipline:.....

Years spent in working as a librarian:.....

1. Are there any special services provided for graduate students in KU library?
2. How do you evaluate the website of the library?
3. What about e-books; I've noticed you had a poster on that?
4. Do you have any statistical reports on the use of electronic resources in the library?
5. What role do faculty members play in students' information literacy?
6. To what extent do faculty members and academic librarians cooperate in order to enhance graduate students' awareness of the importance of being able to use various sources of information?
7. What are your perceptions for the future of the library in light of the rapid development in the electronic information resources environment?

Thank you very much for taking the time to answer the questions.

Appendix 7: Auxiliary figures from Chapter 6 (Questionnaire Analysis)

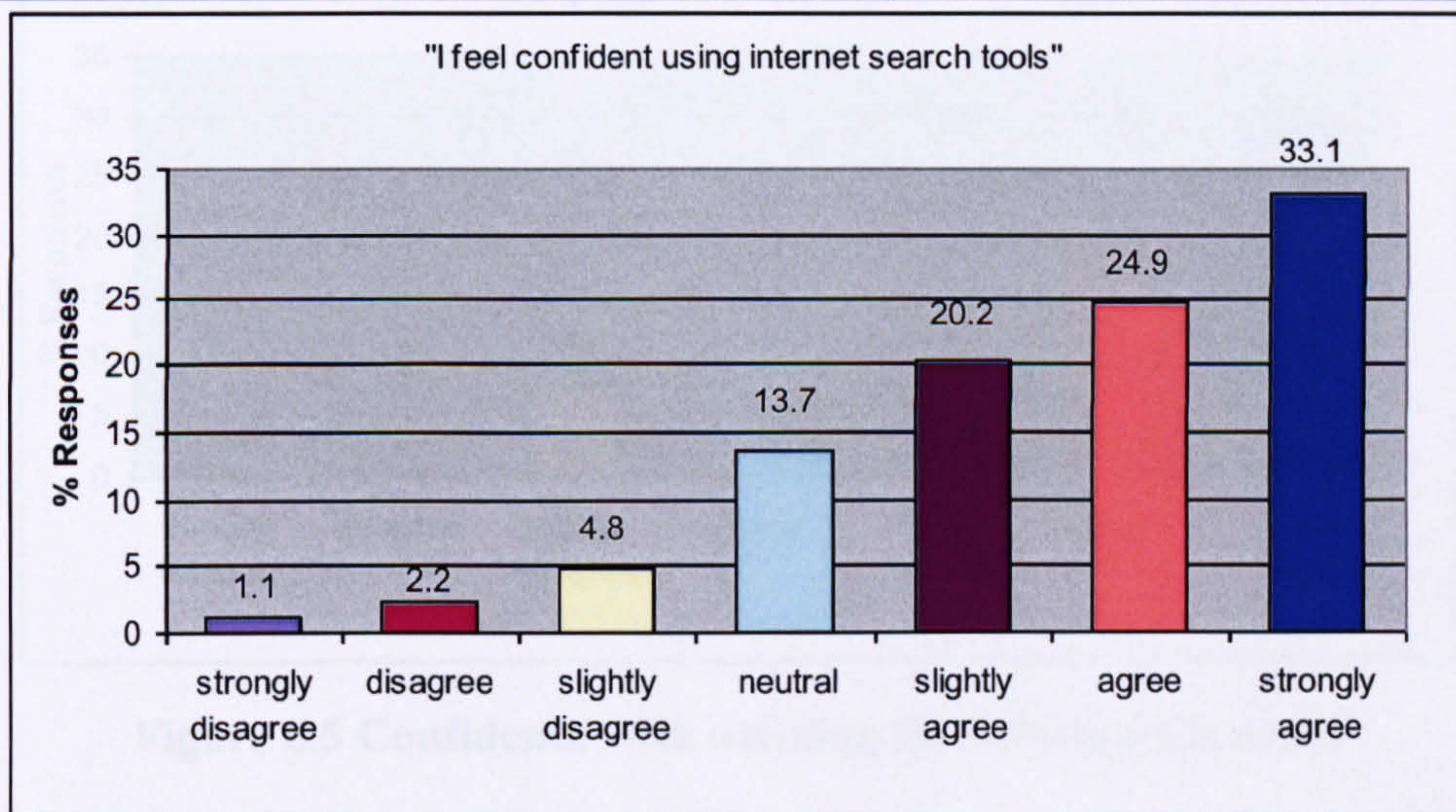


Figure 6.3 Confidence with using Internet search tool. Graduate students

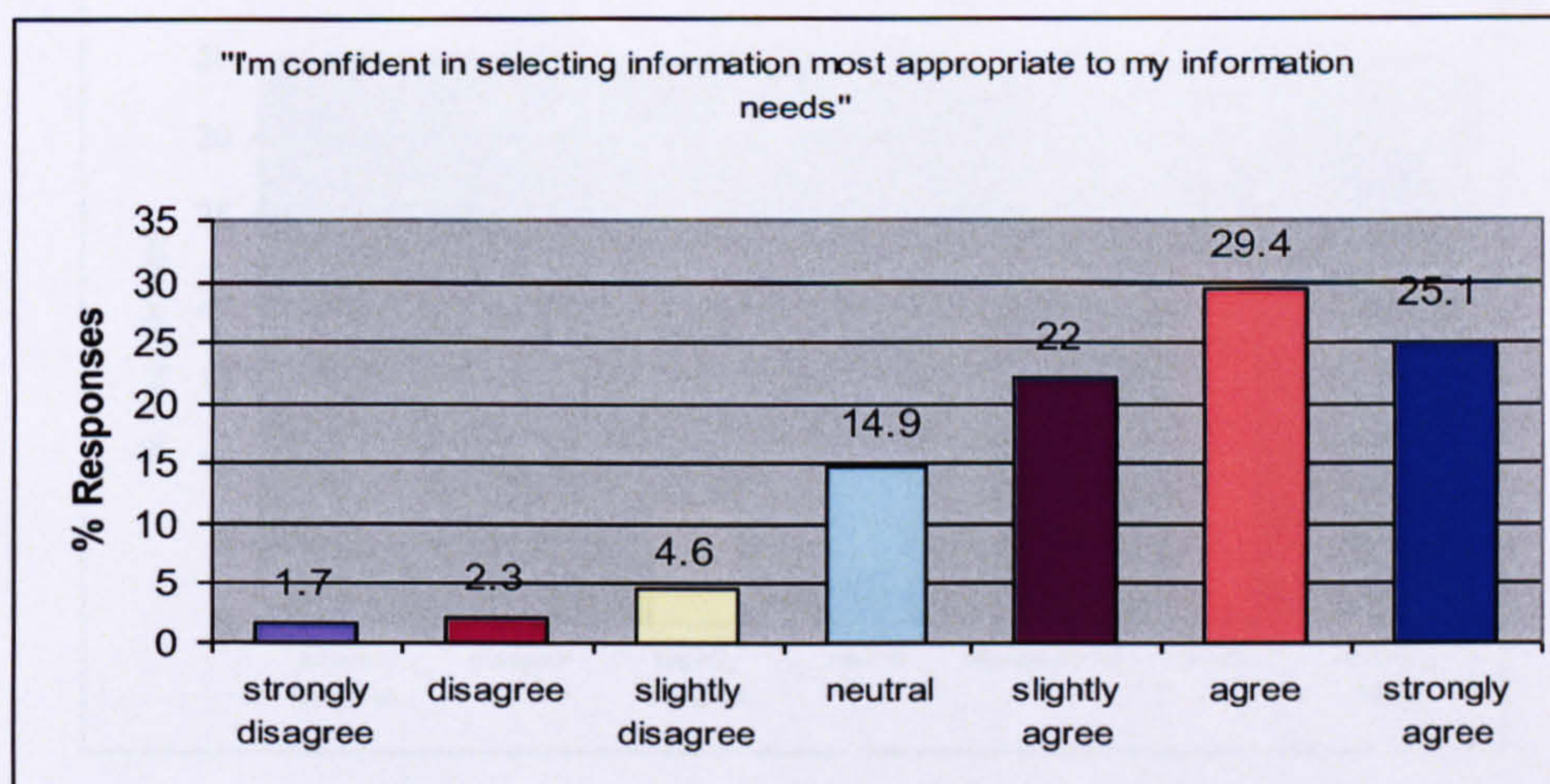


Figure 6.4 Confidence with selecting information resources appropriate to the students

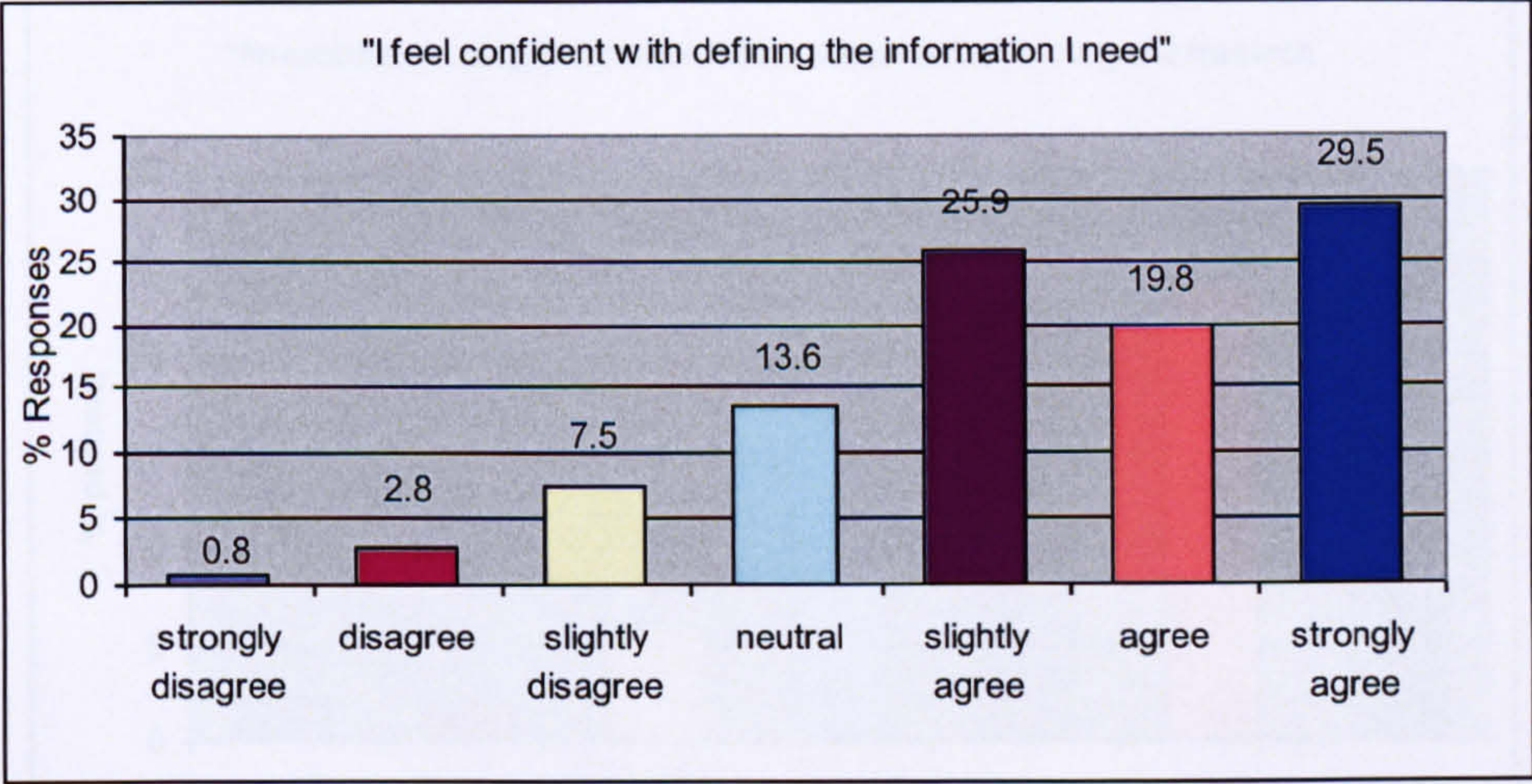


Figure 6.5 Confidence with defining the information needs

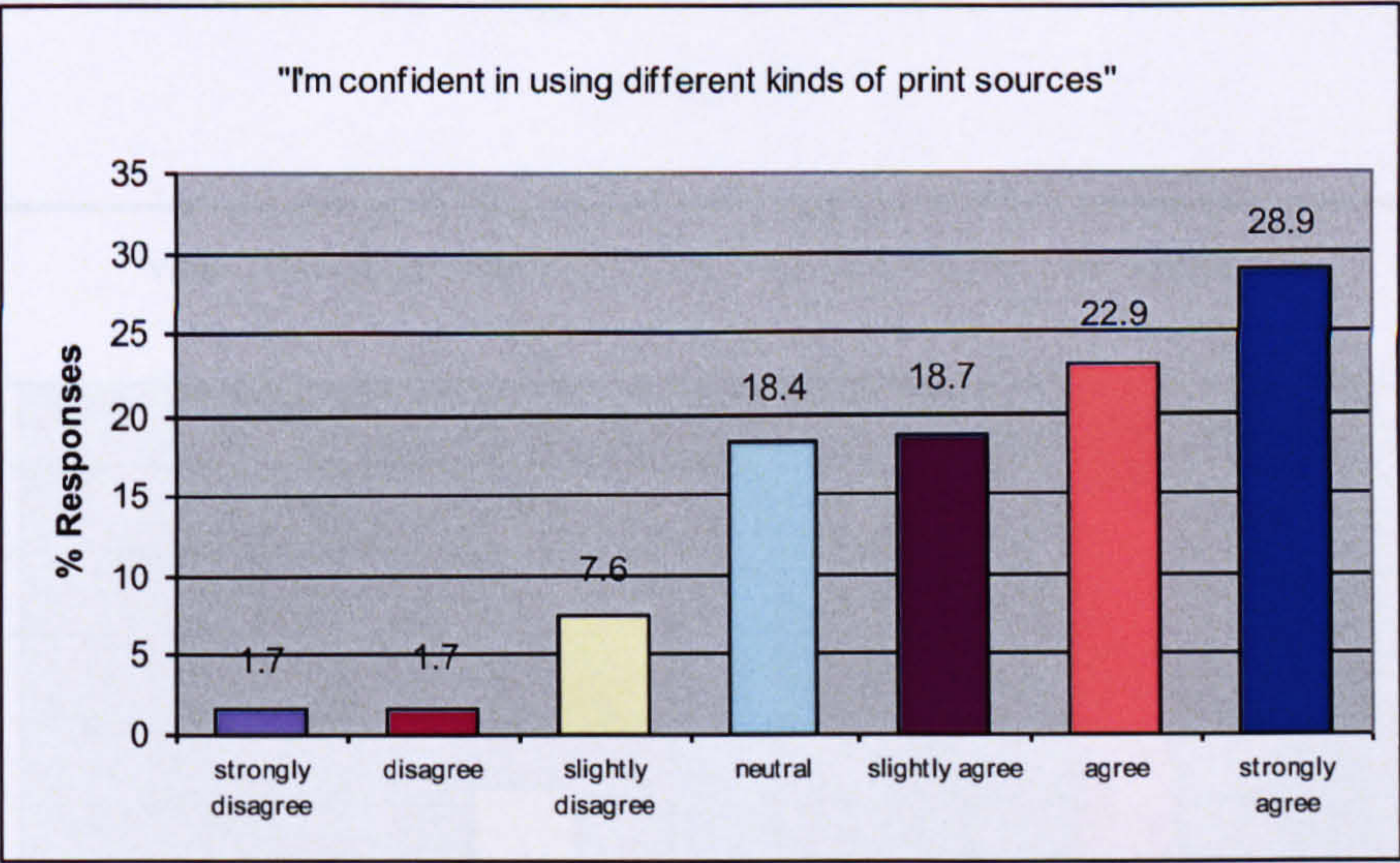


Figure 6.6 Confidence with using various kinds of print resources

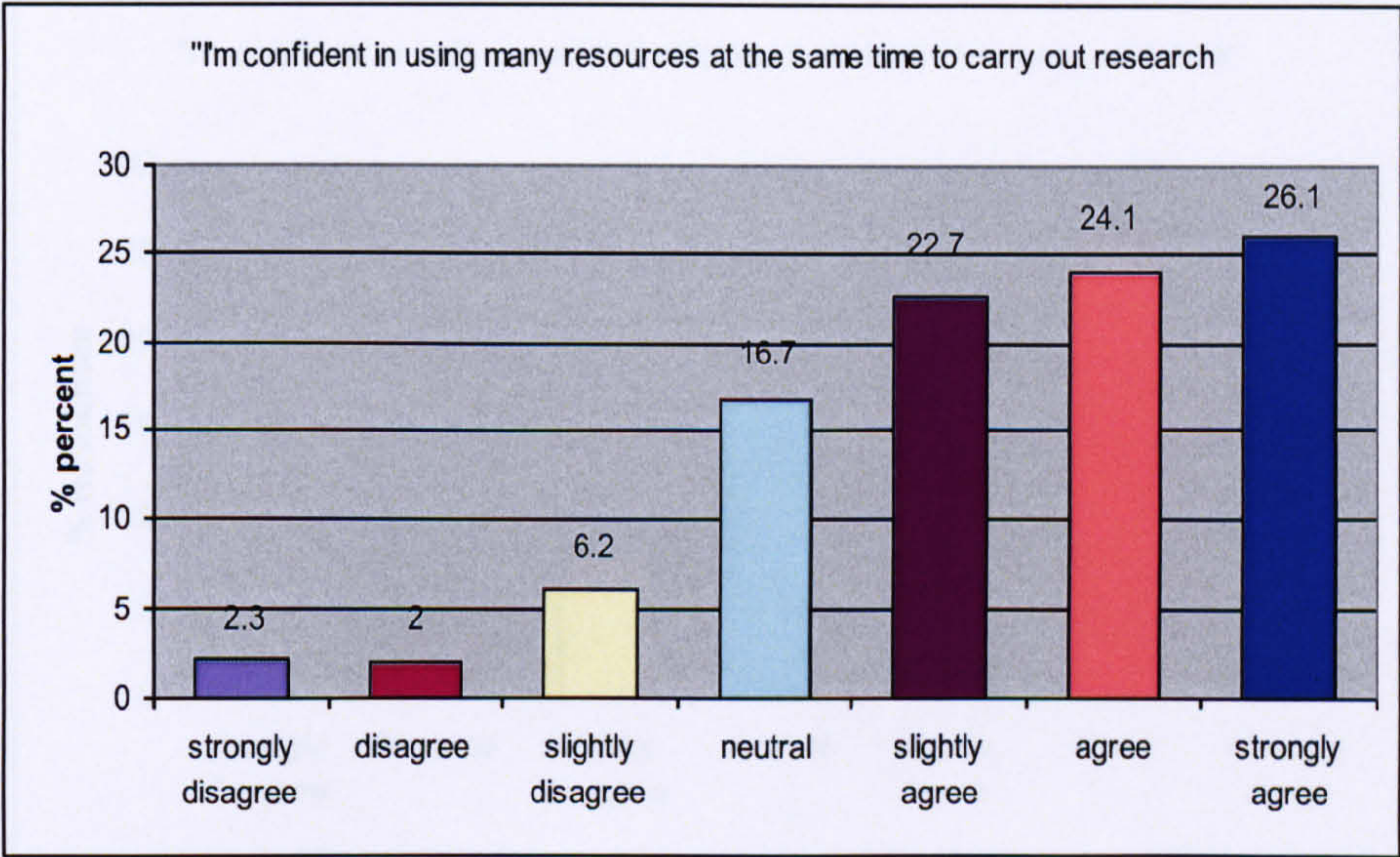


Figure 6.7 Confidence with using many resources at the same time to carry out research

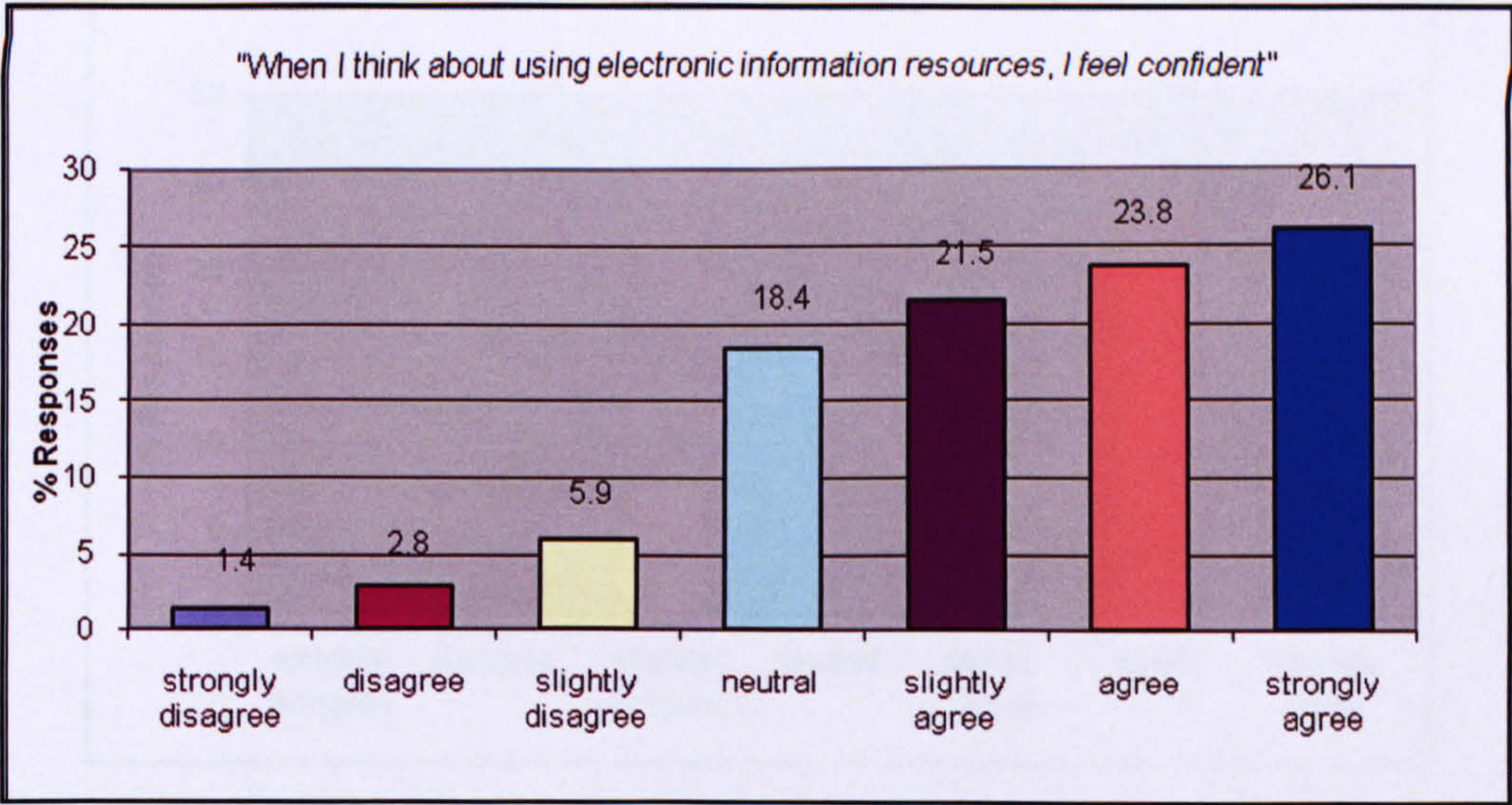


Figure 6.8 Confidence with using electronic information resources

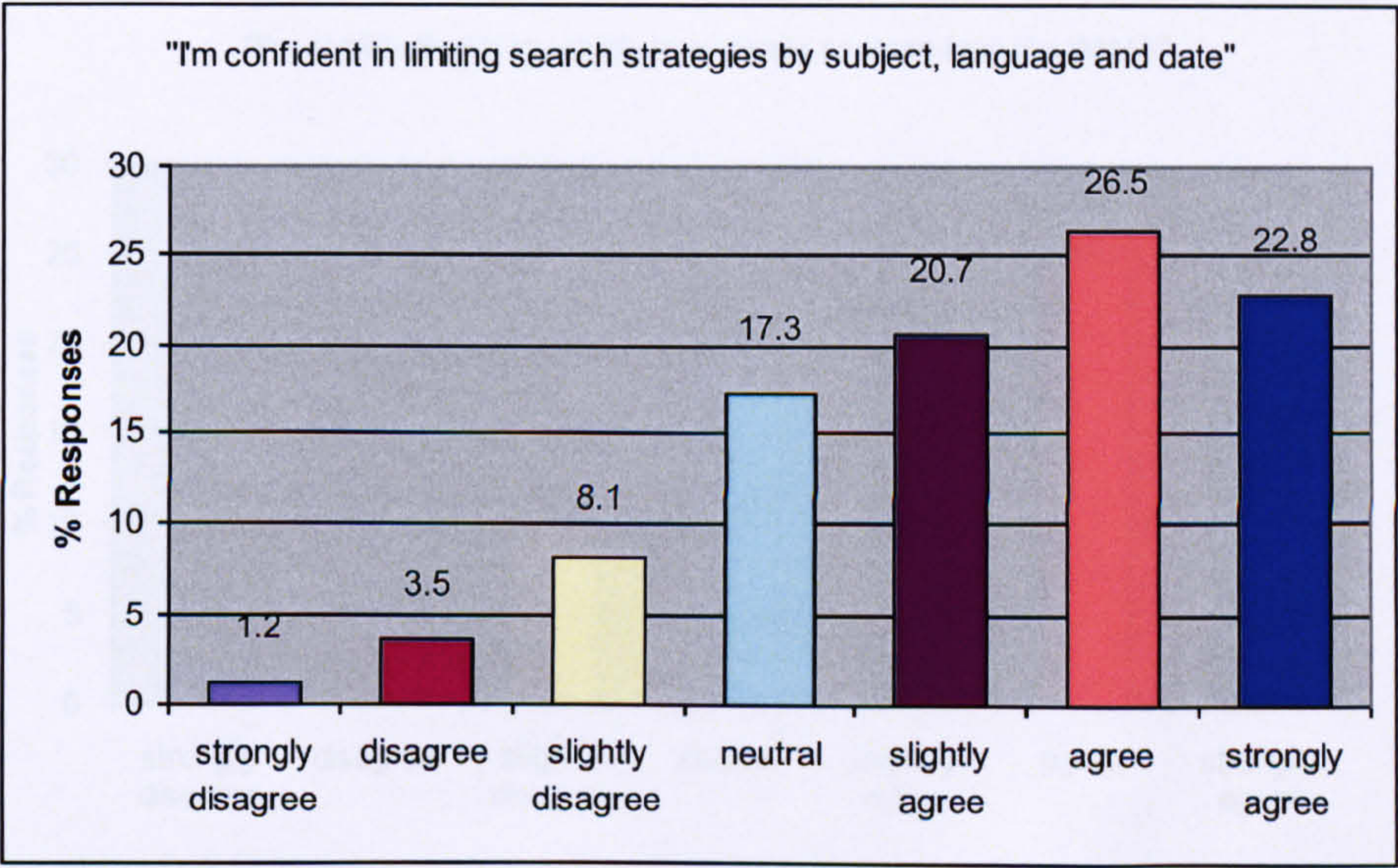


Figure 6.9 Confidence with limiting search strategies by subject, language and date

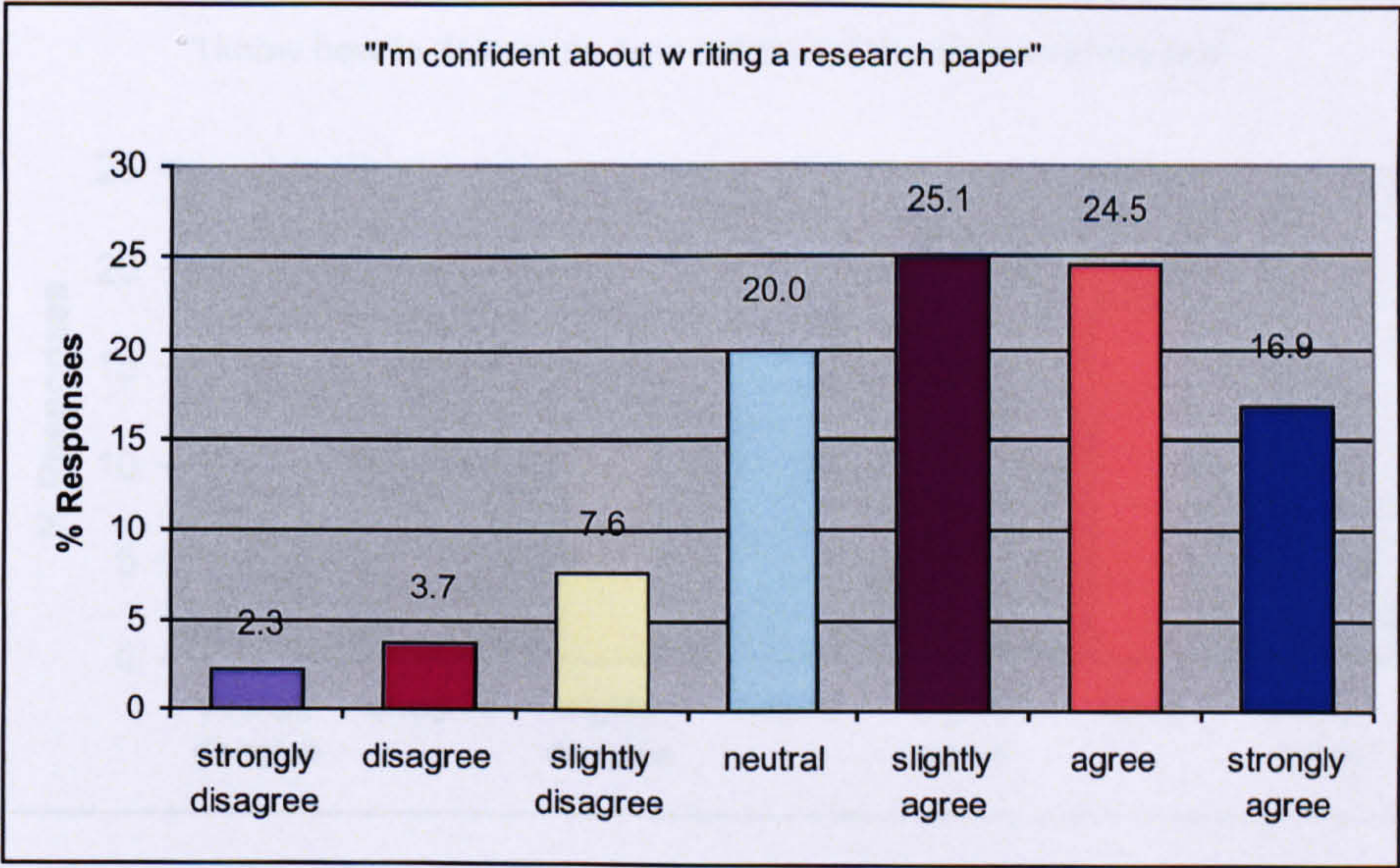


Figure 6.10 Confidence with writing a research paper

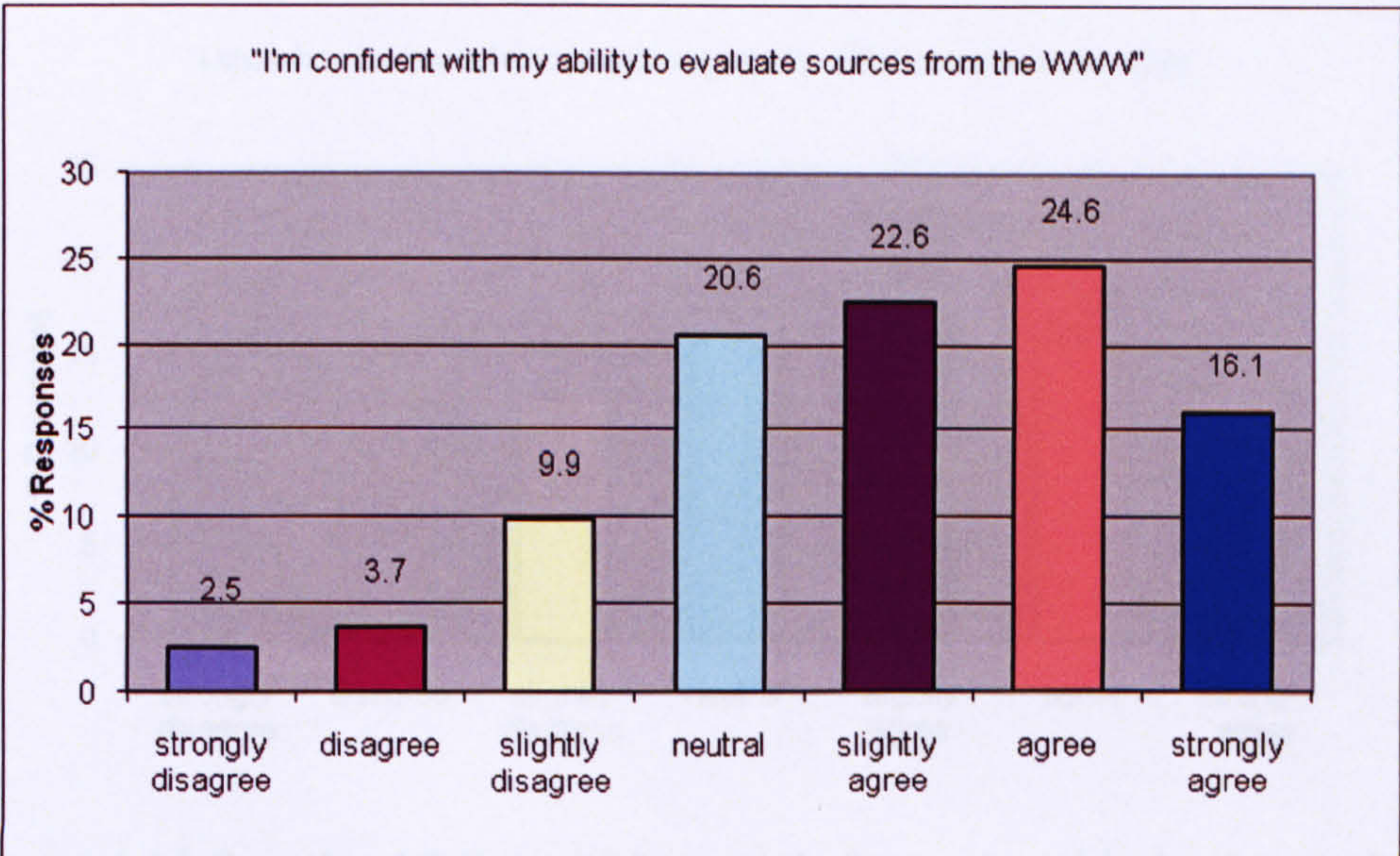


Figure 6.12 Confidence with evaluating sources from the World Wide Web

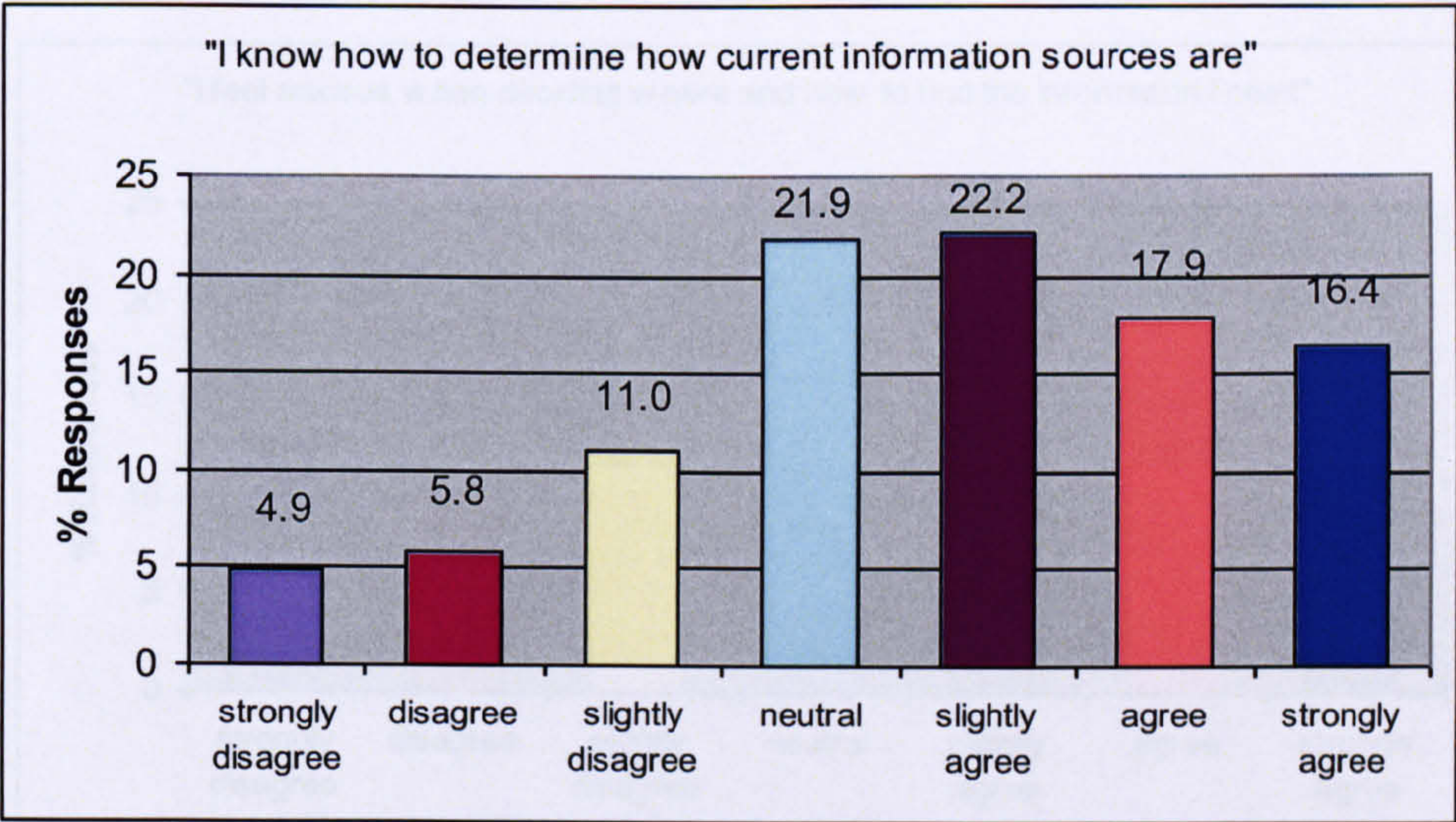


Figure 6.13 knowing how to determine the currency of information resources

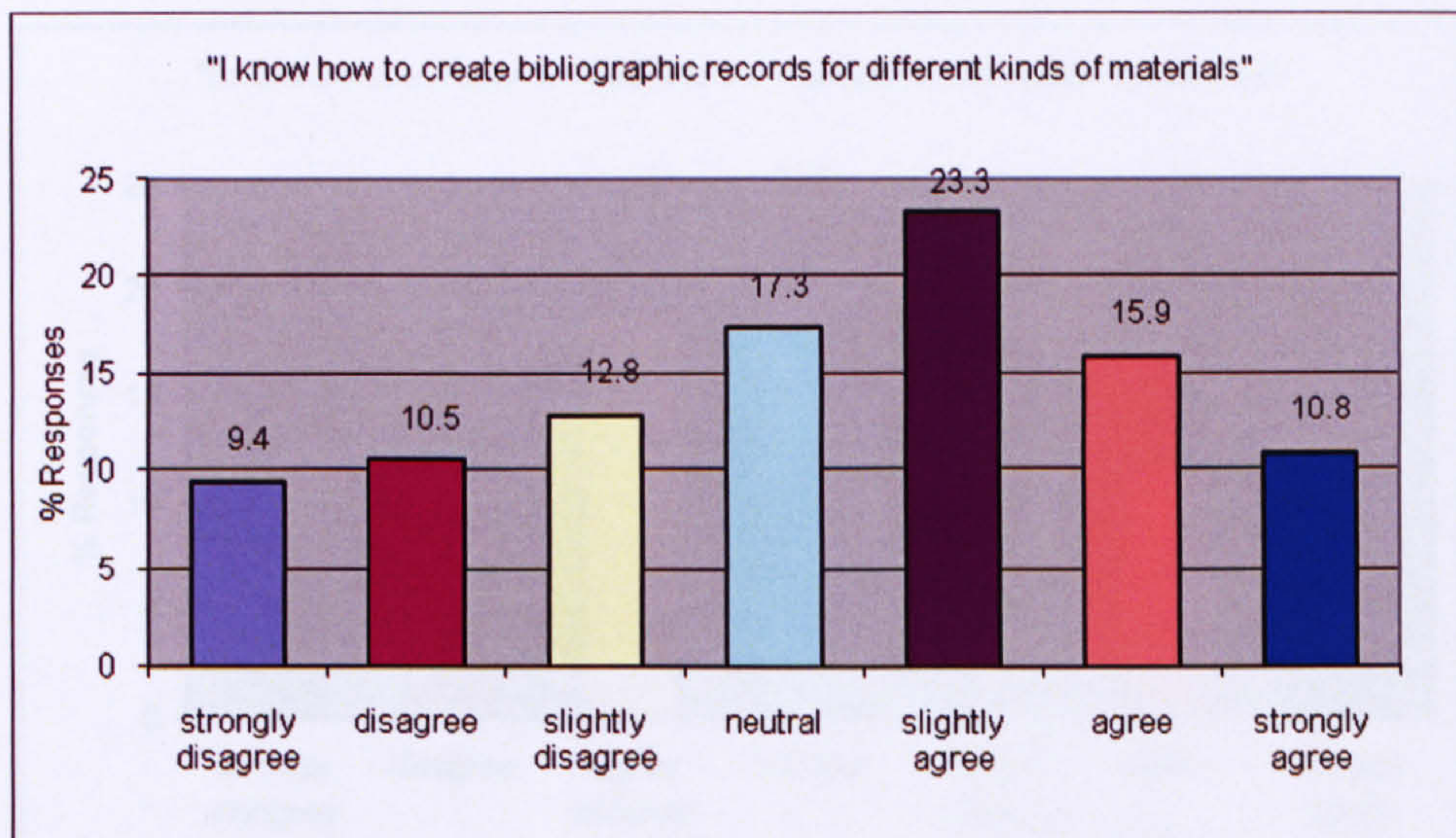


Figure 6.14 Creating bibliographic records for various kinds of materials

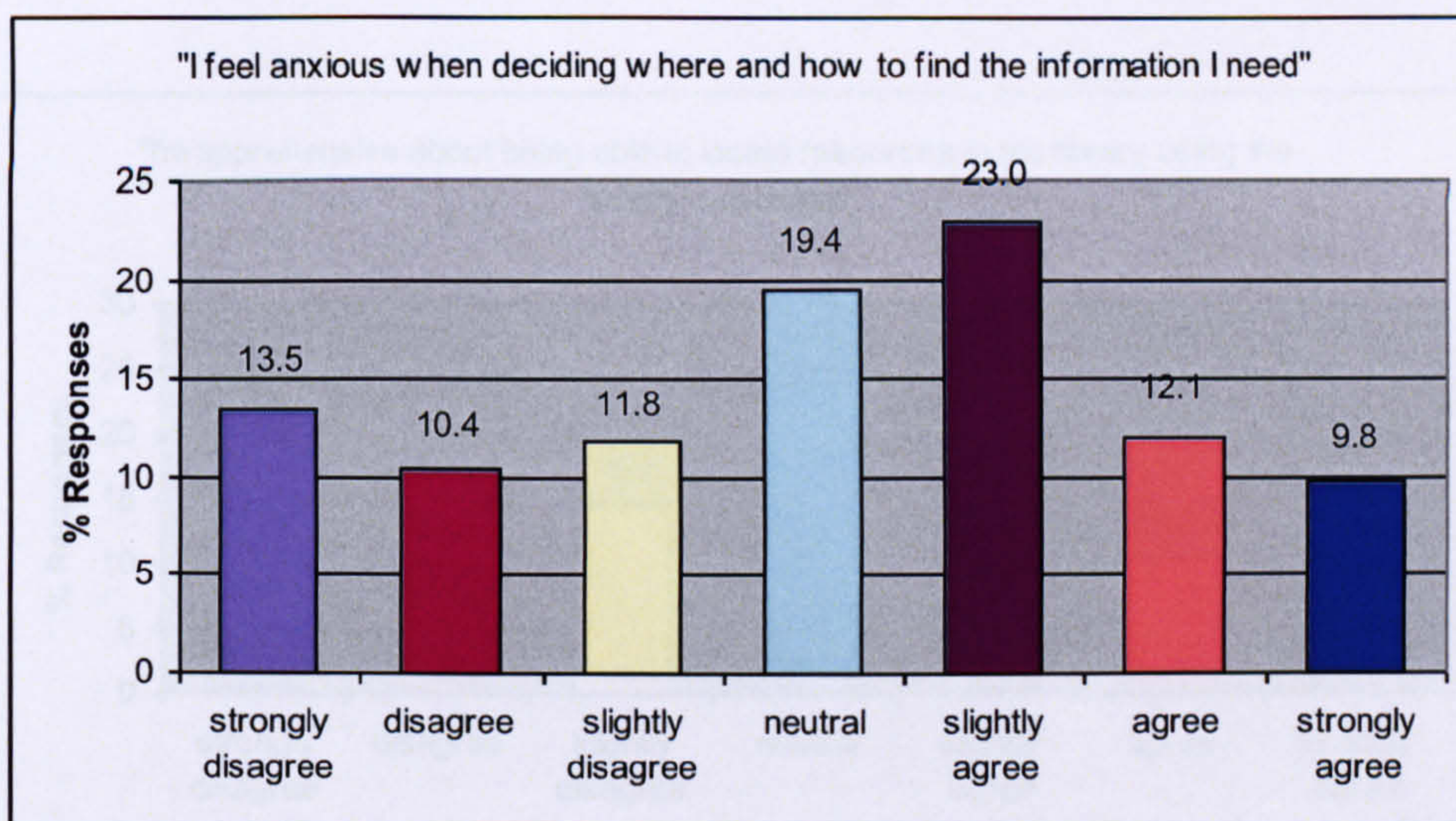


Figure 6.15 Anxiety towards deciding how to find the needed information.

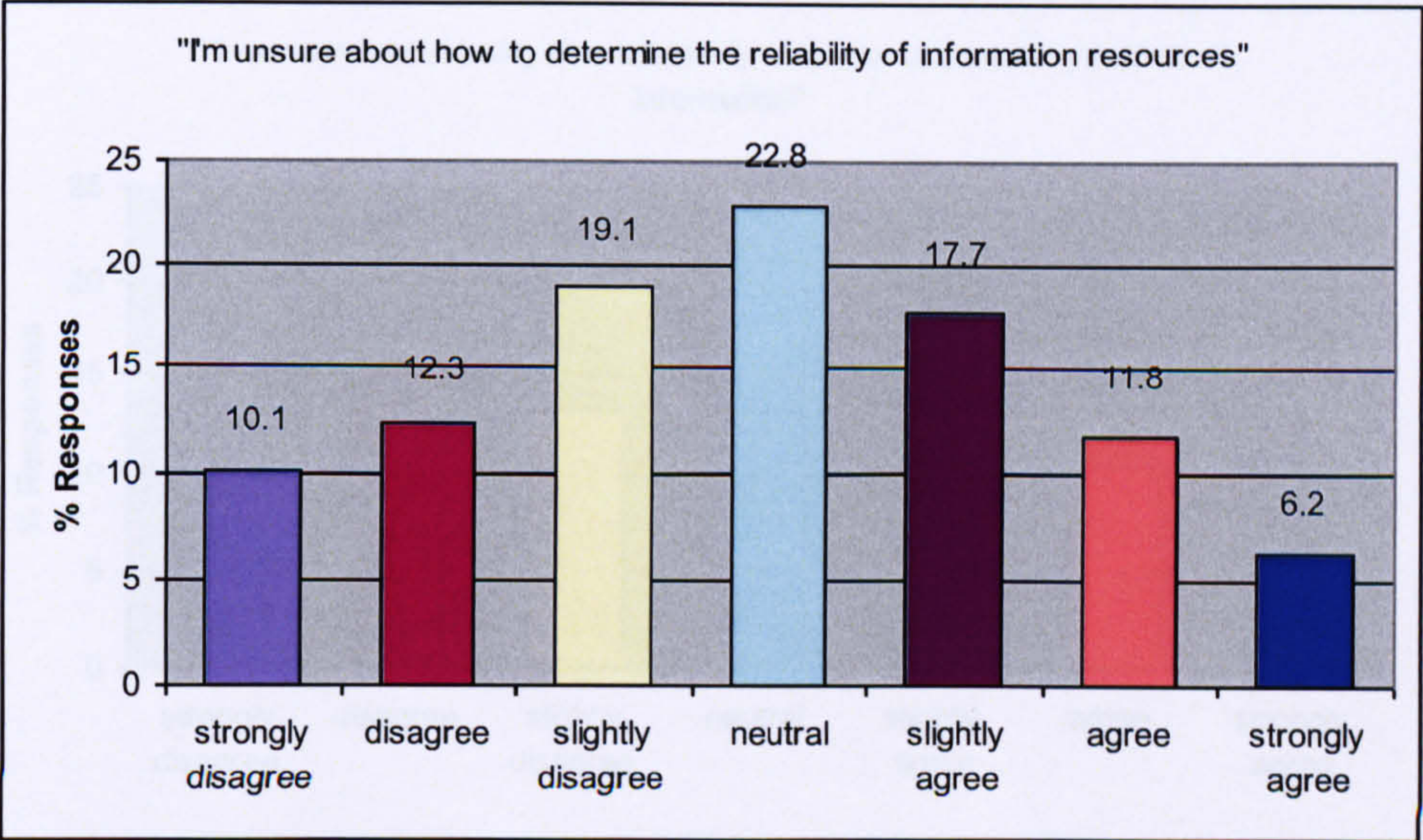


Figure 6.16 Uncertainty how to determine the reliability of information resources

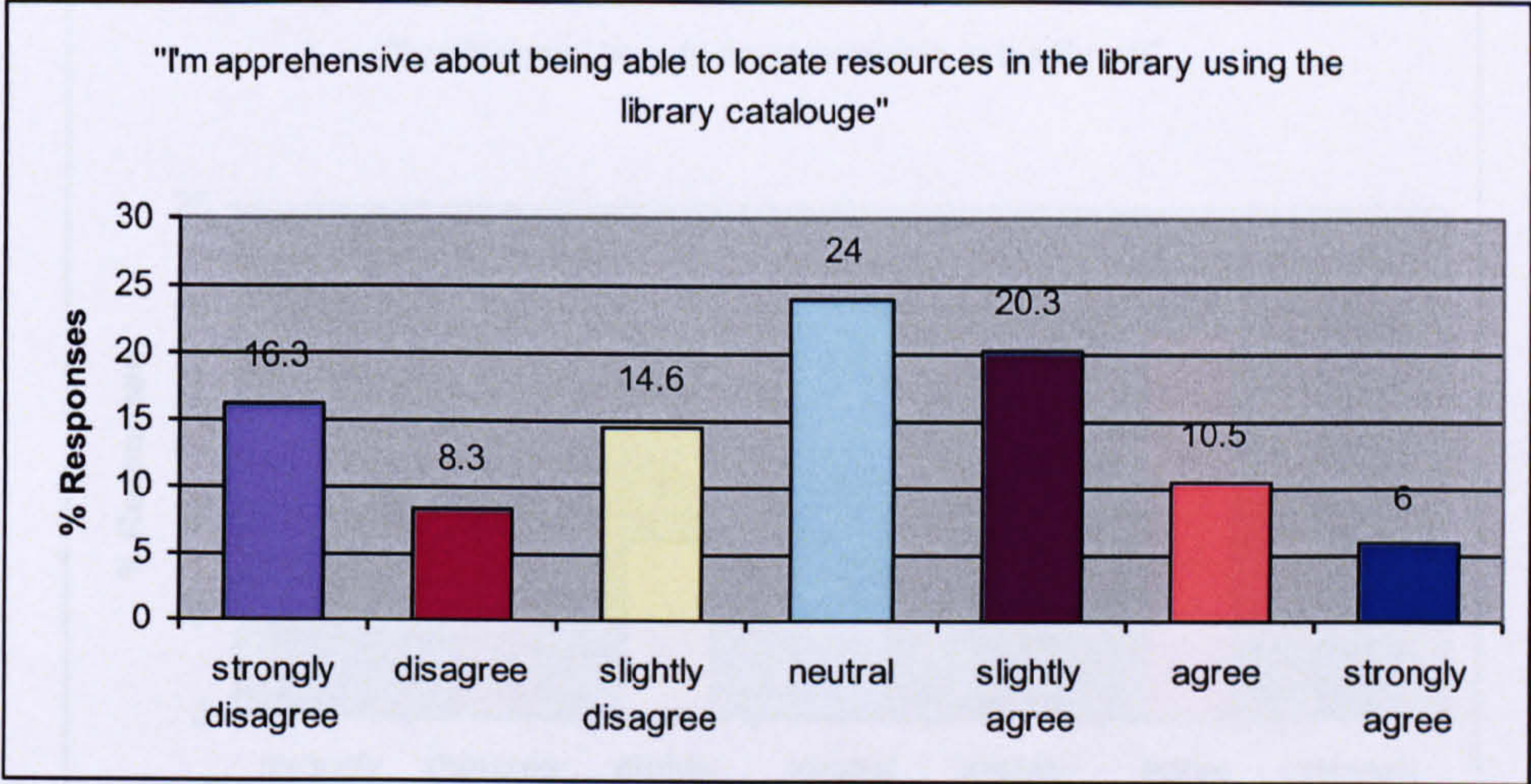


Figure 6.18 Locating resources using the library catalogue

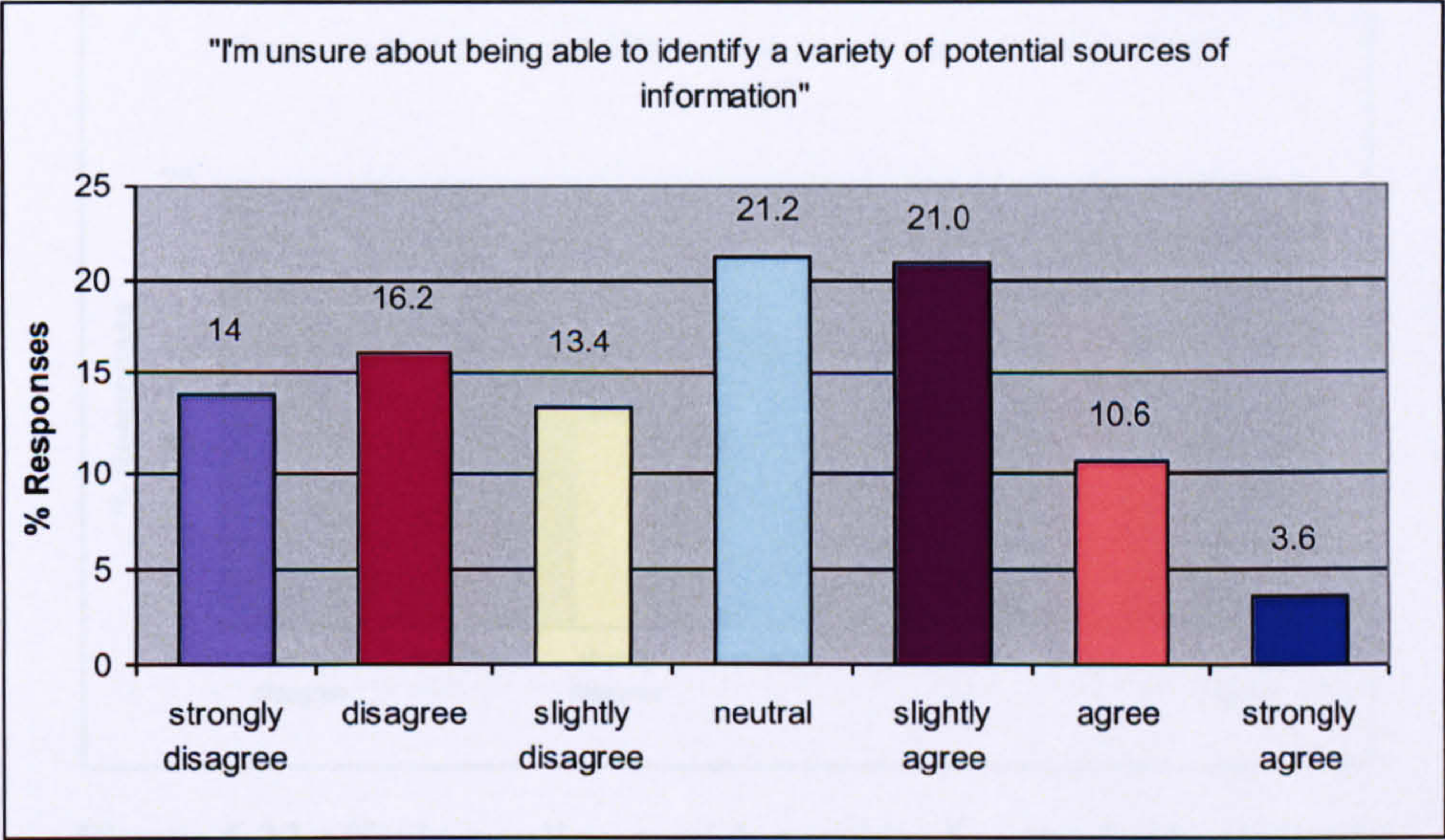


Figure 6.19 identifying various sources of information

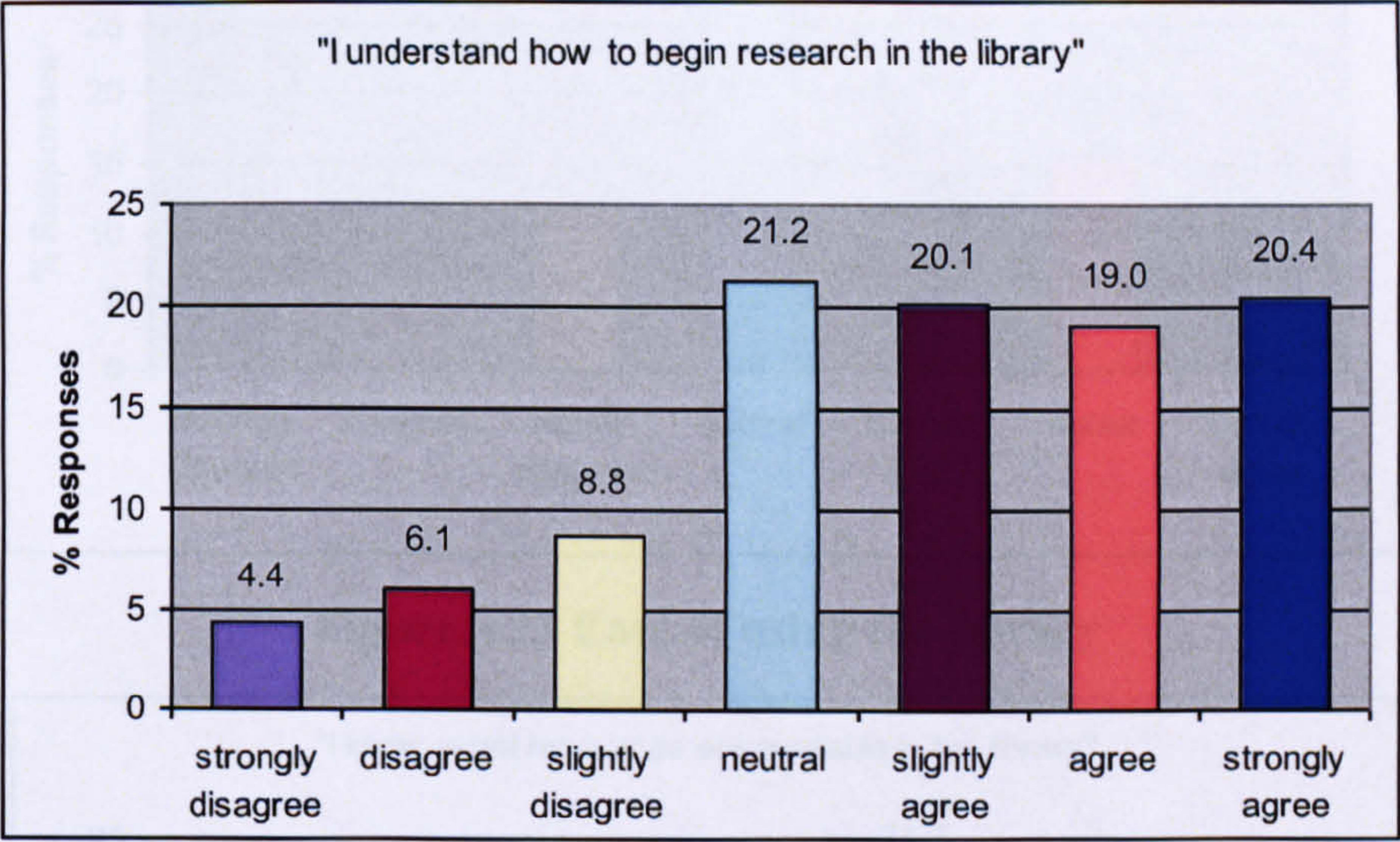


Figure 6.21 Understanding how to begin research in the library

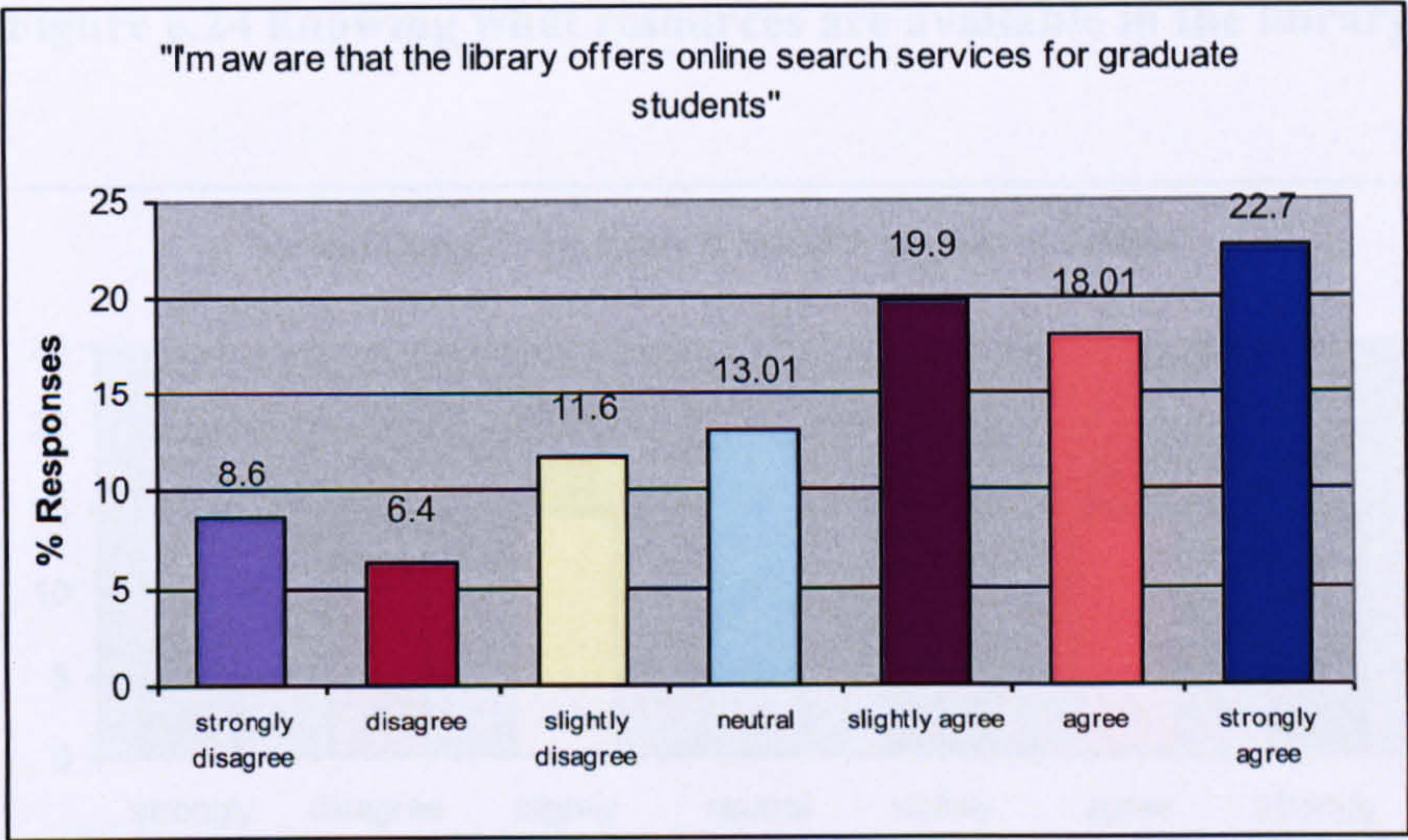


Figure 6.22 offering online search services for graduate students

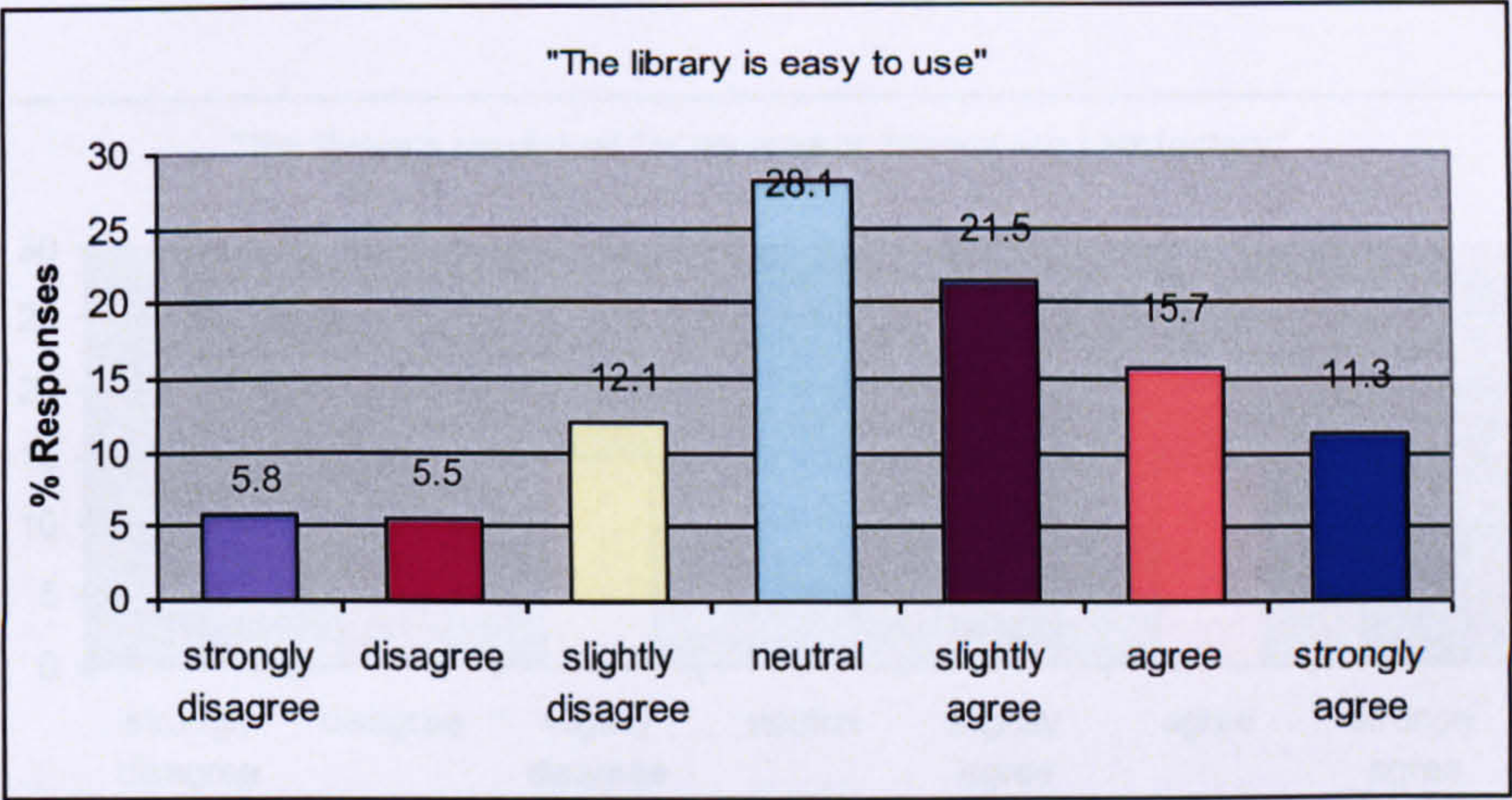


Figure 6.23 Ease of using the library

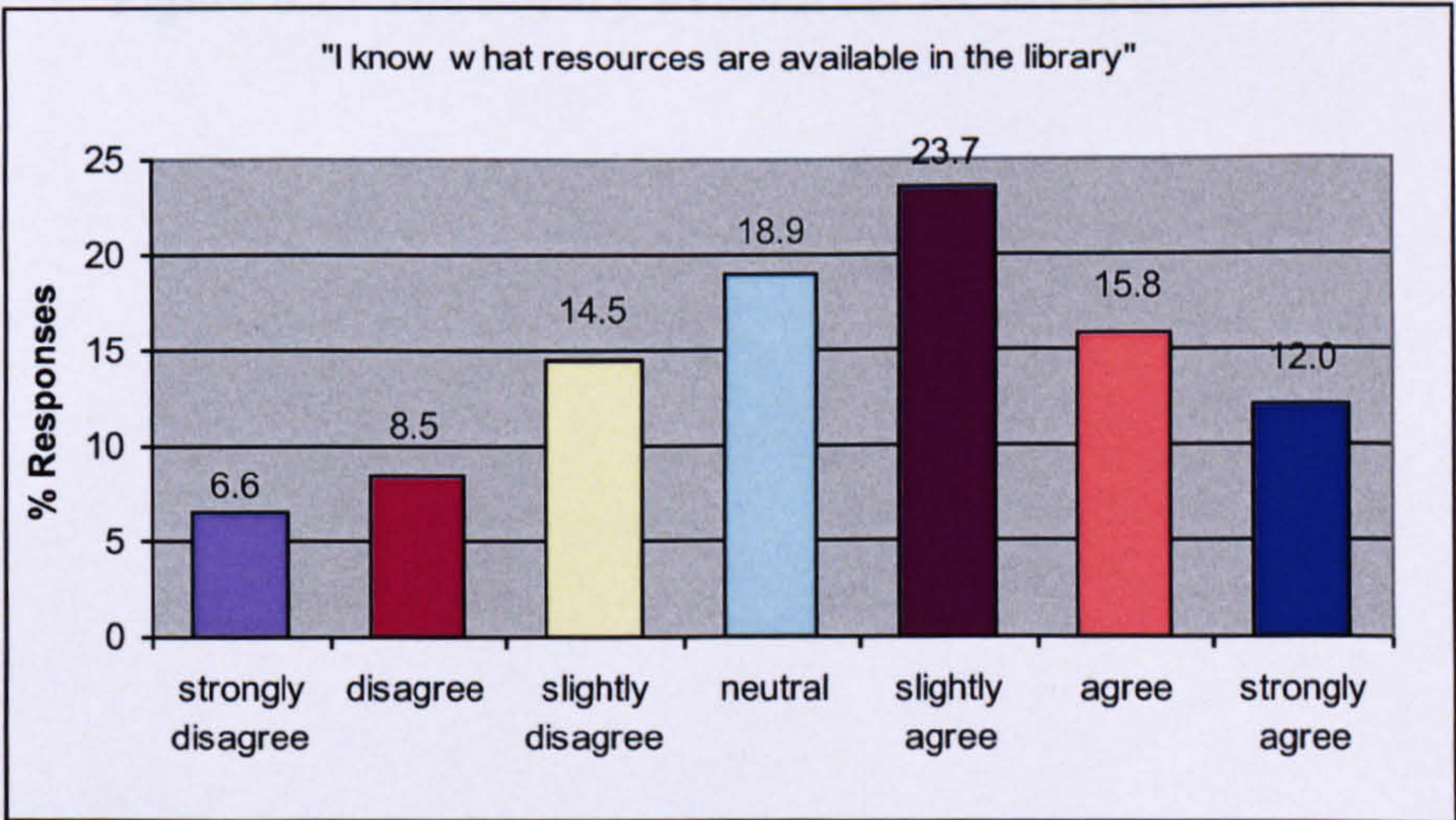


Figure 6.24 knowing what resources are available in the library

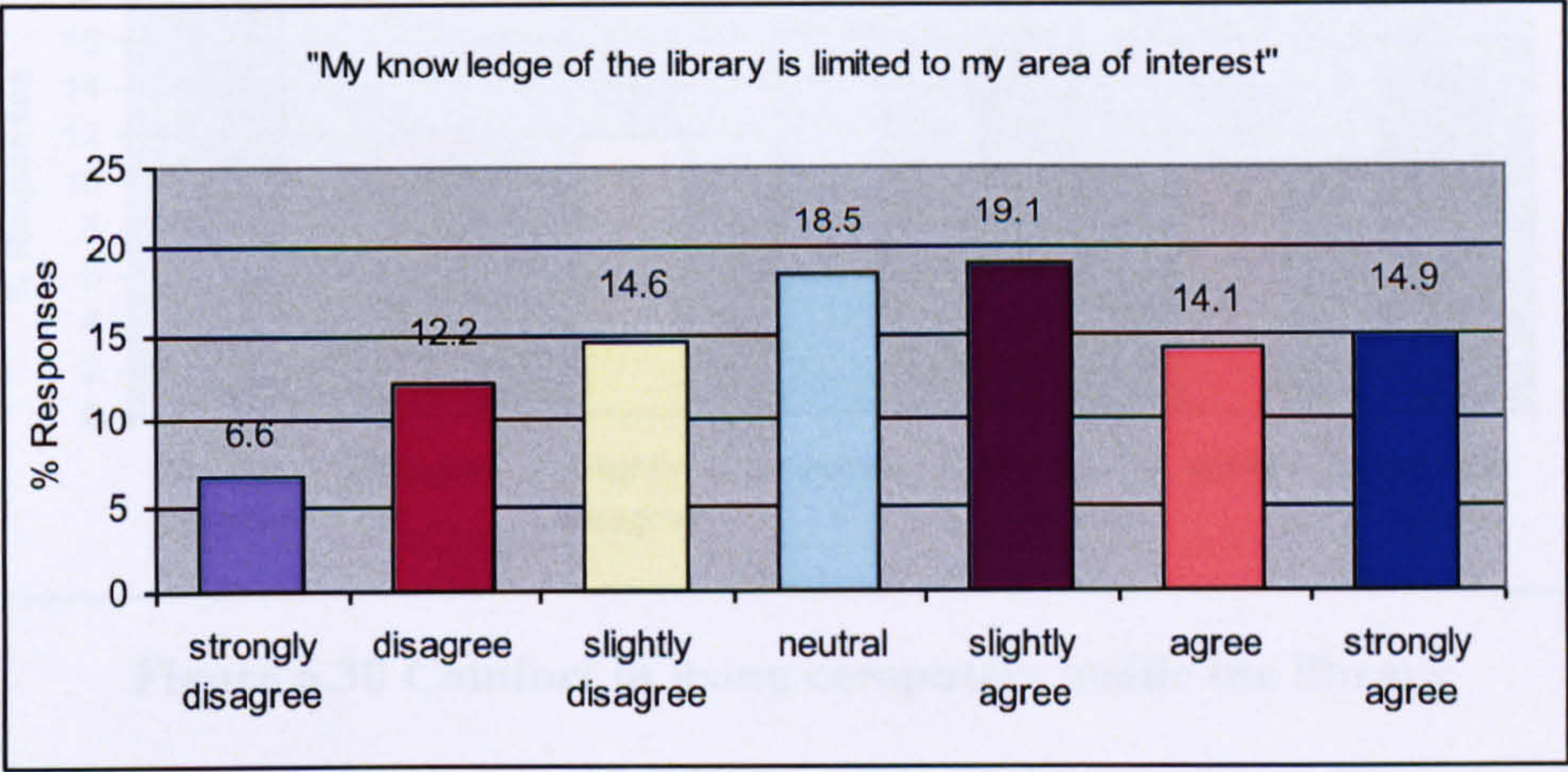


Figure 6.26 knowing the library in accordance with the area on interest

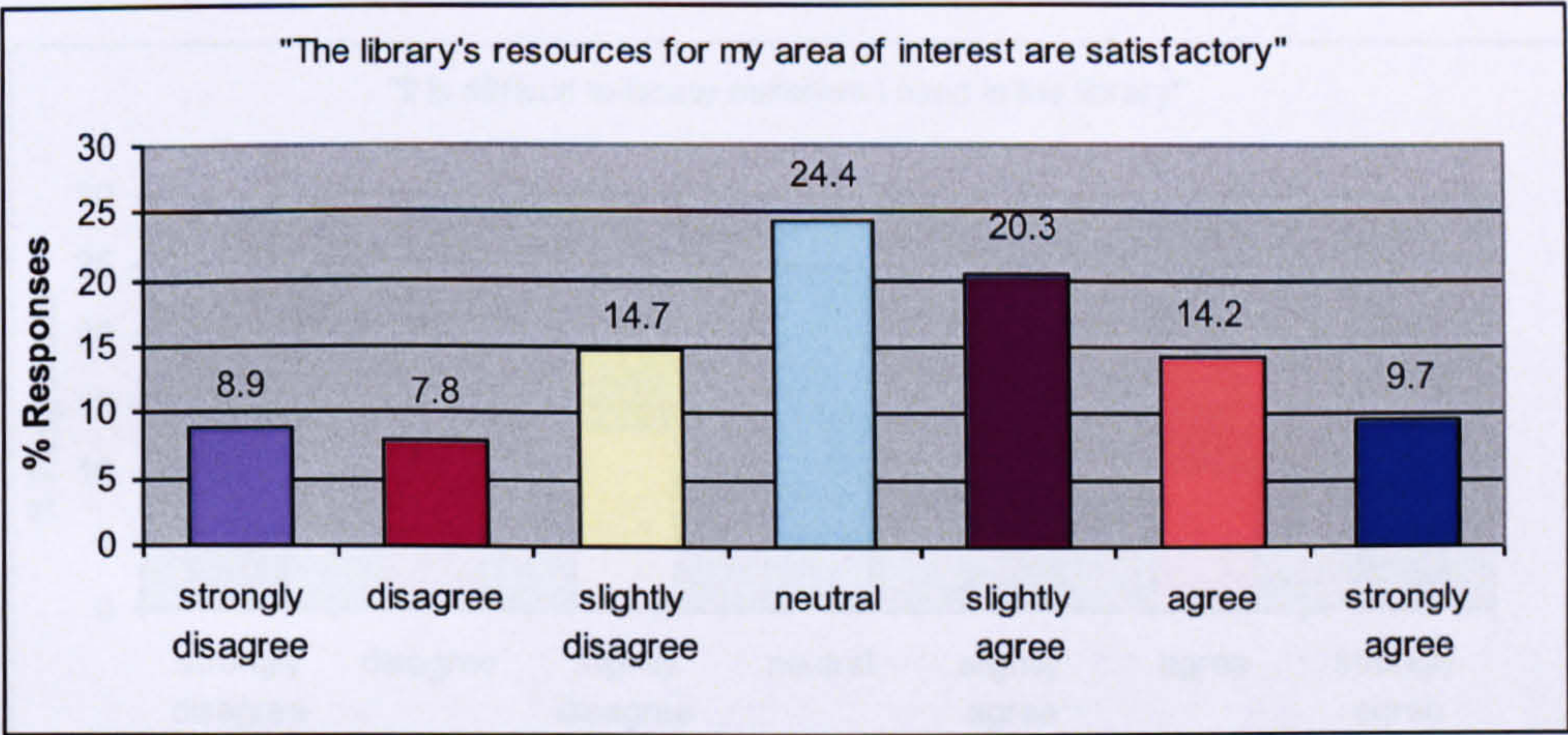


Figure 6.27 The library's resources for areas of interest

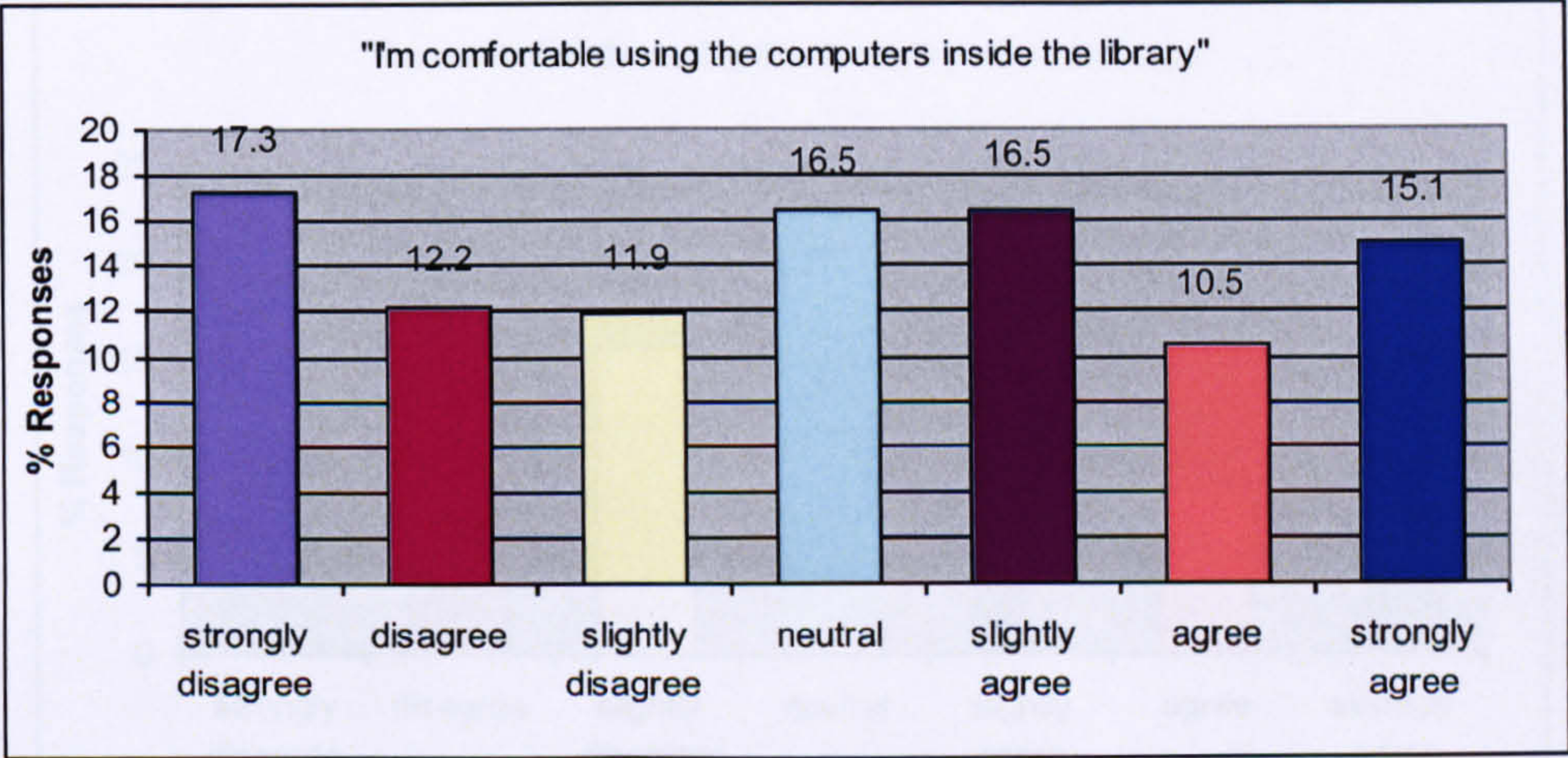


Figure 6.30 Comfort in using computers inside the library

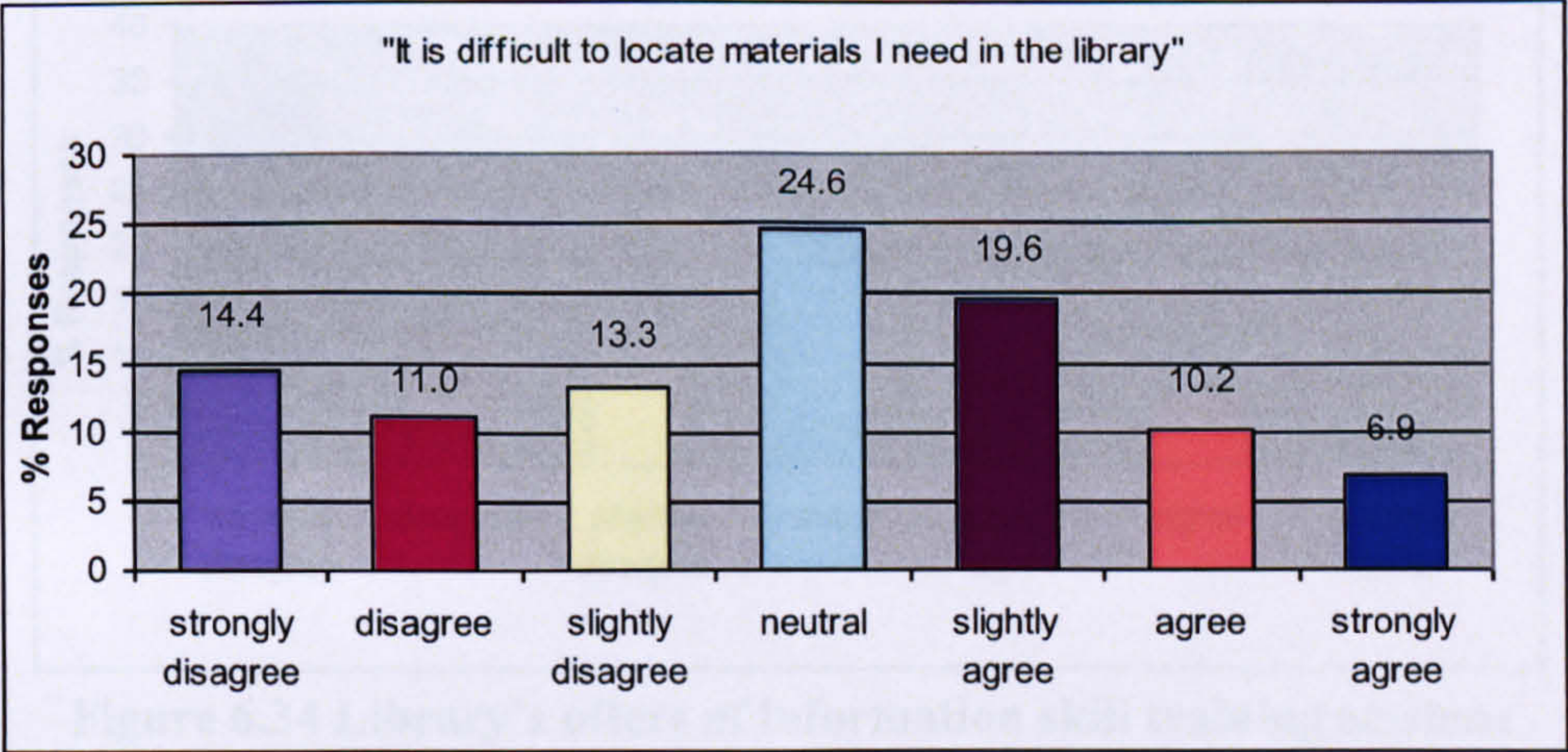


Figure 6.32 Difficulty in locating materials in the library

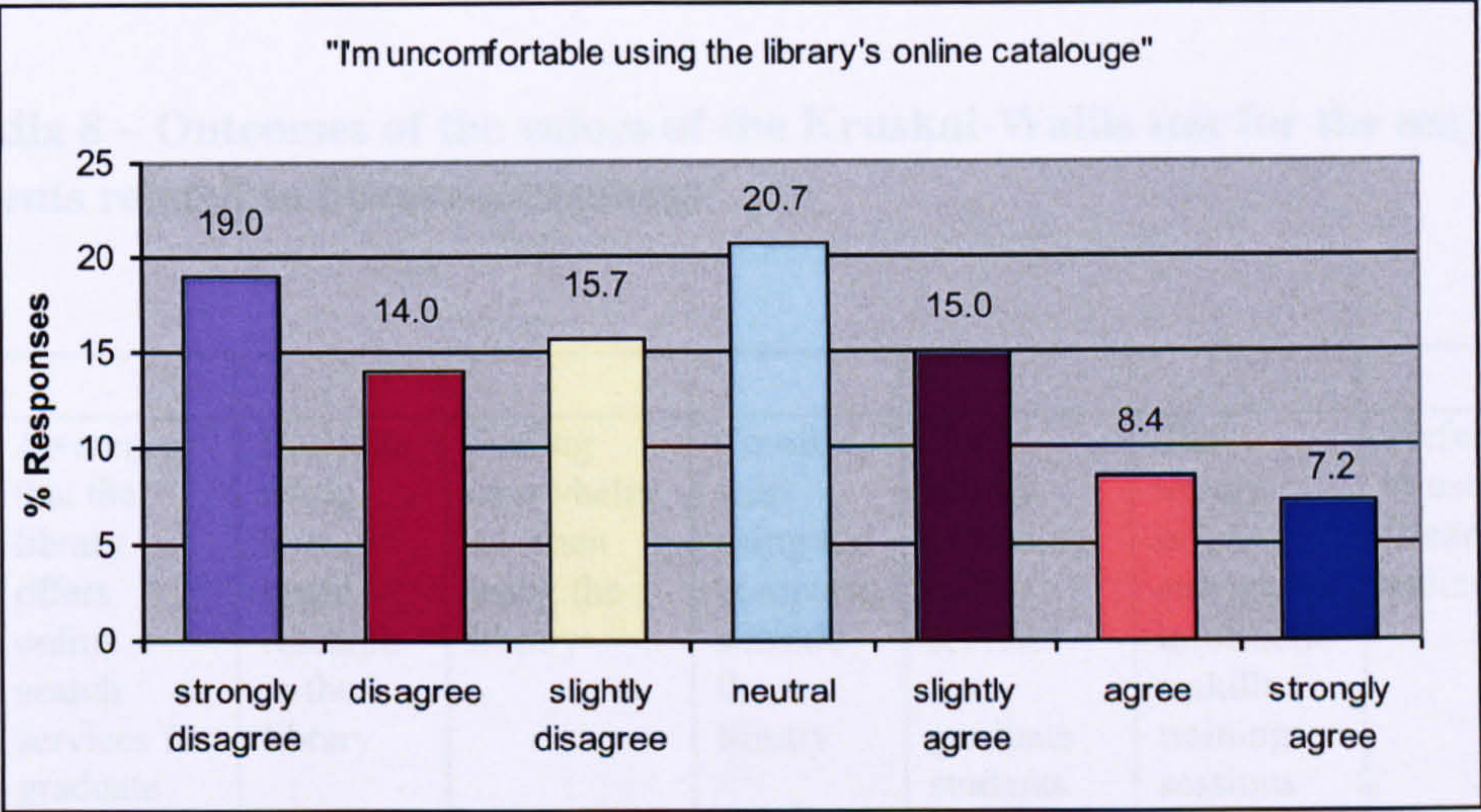


Figure 6.33 Comfort with using the library's online catalogue

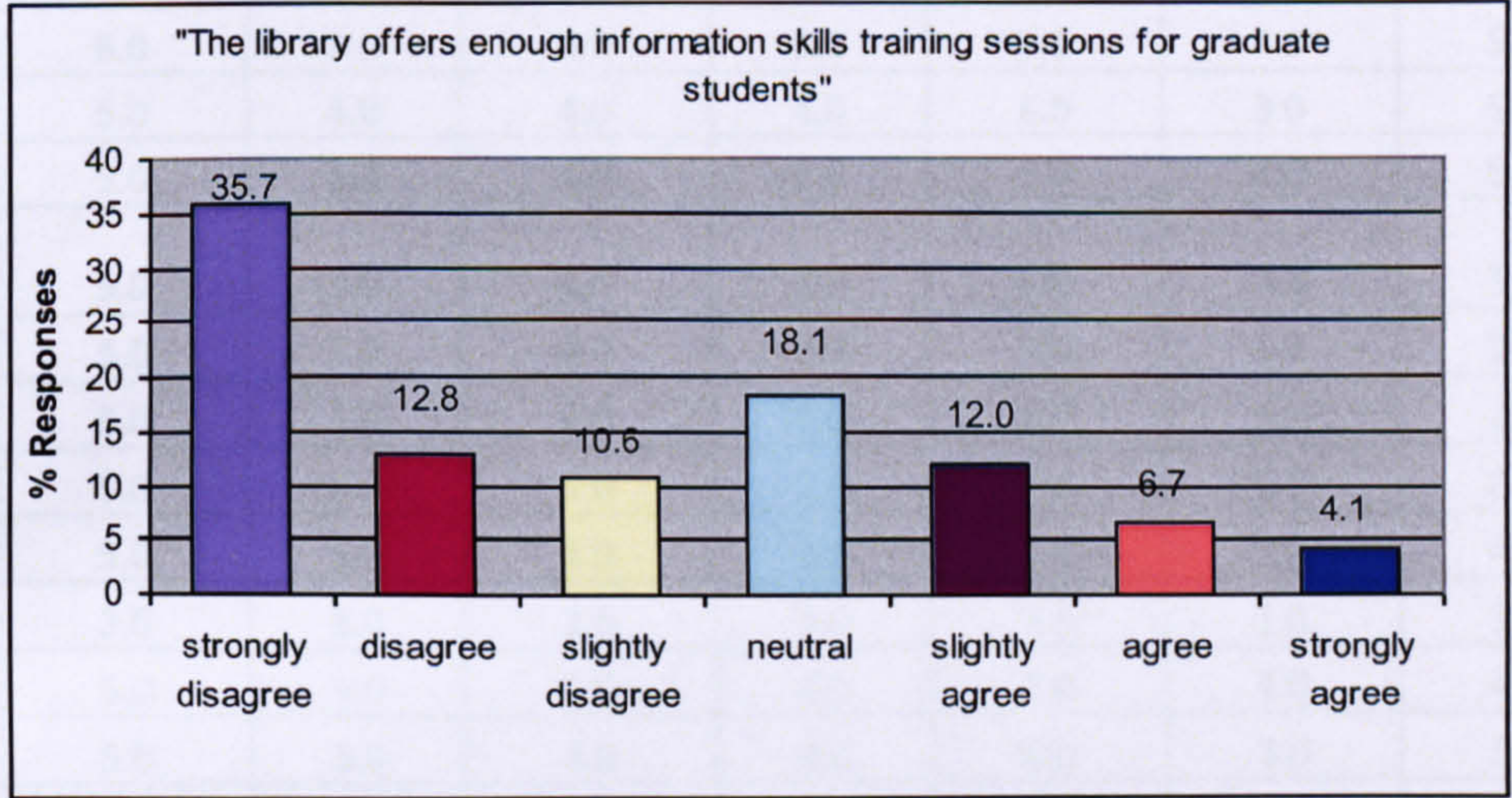


Figure 6.34 Library's offers of information skill training sessions

Appendices

Appendix 8 – Outcomes of the values of the Kruskal-Wallis test for the majors and statements related to library awareness

	Awareness that the library offers online search services for graduate students	Understanding how to begin research in the library	Feeling overwhelmed when using the library	Comfort with using the computers inside the library	The library providing more services for graduate students	The library offering enough information skills training sessions for graduate students	Preference to use the library online	Negative effect of using the library on students' research
Major								
Medicine	6.0	6.0	4.0	5.0	7.0	4.0	5.5	3.0
Engineering	5.0	4.0	4.0	4.0	6.0	3.0	5.0	4.0
Science	5.0	5.0	4.0	5.0	5.5	4.0	5.0	2.5
Business Administration	5.0	5.0	4.0	4.0	5.0	4.0	5.0	4.0
Arts	5.0	5.0	4.0	2.5	7.0	1.0	3.0	3.0
Law	5.0	5.0	4.0	5.0	5.0	5.0	4.5	5.0
Social Sciences	6.0	5.0	3.0	3.0	7.0	2.0	6.0	3.0
Education	5.0	5.0	4.0	3.5	7.0	2.0	4.0	2.0
Islamic Studies	3.0	5.0	2.0	3.0	7.0	1.0	3.5	1.0
Joint Degree	5.0	5.0	5.0	4.0	7.0	4.0	4.0	2.0
Total	5.0	5.0	4.0	4.0	6.0	3.0	5.0	3.0

Appendix 9 - Search Strategy

Topic of interest

The choice of research topic was based on aspects both theoretical, in terms of previous research I have carried out; and personal, drawing on my long-standing interest in the subjects of information-seeking behaviour and information literacy. There was also a professional aspect, growing out of my experience as a graduate student. Background reading of the literature in information-seeking and in information literacy nurtured this growing interest and highlighted the gaps in the literature associated with the research focus. Thus the specific topic of interest was chosen.

Background questions

After deciding on the topic of interest, several questions were formulated to guide the construction of specific research questions. Some of the background questions that emerged from initial readings were:

- What factors have an impact on the information-seeking behaviour of students at universities?
- Which user group is of particular importance for this research? (Graduate students and faculty members)
- What is the focus area of the information-seeking behaviour explored in this research? (Retrieving information from electronic information resources)
- What factors have an impact on the information-seeking behaviour of graduate students at Kuwait University?

Search Terms used to identify articles of interest

With specific questions in mind, the keywords used to search for the necessary information included: information behaviour; information-seeking behaviour; electronic information resources; graduate students; academics; researchers; information needs; scholars; electronic information resources. In addition to the keywords, descriptors such as “information behaviour” and “information resources” were used. For the methodology chapter, descriptors used included “quantitative methods”, “qualitative methods”, “research methods” and “user surveys”.

Studies included

The focus was on studies carried out from the year 2000 onwards. This timeframe was chosen due to the rapidly changing nature of electronic information resources. Only studies written in English were included. It was decided to focus in particular on studies that covered graduate students, the group that forms the focal point in this research, while also encompassing faculty members and undergraduate students, especially since some major studies have included the three user groups together as their population. In the first stage of reviewing the articles the decision to include studies or to exclude them as irrelevant was taken based on the abstracts. For the papers that were selected as relevant and useful to the research, full-text articles were obtained and referenced in folders in RefWorks under the following categories: graduate/postgraduate students, faculty members, higher education, information literacy, the academic library, research philosophies/strategies, Tom Wilson, Christine Urquhart, Nigel Ford, Google Scholar, library anxiety, theories and models in LIS. These folders proved invaluable in classifying all the relevant literature retrieved.

Snapshot of the databases/sources used for the search strategy (It should be noted that there were other strategies adopted, such as using the citation chains from major studies reviewed, and also serendipity.) See the following table.

Appendices

A Table documenting a snapshot of the overall search strategy of the research

Title of database searched	Years covered by the search	Search strategy including search terms	Language restrictions applied
LISA	2000-2009	Advanced search using: Keywords and descriptors. For example: KW= graduate students. DE=information literacy	Searches in all databases were restricted to English language resources on information-seeking in an academic context.
Science Direct	2000-2009	Both quick and advanced search used and searches were restricted to the availability of full-text.	
Emerald	2000-2009	Advanced research option where it was very useful to specify which type of article was needed (e.g: literature review, research paper).	
Information Research Online Journal	2000-2009	Author index, or subject index, or general search. In the subject index the item used was information-seeking behaviour. Author was used whenever available.	
Google Scholar	2007-2009	Advanced search where either all of the word[s], e.g. “Information-seeking” were used, or an exact phrase such as “information-seeking behaviour” and “graduates”. Specific authors were used when known and dates were restricted to the last 2 years as the search engine retrieves a huge number of hits.	
Library Catalogue (for theses and books)	Depending on the needed item	By author, title, or keyword	
WorldCatDissertations (OCLC)	2000-2009	Advanced search by title to review theses and dissertations that have covered information-seeking in a higher education context.	
Interlibrary loan	Those beyond 2000 were not requested	Request made by library webpage	
Frank Perry (academic librarian for Information Science)	When necessary	Referred to when I faced difficulties in locating a resource.	

Appendix 10 - A Table of a systematic review of a number of studies covered in Chapter 3 (Literature Review)

Study details	Sample	Purpose	Methods	Outcomes
Foster (2004)	45 of academics & postgraduates	Explore the information-seeking habits of postgraduates and academics	In-depth interviews	Offers a new nonlinear model of interdisciplinary information-seeking. The model presents information seeking as dynamic, holistic and flowing
Kerins, Madden & Fulton (2004)	12 Engineering & Law students in Ireland, undergraduates and a small number of postgraduates.	Investigated the Information Seeking and students studying for professional careers.	Semi-structured interviews using Critical Incident Technique	Found that Postgraduates have particular information needs & require info skills education. Students could benefit from greater IL & training. Students often excluded librarians & academic staff when they adopt info-seeking strategies.
George et.al (2006)	100 graduate students from all disciplines	Explore their information seeking behaviour and scholarly use of information.	in-depth semi-structured interviews	Findings vary across disciplines. Internet, people (staff & librarians) play a role in students' information-seeking. Importance of staff-library collaboration.
Sadler & Given (2007)	Graduate students and academic librarians – 6 full time PhD students, 2 full time masters from Social science disciplines.	Investigated the information behaviour of graduate students within the framework of Affordance theory	In-depth qualitative interviews and task-based computer explorations	Found disparity between expectations & experience; need to improve communication between graduates and academic librarians to foster information literacy instruction.

Table (continued)

Study details	Sample	Purpose	Methods	Outcomes
Zhang, Anghelescu & Yuan (2005)	13 undergraduates & 9 postgraduates.	to explore the Domain knowledge, search behaviour & search effectiveness of Engineering & Science students	Pre and Post-search questionnaires, self-reported ratings of familiarity with thesaurus term rating form?, computer logs, search session printouts.	As the level of domain knowledge increases, users tend to do more searches. Level of domain knowledge has effect on search behaviour but not search effectiveness.
Urquhart & Rowley (2007)	Undergraduates, postgraduates & staff, library managers.	Investigated Students' information behaviour in relation to EIS	Questionnaires, interviews, themed snapshots, critical incident technique, action research, prototype development.	Surfaced a model that identifies the factors that influence information behaviour.
Junni (2007)	73 graduate participants who have written their Master thesis	Investigated students' seeking information for their Masters' theses: effect of the internet	A cross-sectional analysis. Studying reference lists of Masters' theses in 3 disciplines – followed by semi-structured phone interviews	found that Internet had a profound effect on type & quantity of information that students use as references. Lack of training in information seeking; many respondents needed additional training on using library databases.
Steinerova (2008)	21 doctoral students from SS and LIS	To have empirical evidence on understanding relevance behaviour in academic information use	Semi-structured interviews	Relevance judgement is multidimensional, based on multi-criteria cognitive processing. relevance is experienced and integrated by emotions, esp delight, discovery and anger.

Study details	Sample	Purpose	Methods	Outcomes
Chu & Law (2008)	12 PhD students (purposive sampling) from Education and Engineering	To examine the development of information search expertise of graduate students in Education and Engineering	Surveys, direct observations, verbalization of their own thinking and interviews.	The study showed that information search training is still essential at the postgraduate level. Results also implied that the training provided should also be tailored to the specific needs of the students.
Roos et al. (2008)	91 researchers – 57 PhD students, 5 undergraduates, 29 senior researchers.	To describe and analyse the information environment of research work in molecular medicine	Qualitative case study – Web survey and semi-structured interviews (Critical Incident Technique).	Substantial use of portals; central role of PubMed. Google used to locate general web pages, research groups, methods & tools. Interpersonal communication seemed effective. Lack of knowledge on how to use resources
Saiti & Prokopiadou (2008)	211 education post-graduate students	To investigate whether or not those students choose information technology or other information resources to complete their studies and expand their knowledge	Questionnaires	Greek post-graduate students from different fields of study chose the Internet as their primary information source for a number of reasons but mainly: for the provision of credible and up-to-date information, for easy access to information at home, for the time of day they can access the material and for fast information retrieval