A comparative analysis of the web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology

By

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DECLARATION

I, NTANDO NKOMO, declare that this dissertation is my original work, save for where proper citation and referencing signify otherwise in the text. The dissertation has not and will not be presented for the award of any degree at any other university.

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DEDICATION

I dedicate this study to my family, both immediate and extended. I especially wish to mention my loving parents, Mr. and Mrs. W. Nkomo, aunt Lucy Mathibe, uncle Patrick, brothers Lizwe and Mphiliseni, angelic sister Fransiner, my nephew Julian, and my grannies MaMpofu and MaNcube, for the immense space they hold in my heart.

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LIST OF ABBREVIATIONS

BTech - Bachelor of Technology

DUT - Durban University of Technology

EDDS - Electronic Document Delivery Services

HEIs - Higher Education Institutions

ICTs - Information and Communication Technologies

MTech - Master of Technology

OPACs - Online Public Access Catalogues

PG - Postgraduate

UG - Undergraduate

UNIZUL - University of Zululand

WWW - World Wide Web, Web/ web

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ABSTRACT

Today's online experience has literally added a new dimension to our information seeking activities, presenting users with a vast array of options. A considerable amount of information has migrated from the print world and is now available electronically. Thus a lot of people immediately associate the World Wide Web (WWW) with information and its related activities. This association partly prompted this study on the web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology. Web information seeking generally raises new challenges within academic dispensations in different settings and in different ways. The selected institutions were assumed to be at different levels of development because of the country's (apartheid) history; the former institution is rural-based and the latter, urban-based, and it was thought that this would affect the uptake of ICTs. The objectives of the study were: i) To identify the web information needs of students and staff; ii) To determine how, when and where web information is sought; iii) To establish the channels used when searching the web for information; iv) To identify the challenges faced when searching for information online; and v) To recommend the best ways to improve web information seeking and use within the two institutions. Both quantitative and qualitative research methodologies were employed in a survey. The main research instrument was a questionnaire, supported by limited interviews.

The results show that the web is a platform that people in academia have come to rely on, although only a few of its numerous channels are used significantly. A wholesale swing in the pattern of use from reliance on traditional information providers to this new medium was not evident; however, the old and the new appear to coexist. Many claimed that although the web is now their first choice as an information source, they have not discarded the 'old ways' - they still visit the library and feel it plays a vital role in meeting their information needs. A number of challenges were identified, chief among them being connectivity problems. Bandwidth was particularly problematic and made worse by the two institutions' large student populations. Relevant infrastructure (computer laboratories, computers, etc.) seemed available, although inadequate. The

results shed light on the general retrieval difficulties students' face. Most of these appeared to stem from poor training or lack of skills. Many users, students in particular, appeared to be familiar with how web technology works but not with how to use the technology to achieve results. The study recommends comprehensive training programs that address the skills' deficiencies noted. It is also necessary to institute mechanisms that improve both physical and intellectual access to web resources.

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1. Information seeking/ information seeking behaviour

The behavioural spectrum and habits of human beings when searching for information are the bedrock of information seeking research. The task of identifying these behavioural patterns is not easy for the simple reason that human beings are not homogenous and can choose numerous routes or approaches in their quest to satisfy an information need. Attempts at reducing human information seeking behaviour to a few set patterns or steps may therefore be oversimplifying things. However, this ought not to and in actuality has not deterred scholars from attempting to define information seeking and its associated characteristics/behaviour. Various fields of study have over the years sought to pin down the information seeking habits of various user groups in both electronic and non-electronic environments. For the Library and Information Science field, the reasons are obvious: as a service-oriented field, it is paramount that we know what our users want in order to respond accordingly.

Suggestions of what constitutes information seeking are many; take Ellis (in Ernest, Level and Culbertson, 2005:88), who defines information-seeking behaviour as: "The complex patterns of actions and interactions that people engage in when seeking information of whatever kind for whatever purpose." Robins, as quoted by Ikoja-Odongo (2002:12), views information seeking to be the manner in which an individual goes about looking for information to address some problem. Borgman et al. (2005:641) claim that information searching/seeking is a broad sub-category of information use; in part, it includes an individual's recognition of a knowledge gap or anomalous state of knowledge that instigates the pursuit of information, and goes on to include any behaviour an individual exhibits during the search process. According to Taylor and Procter (2005:1), it is the ability to scan literature efficiently using manual or computerized methods in order to identify a set of useful articles and books. Siatri (1998:n.p) offers that the course of action that a user engages in determines their information seeking behaviour. Accordingly, Aina (2004:67) suggests that information seeking behaviour depends on a user's education, access to the library, and the length of time a user wishes to devote to

the information seeking process. Web information seeking behaviour refers specifically to information seeking processes and their associated behaviours on the World Wide Web (WWW or Web/web).

1.1.1. Web information seeking in higher education

Technologies that allow for advanced information and communication capacities, encapsulated in the term Information and Communication Technologies (ICTs) have continued to diffuse the entire realm of human activity over the past few decades. These technologies are already involved in the reshaping of education. It is in our interest not to let the educational uses of these technologies evolve without our active participation during their planning stages and/or in their institutionalization. Education requires studies that uncover how to optimally use these technologies for the benefit of its patrons (students and staff). One such technology, which is now highly pervasive in higher education, is the Internet. Farivar (2004:17) describes the Internet as the latest (and most awesome) form of widespread communication technology that exists to date.

The impact of the digital information seeking environment, which for a long time has been poorly understood despite its role in informing the design of services, has dramatically come of age. Recent studies suggest that there is no contention around the immense role of digital media in the information seeking process. For example, Johnstone, Bonner and Tate (2004:n.p) note that increasingly, the information sources people clamour for and use are digital in nature. As Miel and Faris (2008:1) observe, "Everyday, more people turn to the Internet […:] reading blogs, visiting aggregators and online news sites, watching video clips, listening to podcasts, and opening links in emails from friends." Accordingly, Selwyin (2007:1) states, "The information needs of today's generation of young people are seen to be influenced significantly by the development of Information and Communication Technologies (ICTs) such as the computer, Internet and mobile telephony." Selwyin notes that although significant disparities persist between the developed and the developing world, these digital media now form an integral part of the 'information spaces' of young people while demonstrating their effective and successful participation in the information society. Exploring the role of the Internet, as Kari and

Savolainen (2003:156) postulate, is therefore imperative if we aspire to genuinely understand real-life web information seeking behaviour. Choo, Detlor and Turnball (2000:184) allege that any new technology elicits new patterns of behaviour from its users, meaning that managing the web as a new technology can only be effective when it is based on a clear understanding of how people are adapting web information into their work and studies.

It is increasingly clear why the digitization of information has brought along substantial changes in the information seeking habits and expectations of users. The information world today is dominated by the Internet, and as Large, Tedd and Hartley (1999:n.p) note, although it is difficult to predict exactly where information seeking in the electronic environment will go, it is already clear that using electronic resources has moved away from being a sophisticated activity undertaken only by information professionals to an everyday activity that can be carried out by any end user.

Ward and Reisinger (2000:n.p) state that Internet information resources are fast seeping into the common consciousness of academia, taking their place alongside traditional academic resources in core research assignments. They further state that it is now common to find that when people (including end-users with no formal search training) decide to find information, they almost always opt for the web. Jenkins, Corritore and Wiedenbeck (2003:65) believe that these end-users represent a revolutionary shift in information seeking and access. Although this may apply mainly to the developed world, personal experience and observation at the University of Zululand would suggest that a large number of students and staff members have come to rely on web-based resources. This, as noted earlier, confirms that important changes are underway in education because of ICT. Undoubtedly, there has been growing reliance on the World Wide Web for information seeking processes. In academia, the effect of these present developments in ICT, particularly the World Wide Web, has seen significant changes in the electronic information retrieval and communication patterns (information seeking behaviour) of students and staff. A cyber briefing paper on the information behaviour of the researcher of the future by UCL (2008:1) reports: "Enormous changes are taking place in the

information landscape that are transforming teaching and learning, scholarly communication and the role of `traditional' research library services." Greenstein and Healy (2002:n.p) also report that students and staff alike prefer to use the Internet for information more than traditional print sources, perhaps because as everything [continues] to migrate from paper to electronic format, users too are evolving and migrating to new services (and hence deserting traditional repository environments). As observed by Davis (2005:57), "The problem of student learning in the information age is not unique to Africa in general and South Africa in particular. In studies conducted elsewhere, it was found that students rely quite a lot on finding information on a computer, assuming that there's nothing of value in the library." The easy-to-use WWW promotes more information seeking while constantly attracting more new users, and achieves this immeasurably faster than traditional repositories. This has catapulted the Internet (predominantly the WWW) to the top of the pile of current information resources.

Literature abounds with indications that we have entered a new age of networked information. It is assumed that in this new age, which is characterized by the extensive use of ICTs, users' needs have evolved into something considerably less familiar. According to Jansen and Pooch (2001:1), a completely new pattern of information seeking behaviour has emerged. Because new technological resources (cell phones for example) bring about changes in users' information seeking habits, research on user behaviour in networked environments is essential (Case, 2002; Fourie, 2002). In education and training, there is general consensus that the recent changes in student learning were catalysed by the changing landscape of electronic ICT (Gorman, 2001:70). The principal reason for this catalysis has been that ICTs are a diverse set of technological tools and resources that are used to communicate and create, disseminate, store, and manage information; processes that lie at the very heart of education. Moreover, the level of use of various ICTs by students and staff in South Africa and other parts of the world warrants investigation by all parties into issues concerning their further adoption and use.

1.1.2. Institutional background

Commenting on the ICT situation in universities, the International Education Association of South Africa (2007:n.p) noted that although ICT should underpin technological innovation, research, communication and the development of the knowledge economy in most SADC states, ICT resources are "poor or virtually non-existent", with 80% of sub-Saharan universities inadequately connected. Although South African institutions are far better off when compared to the rest of Africa, their development still remains overshadowed/tinged by the historical legacy of apartheid. Many institutions are still reeling from apartheid injustices, although the new democratic government has taken commendable steps to address these imbalances. Tshikwatamba (2003:8) suggests that a judicious understanding of the consequences of South Africa's colonial and apartheid past, particularly the historical distribution and functional purpose of educational institutions, is necessary. In this attempt to investigate the status of the adoption and use of the web by students and staff at the University of Zululand (Unizul) and the Durban University of Technology (DUT), this anomaly was astutely recognized. In fact, it forms one of the key bases of comparison. This comparison was made in order to foster an understanding of the impact of technological reforms (particularly the web) on user behaviour at Unizul - a comprehensive university with a combined theoretical and practical teaching focus - and DUT, a technical university with an applied or professional course inclination.

The comparison was also of two educational institutions in two different settings, the former being rural and the latter urban-based. Historically, the two institutions served different ethnic groups; the institutions that merged to form DUT, ML Sultan and Natal Technikon catered for Indians and whites respectively, while the University of Zululand was a community-based university for blacks. It was hypothesised that the use and exploitation of web facilities in the two institutions would differ because of disparities in infrastructure and support owing to apartheid. In terms of the latter, it was expected that there would be disparities with regard to resource allocations: white institutions of higher learning were well-resourced compared to the institutions established for blacks and Indians. Although apartheid was brought to an end, it is the belief of the author that in the

current environment, previously advantaged institutions still hold their advantage despite attempts to remedy and balance the situation.

1.1.2.1. Durban University of Technology

The International Education Society of South Africa (2007:n.p) describes the Durban University of Technology as a vibrant multi-campus university that is at the cutting edge of technological training and research. It has seven campuses located across KwaZulu Natal. Its two main campuses, ML Sultan and Steve Biko, are located in Berea in Durban. The Pietermaritzburg campus (in the Natal Midlands) is thought to have extraordinary potential as a hub for technological innovation and education. DUT boasts of a solid foundation as a university of technology with a history that stretches over a century. Programmes are offered within four faculties, namely Arts, Commerce, Engineering, Science and the Built Environment, and the Health Sciences. Qualifications include national diplomas, a Bachelor of Technology, and Masters and Doctoral degrees, amounting to 72 programmes in total. These are all offered either on a full-time or part-time basis.

1.1.2.2. University of Zululand

The University of Zululand's main campus is situated in KwaDlangezwa, which is about 150 kilometres north of Durban - KwaZulu-Natal's main city and chief port - and 45 kilometres south-west of one of South Africa's main industrial growth points, Richards Bay. It was built with the sole intention of serving blacks, particularly folks in the surrounding areas of northern KwaZulu-Natal and Swaziland. Following the restructuring of higher education institutions in the country, the University of Zululand had to re-focus its mission and transform itself into a comprehensive institution that now offers technikon-type programs as well as a limited number of relevant university-type programs (Tshikwatamba, 2003:8). Unizul (like DUT) has four faculties, namely Arts, Education, Science and Agriculture, and Commerce, Administration and Law. Each offers degrees and diplomas at undergraduate and postgraduate levels within 60 departments that provide a wide range of study opportunities (International Education Society of South Africa's website).

1.2. Motivation and problem statement

Academia has experienced a move away from the direct transfer of information from teacher to student, to teaching students how to find information on their own. It is obvious that with this deliberate move, successfully searching for and finding relevant information becomes imperative. Kari and Savolainen (2001:5) explain that skills, [to search for and find information], are especially necessary because there is often a wide range of potentially relevant information sources (of which one or more may get solicited). Technological reforms are also matters of great importance in education as they affect the information seeking habits of its patrons. The Internet and the web are one of the latest reforms to impact on education, hence this investigation.

Today, the Internet and WWW are positioned as one of the main sources of information for students and staff alike, which is why web searching has become one of the most active information access tasks in higher education. Exploring the role of the Internet among the various users is therefore timely and relevant. This study examines information seeking on the World Wide Web, specifically how information delivered via the web influences student and staff behaviour as it continues to permeate higher education.

Following Fourie's (2006:20) suggestion that information seeking is generally a complex, dynamic and social human behaviour that needs 'as rich a picture as possible' to truly understand it, research in web information seeking, like this study, goes a long way in adding to this 'picture'. Again it must be noted that literature is awash with empirical studies that focus on the web information seeking behaviour of students and staff, but most of these have been conducted in the developed world. This study therefore views the issue from the perspective of institutions based in a country in the developing world. Even in this context, the factors that are brought to the fore, such as the legacy of apartheid and the resultant imbalances in the level of ICT development in educational institutions, also differ significantly from other developing countries.

This study queries how students and staff have adapted to the new web information seeking environment, what their information needs are, and why and how they seek information online. From this 'snapshot', we'd be better able to understand the nature of their information seeking goals, the ways in which they attempt to reach them, their needs' influence on the design of services, and the type of knowledge structures end-users should possess in order to effectively and successfully use and find online information.

1.3. Aim of the study

The aim of the study was to examine web information seeking among students and staff in academic institutions in order to understand the human and behavioural processes through which web information is enacted or engaged (sought). Furthermore, the study sought to determine whether there are any differences or similarities in the web information seeking behaviour of students and staff in universities of technology, which offer practically-oriented diplomas and degrees in technical fields, and students and staff in comprehensive universities, which offer both theoretically-oriented degrees and practically-oriented diplomas and degrees.

1.4. Objectives

To achieve the above mentioned aim, the following objectives were developed:
1 To identify the web information needs of students and staff in institutions of higher learning;
2 To determine how, when and where web information is sought;
3 To establish the channels used when searching the web for information;
4 To identify the challenges faced when searching the web for information; and
5 To recommend optimal ways of web information seeking and use within higher education institutions.

1.5. Research questions

The following research questions were posed:
1 What are the web information needs of students and staff in institutions of higher

learning?

2 How, when and where is web information sought?

3 What are the channels used when searching the web for information?

4 What are the challenges faced by students and staff when searching the web for information?

5 How and to what extent has the web affected the information seeking behaviour/habits of students and staff in institutions of higher learning?

1.6. Significance of the study

Understanding users' information seeking behaviour has always interested information science professionals. This understanding is crucial to the provision of better services to users and the design of information systems. According to Cutrell and Guan (2007:2), "Understanding how users search for information on the Web has enormous practical implications for both commercial and academic endeavours." Allen (1997:111) also observes that understanding the information needs of users is the first and most indispensable step in designing and building effective information systems. Fourie (2002:62) suggests that substantial web information seeking/searching studies are necessary to refine our knowledge of web information spaces, their design and maintenance, and training-related issues. In the emerging electronic environment, knowledge about the information seeking behaviour of students and staff on the web is crucial for those wishing to help them effectively meet their information needs online.

This research project hopes to add to existing knowledge on how students and faculty members currently make use of the Internet/web to aid them in their studies, research and teaching in Higher Education Institutions (HEIs). The study is of potential value to library and information science professionals, library personnel, information technology service providers and policy makers, students, and any other interested parties. The study also adds to existing knowledge for the development of quality web services, thus putting institutions in a better position to respond appropriately with technology and materials that optimize the web as an information seeking platform/space. The content also serves as an addition to the ongoing review of technological and facility investments

(infrastructure). Finally, the study could help with the design of library services through adapted approaches to information literacy and information seeking-skills nurturing. Other potential uses are:

1. The study uncovers the information and computer literacy levels of students and staff and proposes ways of responding to these.

2. It provides an assessment of the infrastructural situation at the two institutions, bearing in mind that effective web information seeking is dependent on the existence or availability of optimal ICT infrastructure.

3. Various units within these two institutions, such as libraries, information centres, policy makers, etc., can get valuable information about the web information seeking behaviour of students and staff that they can then use in their decision-making processes.

1.7. Scope and limitations

In the limited time available, the researcher analysed the web information seeking behaviour of students and academic staff at two institutions, namely the University of Zululand and the Durban University of Technology. Time and financial constraints meant that the study could not include other institutions in the province and/or country. Selecting just two institutions ensured that sufficient time was allocated to the respondents to answer the questionnaires. From the Durban University of Technology, the campuses selected were ML Sultan, Steve Biko, Brickfield and City Campus. All four campuses are located in Durban. Indumiso and Riverside campuses were left out because they are based in Pietermaritzburg; their inclusion would have required a great deal of travel and therefore resources (both financial and otherwise), which were simply not available. The focus groups of the study were students and academic staff.

1.8. Dissemination of findings

Findings will be disseminated through a published dissertation, reports presented in seminars and conferences, and articles in academic library journals.

1.9. Definition of terms

1. **Web**: Shortcut for World Wide Web or WWW. It is an interactive and collaborative information environment that is composed of hypermedia and hypertext documents linked to one another and distributed over the Internet (Kari and Savolainen, 2001:6). The term "web" is used to describe all hypermedia-based information sources that are available on the Internet (Jansen and Spink, 2004: 3). NB: The Internet and World Wide Web domain is relatively new and terminology is still evolving. The term Web – with first letter uppercase – has gradually been replaced with 'web' in lowercase in most documents. The same applies for email – which used to be E-mail – and a lot of other terms.

2. **Information seeking**: A conscious effort to acquire information in response to a need or gap in one's knowledge (Case, 2006:5).

3. **Information seeking behaviour**: This refers to the variety of methods people use to discover and gain access to information resources (Fourie, 2002:51).

4. **Web information seeking:** A process through which humans purposefully change their state of knowledge by using information on the web.

5. **Web information seeking behaviour**: The actions and conduct of users while in pursuit of information specifically housed on the web.

1.10. Summary and structure of thesis

Chapter one discussed the importance of information seeking on the web in higher education. The web has been embraced pervasively in education; as a result, new patterns of information seeking have emerged. This was part of what inspired this investigation into web information seeking in an academic setup in an African context. The chapter's aim was to interpret the way in which electronic information services are being delivered and how they are being accepted. In the ensuing chapter, literature on web information seeking will be reviewed, with particular focus on higher education.

Six chapters constitute this dissertation. This chapter (Chapter one) introduced the study, defined the concepts used, the problem investigated, and outlined the motivations underpinning this research. Chapter two reviews related literature and discusses the

various channels and models of information seeking. In Chapter three, the procedural design of the study is explained (i.e. approaches followed, methods and data collection instruments used, etc.). The findings are analysed in Chapter four, which is divided into two separate sections (4.1 questionnaires and 4.2 interviews), and discussed in Chapter five. The final chapter (Chapter six) concludes the study and provides recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

Web information services have permeated academia and profoundly affected the way in which information (in institutions) is sought today. A more complete understanding of the way in which students and staff acquire and use web information is therefore necessary. The literature review presented in this chapter provides a holistic view of the historical trajectory and current status of research in this domain. Literature is examined in order to investigate user actions and their cognitive understanding of and psychological motivations behind acquiring information via the web. An attempt was also made to identify a range of web information seeking behaviours that are inherent in the higher education environment.

The literature review addresses the following research questions:

1. What are the web information needs of students and staff in institutions of higher learning?
2. How, when and where is web information sought?
3. What are the channels used when searching the web for information?
4. What are the challenges faced by students and staff when searching the web for information?
5. How and to what extent has the web affected the information seeking behaviour/ habits of students and staff in institutions of higher learning?

2.1.1. Rationale for the study

As changes in higher learning institutions continue to occur because of new technology, each (change) comes with a desire to make that technology better serve its education patrons (students and staff), be it through the radio, audio-visual media or of late, the Internet/web. The underlining motive behind user-centred research in information seeking environments is the undeniable fact that the user is the epicentre of any information system. Sridhar (1988:12) intimates thus: "Understanding the user is half the battle in the provision of information services." These remarks are an impetus for this research on web information seeking behaviour. Further rationale for this study can be

borrowed from the assertions of Jansen and Pooch (2000:244) that the web is a unique searching environment that necessitates further and independent study. The thinking behind Kellar, Watters and Shepherd's (2006:2) claim is that although a large body of theoretical research examining information seeking in both electronic and non-electronic environments exists, information seeking on the web is a 'newer' branch of research that differs from library-based information seeking in the complexity of the resources and the tools used. New ways of searching for information have been developed and substantial changes have occurred as a result of the web.

What remains undisputable, and what Mansourian and Madden (2006:90) allude to, is the fact that information seeking on the World Wide Web provides, for an ever-growing number of people, a means of access to diverse sources of information. Taking into account the constant development in the provision of recent electronic systems, Siatri (1998:n.p) observes that failing to understand information seeking behaviour is an obstacle to interpreting the way in which electronic information services are being delivered. Carr (2006:n.p) states that the emergence of information resources in electronic format, especially the advent and pervasive dominance of the Internet, serves further to accelerate this new and welcome emphasis on giving prominence to the needs of users. Kebede (2002:157) agrees, arguing that as the electronic information environment continues to rapidly expand, the need to investigate and uncover the information needs of users in the new environment should also receive due priority. Fourie (2006:20) believes that research on user needs and user requirements is vital in order to increase the acceptance of web information services.

In a nutshell, there is a definite need for more research, particularly in a new area like web information seeking, to provide enough knowledge for service providers to stop 'grappling in the dark' and know what the learning community's web needs are. Nicholas (2008:n.p) suggests that with: "The massive exodus of the information user from the physical space to the virtual […] requires us all to reflect on what this really means in information seeking terms."

2.2. Conceptual framework (information seeking terminology)

When doing research, it is important to provide clear and unambiguous definitions of key concepts. For this reason, it is necessary to first clearly define concepts such as information seeking, information seeking behaviour and web information seeking behaviour and how they apply to this study.

Reiterer, Mußler and Mann (2001:2) suggest that one of the first steps in dealing with information seeking systems is to get an idea of how best to describe the information seeking process. The problem is that information seeking, information-seeking behaviour, and information behaviour are complex terms often used synonymously for all aspects of humans' search for information (Wilson, 2000:1). Moreover, debates and concerns over definitions continue in the information profession, and information seeking terminology is constantly changing to accommodate new developments in the field (Wilson, 2000 and Reiterer, Mußler and Mann 2001). Siatri (1999:132) notes that concepts such as information use or need, information seeking behaviour, and channels of communication all exist in a system of complicated and interdependent relations. It is believed that variations in the definitions of the terms used to describe information seeking are proving to be an impediment to understanding what happens when people go online to communicate and/or retrieve information. The fact that web information seeking is a topic that unites many strands of academic and commercial research - from studies of information-seeking behaviour to the design and construction of large-scale interactive systems – makes it difficult to arrive at serviceable definitions. This perhaps justifies Kingrey's (2002:1) observation that: "The where, why, when, and how of information seeking continues as the topic of debate and discussion on both the theoretical and practical level of a variety of social science disciplines." The fact that this debate should continue is unsurprising, seeing as searching for information, retrieving it, and using it lies at the heart of university education.

2.2.1. Information seeking

According to Kingrey (2002:1), "The term information seeking often serves as an umbrella overarching a set of related concepts and issues." Kingrey's observations are

that discussions of database construction and management, community information needs, reference services, and many other topics all resonate with the term in the library world, although a single, serviceable definition remains elusive. She concludes that:

> In the simplest terms, information seeking involves the search, retrieval, recognition, and application of meaningful content. This search may be explicit or implicit, the retrieval may be the result of specific strategies or serendipity, the resulting information may be embraced or rejected, the entire experience may be carried through to a logical conclusion or aborted in midstream, and there may be a million other potential results.

According to Case (2002:5), information seeking is a conscious effort to acquire information in response to a need or gap in one's knowledge. Marchionini and Komlodi (n.d:6) expand on this, defining information seeking as a process in which humans engage to purposefully change their state of knowledge. They suggest that the process is inherently interactive as information seekers direct attention, accept and adapt to stimuli, reflect on progress, and evaluate the efficacy of continuation. The two scholars conclude that information seeking is a cybernetic process in which a knowledge state is changed through inputs, purposive outputs and feedback. However, it is a strictly human process that requires adaptive and reflective control over the afferent and efferent actions of the information seeker.

Another definition of information seeking is provided by Lallimo, Lakkala and Paavola (2004:2), who describe it as a term used widely in information science to encapsulate an entire process, from recognizing the need for information to finding and using it. They also believe that the term can be seen to overlap with other related terms such as information gathering, which is the phase during which the user searches for and acquires what he or she considers to be a relevant source of information. Information seeking also focuses on the interaction between the information seeker and information resources; is a cyclic or iterative process by nature that involves more than simply gathering information; and consists of reflective processes that involve posing and identifying the research questions, exploring the information available, refining the questions, gathering and evaluating further information, and synthesizing and using the information. This

cyclic process of gathering, sorting, evaluating, and refining may be carried out a number of times (Lallimo, Lakkala and Paavola, 2004:2).

Another point of view is that information seeking looks at how individuals go about finding the materials that they need in order to satisfy their personal, professional and/or recreational information needs (Lines, 2003:n.p). This a view shared by many scholars, among them Nel (n.d:24), who suggests that information seeking is always embedded in the larger tasks of work, learning and play. A similar thought is shared by the University of Michigan's (School of Information's) information seeking behaviour instructor, Rieh (2004:n.p), who says: "Information seeking is a complex information and communication activity requiring access to diverse information systems and resources in order to deal with work-related, personal, and social information problems."

Taylor and Procter (2005:1) define information seeking more simply, stating that it is the ability to scan literature efficiently using manual or computerized methods to identify a set of useful articles and books. This is congruent with Kari and Savolainen assertions that information seeking manifests itself in the end-user's active search for and consultation of information sources.

Like any other complex concept, information seeking means different things in different contexts. All the same, the definitions listed above lead one to deduce that information seeking is a process or activity that involves the consultation of sources. These sources can be manual or computerized, and there is often a behaviour, pattern or way one goes about consulting these sources.

2.2.2. Information seeking behaviour

The problem scholars' face when defining information seeking behaviour is well articulated by Case (2002:5), who explains that information seeking behaviour is a phenomenon that often defies generalization and escapes observation because it varies depending on people, situations, and objects of interest. A lot of it is intangible and takes place in a person's head, making it difficult to measure. Despite this quandary, a plethora

of studies and articles have been conducted examining information-seeking behaviour in a variety of diverse fields, resulting in a wide array of definitions.

Meho and Haas (2001:6) claim that information seeking behaviour is a broad term that encompasses the way in which individuals articulate their information needs and seek, evaluate, and use information. A similar definition is provided by Järvelin and Ingwersen (2004:1), who state that information seeking behaviour is showcased in the act of acquiring information from knowledge sources. Fairer–Wessels (in Kakai, Ikoja–Odongo and Kigongo–Bukenya, 2004:n.p) declares that information seeking behaviour refers to the way people search for and utilize information. This process, according to Patitungkho and Deshpande (2001:n.p), starts off with their reasons (personal or otherwise) for seeking information, and goes on to include the kind of information being sought, and the ways and sources that they use to find the information.

According to Wilson (2000:1), "Information seeking behaviour is the purposive seeking for information [sic] as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer-based systems (such as the World Wide Web)."

It therefore generally appears as though information seeking behaviour involves some action being taken by a user to fulfil an information need, whether perceived or otherwise, and this culminates in an eventual interaction with some kind of information system. Information seeking can be affected by the characteristics of the users, such as age, knowledge and experience. Information seeking behaviour is also encapsulated and expressed in various forms, from reading printed material, to research and experimentation.

2.2.3. Web information seeking behaviour

Although information seeking has a long history, information seeking using the web is a relatively new phenomenon. A brief examination of existing literature indicates that there

are very few definitions of web information seeking behaviour per se. According to Choo et al. (in Shongwe, 2005:4), web information seeking behaviour is the active process of obtaining data from the web. This simple definition stems from the notion that any activity an individual engages in on the web is a form of information seeking. The above definition was the closest identified. It thus informed and was used in this study to set the parameters of what constitutes web information seeking. Online information seeking in this study is taken to mean the same as web information seeking, the reason being that there is no fundamental difference between online and web information seeking - these concepts are often used synonymously (e.g. Fortin, 2000). The researcher is, however, aware that some could argue that this may not altogether capture the true essence of web information seeking because 'online' often doesn't refer to whether or not something is available on the web. This shortcoming is noted as one of the dilemmas associated with information seeking in the electronic environment; constant changes that take place are not created in tandem with the conceptualisation of terminologies, making it difficult to understand the distinctions between terms. What the study stresses is that the choices users make when searching - what terms they choose, how many, and which other features (e.g. phrase search or Boolean logic) they naturally select - are key areas of research in the new web or online environment. Again, this area should be investigated broadly to encompass all possible online channels, such as search engines and directories like Google and Yahoo, social networking sites such as Facebook and You Tube, communication channels such as Skype, blogs, podcasts and other recent phenomena that are very much in tune with web behaviour.

Fourie (2003:116) views information seeking and information searching as terms that belong to a broader field of user studies, and web information seeking as part of information seeking. Web information seeking in this investigation is understood to be the process in which humans engage to purposefully change their state of knowledge by using information on the web, while web information seeking behaviour stands for the actions and conduct of users while in pursuit of information specifically housed on the web.

2.3. Growth and related studies on web information seeking

Research in the domain of information needs, information seeking and information seeking behaviour spans a number of decades. Tibbo (n.d:n.p), while tracing the history of information seeking and behavioural studies, points to studies conducted in the early 1900s, citing Charles Eliot in 1902 who wrote about what was being used in the library, and Ayres and McKinnie in 1916 who studied information seeking at the Cleveland Public Library. Tibbo reports that a notable proliferation of studies on the subject occurred in the 1960s [e.g. the study by the American Psychological Association, 1963 - 1969 and Earle and Vickery's study in 1969]. Wilson (2000:49) identifies an early emphasis on the use of information systems with a more person-oriented approach evolving later in the 1980s. Although early user-centred research concentrated on the scientific community, it quickly broadened to incorporate educational institutions to investigate students and staff's actions and motivations when using the technology.

The information seeking behaviour of academics also appears to have been a focus of inquiry for a long time, reflected in the many studies identified by Tibbo (n.d:n.p) [e.g. the study by the American Psychological Association, 1963 - 1969; Bath University, 1979 - 1980; and Earle and Vickery's study in 1969]. The view held by Borgman et al. (2005:640), is that research on the information needs and the information-seeking behaviour of academics extends back to the late 1950s, beginning with simple descriptive studies and evolving into discipline-specific investigations. Much of the research evolved from a more generalized interdisciplinary interest in the work of scientists and the nature of scientific communication, resulting in a large body of literature that dates back to 1940 - 1960. Parallel to this interest in science, other early studies focused on the work of technical experts, such as engineers, in an attempt to understand how information and information seeking permeates an individual's work-life and personal productivity. According to Francis (2008:68), "Researchers and practitioners in the field of LIS have long held an interest in the information-seeking behaviour of different client groups. Research in this area dates back to the 1940s and the focus was on scientists." Since then, studies quickly progressed, starting with those intended to improve collection development, followed by those that explored the research habits of individuals or groups

for the design of appropriate systems and services – in other words a user-centred approach that examines the system as seen by the user. Studies on web information seeking behaviour appeared later, and many pen down the mid-90s as the exact starting point. Spink and Jansen (2004:21) suggest that the earliest studies of web searching behaviour in the mid-90s occurred as web search engine and web browser use began to grow, particularly in academic environments.

There is a feeling that while studies of the web as information and communication media are much younger, they have generated tremendous excitement (Choo, Detlor and Turnball, 2000:15). Reports by Fourie (2006:20) suggest that over the past few years, there has been a remarkable growth in the number of studies on web information seeking behaviour. This phenomenal growth has created a growing body of empirical research investigating many aspects of user interactions with the web. Stenmark & Jadaan (2006:1) confirm that alongside developments in technology, studies of users' behaviour when interacting with technology have gained momentum. Thus Hider (2005:n.p) declares, "Research into online behaviour is now well underway across a range of disciplines." Gleeson (2001:4) would agree, arguing that the study of information seeking behaviour of various populations is a well-known and major research area in library and information science, but not exclusively since it is also a popular research topic in different fields such as communication science, consumer science and computer science. The concept of information seeking behaviour is therefore broad in scope and stretches across a variety of other disciplines. Hargittai and Hinnant (n.d:5) suggest that researchers in library and information science have expanded their ideas on what should be studied in information seeking research, making information seeking part of a much bigger scene that they refer to as human information behaviour.

2.4. The World Wide Web and information seeking

Jansen, Spink & Saracevic, cited by Tombros, Ruthven and Jose (2003:1), state that one of the most common information-seeking processes that computer users now engage in is the use of an Internet search engine. Tombros, Ruthven and Jose (2003:1) declare that: "The availability of information on the World Wide Web (WWW) has established search

engines as a major tool for IR and web documents as a popular medium through which users' access information." Although this observation might specifically be about search engines, it lends itself well for application to the broader spectrum of other web channels. For many, interaction with the web is mainly through search engines, although social networking sites, blogs, podcasts and other recent phenomena have explosively come to the fore and are now used nearly as often.

Lehnert (2001:37) observes that the World Wide Web is an Internet application that has made the Internet accessible to millions of people, from children to senior citizens. It is a remarkably easy-to-work-with application that integrates resources from other Internet applications. To understand the World Wide Web, one must first understand the nature of the Internet. Often (and even in this study), the terms Internet and World Wide Web are used interchangeably, although there is a distinction. The two terms are not synonymous. Czerniewicz, Ravjee and Mlitwa in the Council on Higher Education (2007:58) confirm this, saying,

> "For many people in higher education, using ICTs means the web. Thus, the term "web-based" is used as equivalents to ICTs even when, technically speaking, the two terms are not interchangeable. The shift from stand-alone multimedia machines to inter-connected web-based technologies is noted, with many observing that it is only since the advent of the web that ICTs have been mainstreamed into education."

According to Quercia (1997:4), "The simplest definition of the Internet is that it's the largest computer network in the world." O'Neill (in Kari and Savolainen, 2002:6) claims that the World Wide Web is the most conspicuous part of the Internet. Kim (2001:234) regards the web to be a hypermedia-based information system that has merged with telecommunications technologies to become one of the most widely used information systems in the world, allowing the flexible presentation of, and seemingly limitless access to information. It is a very popular medium in the information seeking process, made even more pervasive by the degree to which it enables the creation and dissemination of primary information sources.

The web has engendered a feverish rush for adoption by different individuals with different needs. Regardless of their backgrounds, characteristics and information needs, an increasing number of individuals have become frequent web users (Kim, 2001:234). With regard to students and staff in institutions of higher learning, Mugwisi and Ocholla (2002:145) suggest, "Using the Internet provides a fast and relatively cheap form of communication widely accessible from any location, and a variety of new services for both the academic researcher and the student." Lee et al. (1999:n.p) are of the opinion that the WWW represents a new concept in technology - the library on your desktop, the dictionary at your fingertips, the sound in your ear - and that in future there is nothing that we hear or see that will not be available through it.

2.5. The developing world and web information seeking

A small amount of existing literature on information-seeking behaviour is from developing countries. Francis (2008:68) intimates that "not surprisingly, the vast majority of user studies carried out in developed countries are well documented and widely known". Her study therefore "focuses on the few recent user studies….that have emerged from developing countries". Given that conditions in developing countries diverge significantly from those in the developed world, it is imperative that research be done to tell the developing world's story. The developing world's participation in web information seeking is generally poor. The explosion of the Internet and the web is a reality some developing nations have not fully grasped. However, this is at varying levels; some nations are better positioned than others. Nevertheless, problems in terms of connectivity and insufficient ICT infrastructure to support web information seeking persist. In Africa in particular, many countries still lack basics such as clean water and food, and have poor road networks. Basic ICT infrastructure (e.g. phone lines) to support any meaningful offer of web services is in some cases nonexistent. The International Education Association of South Africa (2007:n.p) observed that in most SADC states, ICT resources are "poor or virtually non-existent", while 80% of sub-Saharan universities are inadequately connected. The situation in other regions is equally dire. Still, great strides have been achieved by a few countries, among them South Africa (SA). Peculiar to South Africa, however, are the disparities that outgrew or spilled over from apartheid,

which for a long time maintained disparate higher education systems organized along racial lines, with vastly inferior institutions catering for black students. This means that there is still considerable inequality in SA in terms of access to the Internet and the web.

2.6. Higher education and web information seeking

Various practices of information seeking play a central role within schools at different levels, from preschools to universities (Limberg & Sundin, 2006:n.p). This is important as academia sees a shift in emphasis from the teacher to the student. Rudestine (in O'Reilly and associates, 1997:7) argues that the Internet's eminence in higher education owes to the shift in the direction and movement in teaching and learning from an authoritative (know it all) paradigm, to one where the student is an active agent (an energetic learner; someone who asks questions, searches for information, discusses ideas with others, etc.).

Supposedly since its inception, the development of computer and communications technology has been accompanied by attempts to assimilate it into education in pursuit of teaching and learning goals, and the creation of the first graphic browsers and the WWW in the early 90's was a crucial turning point with respect to the widespread implementation of computer-mediated communication in education (Mioduser & Nachmias in Mioduser, 2000:2). Rudestine justifies the link between the Internet/web and education by saying that "there in fact is a very close fit – critical interlock - between the structures and processes of the Internet and the main structures and processes of university teaching and learning". Another point of compatibility between the Internet and university teaching and learning concerns the basic activity of communication, i.e. the constant exchange of ideas between students and across different faculties. The Internet allows this process of dialogue – of conversational learning - to be transferred easily and flexibly in electronic form (Rudestine in O'Reilly and Associates, 1997:5). Dougan (1996:43) assumes that by bypassing the traditional institutions that have long served as gatekeepers and distributors of knowledge and eroding the traditional influences of time, distance, sovereignty and even identity, the web has managed to establish itself in higher education. The web is a medium with great potential for distance

and flexible learning, and also for widening access and support to students in traditional courses, be they part-time, mature, or work-based. According to Mioduser (2000:8), "The conception of the Web as a learning environment is gaining more and more adherents, and is instantiated in varied forms, e.g., distance learning courses and even degrees, collaborative learning projects, virtual schools and universities, or virtual environments for complementary and informal education." Other pull factors are that it is easy to implement and offers the possibility of multimedia and interactive communication. For the above reasons, the web quickly supplanted other sources as a medium of choice among many in higher education.

It is safe to claim that since then, information technology has insinuated itself into virtually every corner of higher education, and South Africa, like the rest of the world, is directly affected. In their review of the ICT situation in South Africa, Czerniewicz, Ravjee and Mlitwa (in Council on Higher Education, 2007:54) observed that there has been an increase in interest in technology in many higher education institutions in South Africa since 2000. They note that while in other countries, interest in technology directly correlates to national policy frameworks and the impetus provided by funding bodies, this is not the case in South Africa, where there are as yet no clearly specified policies for technology in higher education. Despite this, higher education institutions are spending more of their budgets on ICT infrastructure than in previous years.

The Durban University of Technology is mentioned as one of the institutions with an ICT strategy in place and pertinent policy documents to guide the implementation of ICTs. Czerniewicz, Ravjee and Mlitwa (in Council on Higher Education, 2007:55) identified a handful of institutions with detailed and comprehensive policies and associated documents in place, among them Stellenbosch University and the University of Pretoria. Others are still hobbling with associated policies or drafts. However, not all of the institutions' policies are accompanied by operational or implementation documents. It was noted that even without policies and regulations, other relevant structures exist in most institutions.

To reiterate, information seeking literature reports that higher education is an area that has been subject to a lot of research. Much of the work concerning information seeking looks at well defined user groups with well defined information tasks, typified by students or academics. Often, these investigations of information seeking behaviour within the academic community across different disciplines tend to focus on undergraduates, graduates, staff and/or researchers, mainly because of the underlying assumption that there are differences in the information seeking behaviours of the noted groups.

2. 6.1. Impact of the web on higher education information seeking

As previously pointed out, the World Wide Web wields tremendous influence on the information seeking behaviour of students and academics today. It is safe to propose that the web single-handedly revolutionized campus computing. It did not take long before college students were among the largest user segment of this medium. Lehnert (2001:307) states that the web essentially opened the Internet to the public. In the same breath, Niederlander (n.d:n.p) insists that for better or worse, the Internet has had a definite impact on how people seek information and their expectations of how the Internet can fulfil their information needs. Lawrence and Miller (2000:1) have observed that purveyors of electronic commerce vigorously promote the idea that the answers to all of our questions are only a keystroke away. Observing the situation at the University of Zululand and judging by the extent of web usage, these observations are spot on, although some would still argue that not everything is available online.

It is entirely conceivable why searching for information on the web has become popular in higher learning today - by connecting to the Internet an entirely new world of electronic communication and information (with a greater range of topics that than any other information source) is opened to students and staff. Moreover, the wide range of information available online now means that many information queries can be answered from online sources in far lesser time than with traditional, paper-based sources. Speed or instant information/feedback is a driving factor in the ballooning interest in web information seeking in education.

Mioduser (2000:7) suggests that the reason behind the web's popularity in education is in its most obvious feature: it is a huge repository of hyperlinked knowledge, information, and knowledge manipulation functions (e.g. generation, transmission, storage, processing and retrieval of information), which are at the heart of educational transactions. Mioduser (2000:7) supposes that the ability to contribute to or to access online libraries, databases, e-journals, museums, and other public information containers on the Internet to fulfil valuable educational functions also appeals to higher education users.

2.6.2. Nature, range and types of information sought from the web

What a user of information systems will search for on the web is directly linked to the nature of his/her needs. Humans' information needs are multifarious; a need that one user may desire to satisfy may be trivial to the next. Numerous studies have been done aimed at identifying the information needs of various communities/user groups within the academic sector (Ocholla, 1999; Fidzani, 1998; Eskola, 1998; Fortin, 2000; Patitungkho & Deshpande, 2005; George et al., 2006). Roughly, these studies indicate that although each situation a user may find himself/herself in may determine the type of information sought in general, core areas, such as work, research and studies are assumed to be relevant to students and staff.

In terms of the range and types of information on the web, various authors have stated that innumerable types of information in a large variety of containers and in many different locations are all available in one place. According to Ray and Ray (2002:2), "The Internet contains a range of information, including raw data, statistics, opinions, conventional wisdom, facts, processes, instructions, questions, and answers among many other things." The content coverage and heterogeneity of the resources offered to end-users by web search engines and Internet services are considerably greater than what libraries offer, although the quality may be suspect. That all forms of information are collated in one place, together with ubiquitous access, are qualities that have given the Internet an edge over other information sources and propelled it to dizzying heights. Levene and Wheeldon (n.d:2) also acknowledge that the WWW collates a massive amount of online information. Manger in Mugwisi and Ocholla (2002:145) contends that

students invariably require access to all sorts of information in the course of their studies, and the Internet can be used for just this purpose with online databases, online public access catalogues (OPACs) and other institutional resources (also identified by Mugwisi and Ocholla). Mugwisi and Ocholla (2002:145) also declare that scholarly communication has been a major beneficiary of Internet development, both in terms of finding resources and communicating results.

Summarily, the World-Wide Web is one of the most accessible tools available for users in higher education because it is an easy way to publish material, has a low learning-curve, the majority of its browsers are graphical and user-friendly, and above all, it is free to most people (Lee et al., 1999:n.p). An additional feature that the web has brought to the fore is the presentation of static, linear, non-modular and printed data in a connected, dynamic manner through hypermedia.

2.6.3. How, when and where is information sought from the web

Marchionini (1989:54) suggested that studies of where and how people look for information highlight the interaction between personal factors, such as experience and knowledge, with their ability to fulfil their information needs. According to Jansen and Pooch (2001:236), while there is no certainty as to how a user conducts a search process, there are several prevalent theories (e.g. Belkin, Oddy and Brooks and Saracevic). While most of these studies are based on the empirical analysis of users, they do not agree about their searching processes. Ntoulas et al. (2006:1) suggest that because of the astonishing amount of information available on the web, users typically locate useful web pages by using a search engine. The search engine, particularly Google, has thus become the first step in accessing information resources on the web.

Exactly how users go about the information seeking process has been explained by several scholars. Sridhar (1988:29) says, "In the process of seeking for information what mainly takes place is an effort to match a cognitive need of a user with a source of information and seeking a supply of information to satisfy the need. This process naturally involves many phases and factors." Kuhlthau (1999:3) suggests that a user goes

through a six stage phase, namely initiation, selection, exploration, formulation, collection and presentation, while Choo et al. distinguish starting, chaining, browsing, differentiating, monitoring and extracting. There are some who suggest that users have generally started to adopt very different forms of information-seeking behaviour because of their use of electronic information services. Such a claim was made at the SIGIR WISI (Web Information-Seeking and Interaction) Workshop (2007:n.p), i.e. that the popularity of web browsing and web search engines has given rise to distinct forms of information-seeking behaviour and new interaction styles.

A cursory observation by the researcher points to the fact that infrastructure for web information seeking in educational institutions is primarily located in libraries, computer laboratories and offices, and that personal computer use is also increasing. Lawrence and Miller (2000:30) affirm that the Internet has become an essential component of every library, allowing it to function as a gateway to vast reserves of dispersed information and thus transforming the way students, scholars and librarians think about collections and service. According to Harris (2005:6), "For most college students, the Internet is a functional tool, one that has greatly changed the way they interact with others and with information as they go about their studies." Most times, this involves active or purposeful information seeking to complete course assignments; prepare for class discussions, seminars, workshops, conferences, etc.; write final year research papers; and view news, sports, weather, stocks, teaching material, and such like. From personal experience, both as a student and as a librarian, many (mainly) senior students and staff members are making an effort to familiarize themselves with database searching and access in laboratories, libraries, offices, etc.

2.7. Channels for web information seeking

By definition, an information channel is the medium or source by which information seekers find and access information (Boyd, in Boyd, 2004:n.p). These spaces/channels that house information on the web are numerous and varied. To many newcomers, the web is simply a large search engine. Web search engines are essential tools in the quest to locate online information, but in spite of their popularity, search engines are just one in a

horde of channels available to users on the web. Understanding web behaviour involves more than simply understanding search-engine related behaviour.

Ray and Ray (2002:3) state that apart from search engines, one can use a number of different resources, such as full-text articles, newsgroups, directories, specialized search services, FTP files, etc., when using the Internet to get information. Fourie (2004:75) says that although the web as a whole can be seen as an information channel that can be used to identify information sources (i.e. compared to printed channels or people), it actually consists of numerous information channels, from portals to directories, databases, websites and discussion groups. Ozsoyoglu and Al-Hamdani (n.d:1) put it thus:

> As valuable and rich as the web is, presently, there are few ways to search and locate information on the web: one can use (i) the existing search engines to reach a select set of ranked sites, (ii) meta search engines that in turn employ multiple search engines, and aggregate and rank search results, (iii) question-answering systems (e.g. AskJeeves - www.ask.com) that allow users to pose questions, and return their answers; or, one can (iv) follow links and browse web pages.

Other channels/spaces of information on the web include library catalogues, full-text journal services, document delivery services, current awareness services and intranets. The wide range of services detailed above illustrates the combined impact of the development of the Internet and the World Wide Web.

2.8. Challenges faced when searching the web for information

It is generally acknowledged in literature that the introduction of new technology requires a period of adjustment during which the new application must first be assimilated before it can maximize its potential. This is often the case with respect to the use of different and increasingly complex applications in education, which cause frustration for many new users. For this reason, searching for information in a digital environment requires users to learn the intricacies of the information systems being used.

Jenkins, Corritore and Wiedenbeck (2003:65) state that the web also poses many challenges to users who search for and evaluate web-based information. Chau (1999:n.p)

observes: "The uncertainties of the Internet challenge the modern workplace but also promise unexpected opportunities." According to Chau in Chau (1999:n.p), "The World Wide Web (WWW) is one of the many types of intelligence that requires human mastery due to its decentralized information arrays and the immense variety of materials available." The consistent theme shared by these authors is that despite the hype surrounding the web and its numerous benefits, there are in fact many challenges that users face when looking for information.

Some of the challenges that students and staff face when they are searching for information, as identified by Lallimo, Lakkala and Paavola (2004:4), are technical illiteracy and/or information illiteracy (mostly browser-related navigation in the hypertext jungle); poorly developed search strategies; misinterpretation of information; and the poor utilization of information.

According to Savolainen (2001:211), the networked information environment, epitomized by the Internet, places new demands on people's competencies in everyday information seeking processes. The range of sources and their inherent complexity continues to expand significantly, particularly on the web today. Consequently, information seeking has also become considerably complex, meaning that novice searchers (e.g. tertiary students) may lack the capacity to make good judgments on the web - a vast and often unregulated information medium. Cutrell and Guan (2007:1) observe: "As an increasingly large fraction of human knowledge migrates to the World Wide Web and other information systems, finding useful information is simultaneously more important and much more difficult."

In its objectives, the SIGIR WISI (Web Information-Seeking and Interaction) Workshop (2007:n.p) alluded to the fact that people engaging with this rich network of information often need to interact with different technologies, interfaces, and information providers in the course of a single search task. SIGIR WISI echoed that the systems may offer different interaction accordances and require users to adapt their information-seeking strategies. Not only is this challenging to users, but it also presents challenges for the

designers of interactive systems who need to make their own systems useful and usable to broad user groups. It is noted that the web's growing support for information seeking, creation, and use in a wide variety of applications in higher education highlights the need for efficient and effective information seeking skills. Chau (1999:n.p) points out that the web is recognized as a system that provides opportunities for publishing and disseminating information globally. However, the web's unstructured environment also places obstacles in the way of users' access to relevant information.

Kuhlthau (1999:1) states that people who use a variety of information sources to learn about a particular subject, complex problem, or extensive issue, often have difficulty in the early stages of information seeking. This situation, while it is particularly noticeable with students who have been assigned a research paper, does not apply to students alone. Kuhlthau reiterates that advances in information systems that open access to a vast array of resources have in many cases not eased the user's dilemma, but rather intensified the general sense of confusion and uncertainty. New information systems may deepen the problem by overwhelming the user with everything at once, rather than offering a few well-chosen introductory pieces for initial exploration. The increased availability of non-directed resources on the web (information overload) has increased the need to maintain authoritative content/links.

Debowski (2003:3) is of the view that the process of information seeking is gradually increasing in sophistication as more services are placed online and the capacity of systems to provide extensive information increases. Arguments in the same vein are expressed by Rowley et al. (2001:30), who argue that although students make use of online resources, such as websites and email, it is information skills that are the real problem because they appear not to understand the nature of the services that they use, even while actively using these resources. Rowley and others (2001:30) have observed that while postgraduate students often demonstrate developed knowledge about specific sources relevant to their studies, in other respects they do not exhibit a profile of EIS' (Electronic Information Systems') use that differs much from undergraduates. Walton and Archer (2004:8) allege that web-searching skills are particularly problematic because

of the challenges that the web poses to academic values and traditional research practices. Consequently, the technical skills of web searching are often taught separately from academic curricula or left entirely unaddressed. Leverenz (in Walton and Archer, 2004:8) is of the opinion that online sources challenge conventional academic disciplinary values. He believes that the web turns academic conventions on their head because of the absence of traditional publishing gatekeepers and quality indicators, unclear or collaborative authorship, absence of dating information, and the transience and mutability of online texts in a medium that does not guarantee the ability to retrieve something.

Another challenge of the web is that like any ICT, its use and diffusion is highly dependent on the development of related infrastructures. Farivar (2004:16) asserts that Internet-based technology requires a foundation of computing and telecommunications infrastructure and skills; in other words, the Internet is not a stand-alone technology, it is dependent on other things (computers, telephone lines, data transmission cables, etc.) to function. The web is included in this group. Internet infrastructure is a barrier to student and staff's information seeking behaviour. As Rius-Riu (n.d:3) states, lack of access to appropriate computer equipment can be an insurmountable obstacle for educators and students alike if the necessary infrastructure is not available or is unaffordable.

Commenting on the challenges brought about by the Internet, Nichols in Ronge (2007) says, "It's a whole new critical world out there. I am all for everyone having a voice […] I just don't think everyone has earned the microphone. And that's what the Internet has done. It has given everyone the microphone, saying 'Get a load off your chest'…" Ronge (2007) argues that the information superhighway is also 'the propaganda express', because while there are sites that are luminous with well presented, meticulously researched information, there are also many glibly argued, expensively designed sites that provide false rhetoric.

So in a nutshell, with the increasing importance of the WWW, the ability to use various information sources autonomously becomes more and more important. At the same time,

an information user must be able to properly sift through and select and evaluate information that successfully meets their needs.

2.9. Models and theories of information seeking

Scholars within Library and Information Science as well as outside the field have designed several models to outline the phenomenon of information seeking and information seeking behaviour. It can therefore be supposed that the models somehow trace the development of information seeking as a field. We have also seen improvements and revisions made to weaker areas in the earlier models (e.g. Dervin, 1983, 1996; Ellis, 1981, 1993; Kuhlthau, 1991, 1993; Wilson, 1981, 1997, 1999, etc.). Reddy and Jansen (2007:259) conclude that most current models are representative of the shift from the system-centred to the user-centred perspective in information science research where the user and not the information system is the central component. According to Turnball (n.d:n.p), the influence of new technology on information seeking has also generated a new set of alternative models that more accurately describe the information seeking process as a dynamic activity.

A model of information seeking attempts to describe the process a user follows to satisfy an information need (Wilson, 1999:n.p). Kingrey (2002:5) contends that these theories of information seeking hold important implications for refining the practice of librarianship. For example, the notion of information seeking as an event embedded in a complex interplay between personal and social factors possesses great resonance for librarianship. Although Kingrey's assertions were directed at the library, the researcher feels that they are still applicable to other situations, such as the provision of web information services to students and academics in a university set up, which is the focus of this study.

A variety of models have been proposed by various researchers, e.g. Kuhlthau, Wilson, Ellis, and Choo et al., describing the information seeking process, and some continue to be developed, prompting questions as to whether we still need more new information models today (Infomatters, 2006:n.p).

According to Wilson (1999:n.p), "A model may be described as a framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions." Models can contribute to our understanding of web information seeking behaviour. Fourie (2004:67) opines that web information seeking studies should benefit from a holistic picture of web information seeking as built on insights gained from information behaviour models and findings from information and web information seeking behaviour research. Regrettably, many of the existing models do not comprehensively address how information seeking is conducted on the web or in electronic environments. Fourie (2004:77) says that until recently, very few models have been proposed for web information seeking behaviour. She observes that in recent literature surveys, Jansen & Pooch (2001) did not identify any such models, while Fourie (2002) only identified the models by Choo et al. (1999, 2000a, 2000b, 2000c) and Tang (2002). However, she does note that there are a few earlier models, namely those of Belkin (cited by Wilson, 1999b), Dervin (1999), Ellis (1989), Ellis et al. (1993), Ellis & Haughan (1997), Ingwersen (1992), Kuhlthau (1991), Saracevic (in Wilson, 1999b), Spink (1997) and Wilson (1981, 1999a, 1999b), that have been applied or acknowledged in web information seeking studies. These models, many of which predate the World Wide Web, are inefficient in addressing how information seeking is done in electronic environments.

Shneiderman, Byrd and Croft in Reiterer, Mußler and Mann (n.d:2) have also suggested a four phase framework for information seeking, namely: i) Formulation: expressing the search; ii) Action: launching the search; iii) Review of results: reading messages and outcomes resulting from the search; and iv) Refinement: formulating the next step.

2.10. Suggestions and recommendations for optimal web information seeking and use within learning environments

In a short space of time, the web has grown from a marginal to a pervasive presence in higher education, and has been accepted by students, who appear to use information technology and online information effortlessly. Davis (2005:60) observes, "One cannot deny that computerized and networked information resources form an integral part in

information seeking." Quoting Brandt, he declares that learners have to have some knowledge and an understanding of the technological environment of these resources. Thus with the increased reliance on web-based systems, electronic databases, and knowledge management systems, training in the retrieval and use of these resources should be enhanced. Seeing as skills and strategies when using ICT for information seeking differ from traditional tools (navigation in a hypertext-environment is substantially different from searching a library's index card or bookshelves), the need to equip users with high level search competencies must be attended to. Lallimo, Lakkala, & Paavola (2004:3) question whether ICT brings totally new challenges to students' information seeking skills or whether it supports basic information-seeking skills regardless of the technology. In the same vein, Davis (2005:60) states, "Information seeking is a subset of information literacy. Without a conceptualization of what one is seeking, the exercise of seeking becomes superfluous." For this reason, the researcher feels that there is a need to review the mechanisms by which information seeking might be better inculcated in tertiary education curricula. Moreover, the level of support for information seeking offered to students and staff should increase.

The International Reading Association (in Henry, n.d:2) posits that searching for information on the Internet, and the literacy requirements this involves, is central to the new literacies that will define students' futures. Regarding academics, Debowski (2003:3) believes that they need to be well prepared in the basics of information seeking if they are to successfully integrate this competency into their teaching and their curriculum design. According to Humes (2003:4):

> The information superhighway has increased public awareness in ways to empower people to access electronic networks and use information available through them. A lot of promises are being made about the boon to education offered by the new information technology but providing the complementary skills needed to convert opportunity to success must be the province of all educators.

One would like to believe that given the extent to which the web has encroached into the higher education landscape, web information seeking would be treated as a core competency, and this needs to be reflected and integrated more completely into university curricula.

Kebede (2002:160) noted that there is a need for the physical presence of computing facilities (computer hardware and software and other electronic information-related facilities and equipment, and space to access electronic information sources and content via ICTs) and electronic information sources (CD-ROM, local and remote-located electronic databases, the Internet and other networked information sources); access to computing facilities (proximity, policy, and other issues that affect physical access to the existing computing infrastructure and space); and access to electronic information sources (such as access to remote bibliographic databases, which can be said to be incomplete unless full texts are available for the actual extraction of potentially relevant information content). In a country like South Africa, with an educational system that is limping from the divisive laws of the past, there is a need for infrastructure and policies that would facilitate physical and intellectual access to web information.

2.11. Implications of the reviewed literature to this study

Research on information seeking that focuses on academics and students has occupied a considerable bulk of literature in the past. In the course of research, it quickly became apparent that the body of academic literature on web information seeking is, in fact, growing. This trend is set to continue, particularly research on information seeking behaviour in technology driven environments, because of the growing extent of ICTs' use. Sridhar (1989:66) argues that although some applied aspects of the topic are thoroughly investigated, user characteristics, such as personality traits and psychological domains, are yet to be identified and linked to the information behaviour of users. This review showed that interest in this topic does not occur in a vacuum. Instead, it is spurred on by observations shared by many other scholars that advances in information technology have resulted in technology dominating research in information seeking. There does, however, exist a gap in literature in terms of the study of information seeking

behaviour in the developing world, a shortcoming also noted by Walton, Marsden and Vukovic (n.d:2).

Kautz and Selman in Chau (1999:n.p) believe, "Many information-gathering tasks are better handled by finding a referral to a human expert rather than by simply interacting with online information sources." If this statement is true, it would be interesting to identify what shifts or changes the 'new' end user is causing to established norms and values in academic institutions and what implications these shifts have. For example, a commonly held view in education has been that traditionally, the library has been a physical repository for intellectual activities (Chau, 1999:n.p). While the above assertion has been accepted for a long time, literature would suggest that this position is being challenged, for many people no longer frequent the library.

Walton and Archer (2004:2) expressly state that once most students graduate, their dominant mode of learning will be self-directed and exploratory, and the web will be a key information source. The prevailing scenario today is that even during their tenure at higher education institutions, the web functioned as a key information source for them and the academic staff.

The literature does, however, expose that in light of increased access to the web, many users also face challenges. For example, Humes (2003:1) questions whether as institutions continue to purchase electronic technologies, they prepare students and staff for the onslaught of information that is provided by these technologies. South African students, particularly those from disadvantaged backgrounds, are likely to experience significant problems in this vein. Sayed (in Walton and Archer, 2004:2) argues that for them (previously disadvantaged students); problems with web literacy are merely the latest manifestation of a more general problem that grew with the legacy of apartheid (e.g. different levels of access to information technology and skills).

The effects of incorporating the World Wide Web as a learning tool in higher education are also emerging in literature. Breivik (in Davis, 2005:58) has raised concerns that

despite the advancement of information technologies, "…higher education has only dabbled in the applications of information technologies […] but so often does not choose to use them to enrich students' learning". Owston (in Achacoso, 2003:15) feels that the web can be integrated into education because it appeals to students' mode of learning. He describes Internet use as being "integral to their world". Owston further states that the web caters for flexible learning by providing students with access at their convenience. The lack of face-to-face contact can also help shy students participate in the learning process. Moreover, asynchronous and synchronous communications are possible.

2.12. Summary

The web is a medium of information that continues to grow in popularity and use in education. As observed by Miller (2002:1), "Despite such well-known barriers as network problems, user-unfriendly programs and lack of access to the Web, the advantages of convenience, speed and easy access are acknowledged and drawing more and more […] into the electronic information world." Because universities work continuously towards the efficient use of resources, the Internet has been a boon to information seeking in higher education. As observed by O'Brien and Symons (2007:5), students' use of search engines reveals that the web is indeed the information tool of choice. The two allude to the various reasons behind why students turn to the web, including the availability of library materials, currency, field of study, and inspiration. The benefits of the web and other related technologies have been and continue to be important forces that drive information seeking in higher education. Walton and Archer (2004:2) have noted that once most students graduate, their dominant mode of learning will be self-directed and exploratory, and the web will be a key information source. This observation holds true in many academic institutions today, and also extends to students who have not graduated as well as members of staff. On a cautionary note, the uncertainties of the Internet challenge the modern information seeker even while offering unexpected opportunities. The abundance of unstructured and unrestricted information on the web can easily lead to information overload, and users need to be able to adapt to this new over-saturated climate.

Information seeking in society is an increasingly critical skill that must be developed as more students and staff use a wide range of electronic search tools in their professional capacity (Debowski, 2003:1). The ability to critically search for, evaluate and use information and tools for information seeking within different communities, particularly in higher education, is a competence that is gaining priority. Consequently, understanding information seeking processes and developing systems and strategies to support them is also a priority. The web's growing use in a wide variety of applications in higher education highlights the need for efficient and effective skills. Enabling infrastructure should also be developed or installed for efficient and effective web performance.

From the literature, one would deduce that web information seeking is an activity that has been received with much zest in the higher education sector. As indicated above, the benefits of web information seeking are plenty.

CHAPTER THREE: METHODOLOGY

3.1. Introduction

This chapter explains how the research was carried out. Thus the research design, research methodology, target population, sampling procedures and data collection procedures are outlined. Also highlighted are the challenges and limitations encountered during the course of the study.

3.2. Research

The term 'research' refers to any careful, systematic, patient study and/or investigation into some field of knowledge that is undertaken to discover or establish facts and principles (Fraenkel and Wallen, 2000:9).

3.3. Research paradigm

Best and Kahn (2006:246) explain that research methodologies can be divided into two major paradigms: logical positivism and phenomenological enquiry. Quantitative research methodologies fall within the logical positivist paradigm (i.e. steeped in the natural sciences, e.g. statistics, mathematics, etc.), while qualitative research methodologies fall within the phenomenological enquiry paradigm (founded on the social sciences - psychology, anthropology, sociology, etc.- which use a variety of interpretive research methodologies). Durrheim (in Terre Blanche, Durrheim and Painter, 2006:47) observe that the research paradigm has many implications for the design, sampling, data collection instruments, and analysis of a study, because these aspects differ depending on which research approach is chosen. As Best and Kahn (2006:246) assert, all qualitative research uses the design strategies of emergent design flexibility and purposeful sampling, and most use naturalistic enquiry. In contrast, quantitative research makes use of experimental methods and quantitative measures to test hypothetical generalizations. Quantitative researchers, according to Hoepfl (1997:n.p), seek causal determination, prediction, and the generalization of findings, while qualitative researchers seek illumination, understanding, and extrapolation to similar situations.

This study on web information seeking behaviour used a mixed methods approach (combining qualitative and quantitative methodologies) in a survey research design. Although perceived as a quantitative research design, surveys can be successfully employed in qualitative research as well.

3.4. Research methods and methodology

Wilson in Davis (2005:85) posits that research methodology is often confused with research methods; however, methodology is more fundamental - it provides the philosophical groundwork for methods. Sarantakos (1997:34) has also observed this confusion in terms, and concludes that methods are not synonymous with methodology, instead "… research 'methodology' means the science of methods […] and contains the standards and principles employed to guide the choice, structure, process and use of methods, as directed by the underlying paradigm".

According to Nachmias and Nachmias (1996:13), methodology is a scientific system of explicit rules and procedures upon which research is based and against which claims of knowledge are evaluated. Leedy and Omrod (2005:12) suggest that research methodology is the general approach a researcher follows when carrying out a research project. In simple terms, methodology relates to the broader principles and philosophies governing research. Research methods, however, refer to the techniques selected for gathering data (Harding in Westmarland, 2001:1). Sarantakos (1997:34) defines methods as the tools of data generation and analysis. These are often chosen on the basis of criteria related to or even dictated by the major elements of the methodology in which they are embedded, such as perception of reality, purpose of the research, and type of research units. In this study, the type of data that was required was an influential factor. Within the two methodologies, there are various methods one can employ to obtain information or collect data.

Most research methods can be classified based on the distinctions between qualitative and quantitative research methodologies (Myers, 1997:n.p). The main distinction between the two is that quantitative methods deal with data that is in numerical form while qualitative

methods do not. However, quite often researchers combine techniques from both research frameworks in a single study. Maxwell (1998:1) revealed how studies highlighted the complementary crossover of qualitative and quantitative approaches, which had long been viewed as separate spheres with little overlap. Shenton and Dixon (2003:2) agree that research can profit from the use of both qualitative and quantitative methods because of the contribution each can bring to a study. Sydenstricker-Neto (1997:n.p) is of the opinion that the crossover achieved through triangulation in a study tests the consistency of findings obtained using different instruments. It also increases the ability to control, or at least assess, some of the threats to the validity of the results and to reduce the risk of systematic distortions inherent in the use of only one method. Often, a study that uses only qualitative data or quantitative data misses the rich interpretation that an integrated approach makes possible, particularly when investigating social phenomena such as behaviour.

In this study, this was achieved through the use of a questionnaire, which is considered to be a quantitative data collection technique, and interviews, which fall under qualitative data collection methods. Through the questionnaire, a relatively large target population was reached, while the interviews catered for a detailed examination of the views, perceptions and sentiments of the respondents with regard to web information seeking.

3.4.1. Qualitative research

By definition, qualitative research may generally be understood as research that is conducted in a natural setting; a researcher gathers words or pictures, analyzes them inductively, focuses on the meaning of the participants, and describes a process that is both expressive and persuasive in language (Trochim, 2000:n.p). Sarantakos (1997:6) reiterates that qualitative research employs methods of data collection and analysis that are non-quantitative. Such research aims to explore sociological elements and describe reality as experienced by the respondents. A study by Flick (2006:11) confirms the view that qualitative research is of specific relevance to the study of social relations. An investigation into social phenomena warrants the use of qualitative methods because human actions, such as web information seeking behaviour, are difficult to quantify. This

study adopted Njoku's (2004:305) definition of behaviour as a fairly consistent pattern of reactions or responses to a given problem or phenomenon by a person or group. Other than that, qualitative research methods, according to Durrheim (in Terre Blanche, Durrheim and Painter, 2006:46), allow researchers to study selected issues in depth, openness and detail as they identify and attempt to understand the categories of information that emerge from the data.

The qualitative approach was used particularly for the reasons expressed by Shenton and Dixon (2003:1): that one can explore a particular phenomenon at length, typically through the collection and analysis of subjective data from a relatively small number of participants involved in the processes, circumstances or situations at the heart of the enquiry. Examples of qualitative research methods include action research, case study research and ethnography. Qualitative data collection techniques include general and participant observation (fieldwork), interviews and questionnaires, documents and texts, and descriptions of the researcher's impressions and reactions [recorded or noted down] (Myers, 1997:n.p).

Through some of these methods, the researcher endeavoured to explore and understand people's attitudes, motivations and behaviour with respect to web information seeking. The qualitative methods employed in this study were interviews, general observation, and the unstructured (open-ended) questions in the questionnaire.

3.4.2. Quantitative research

Quantitative research refers to a study that is numerically oriented, requires significant attention to the measurement of phenomena, and often involves statistical analysis. Hopkins (n.d:n.p) defines it as research that aims to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. There are various quantitative research methods that researchers can use in studies today. Myers (1997:n.p) identifies the following quantitative methods, which are all generally accepted in the social sciences: surveys, laboratory experiments, formal methods (e.g. econometrics) and numerical methods, such as mathematical modelling.

According to McCarthy (2006:n.p), quantitative methods are perfect for getting to the nuts-and-bolts of a situation, or the what, where, when and questions. With regard to web information seeking behaviour, the quantitative research method sought to elicit 'who' is doing 'what', and [how many] students and staff are aware of, believe that, or are inclined to behave in a certain way towards the web in their work and learning environments. The quantitative approach was incorporated in the structured questions included in the survey (specifically the questionnaire). Its inclusion was necessary to reach out to a relatively large population inexpensively and easily. It also made it easier to measure descriptive aspects of the study, such as the composition of the population.

3.4.2.1. Survey

Surveys are one of several research methods (others being content analysis, experiments, observation, the historical method, etc.) that researchers employ to gather information for a study. It is one of the most prevalent techniques that researchers employ to gather information. Best and Kahn (2006:271) identify the survey as a research instrument that uses both quantitative and qualitative research methodologies. Correspondingly, Maxwell (1998:4) argues that surveys usually generate quantitative information, although open-ended questions with narrative answers can be used in survey questionnaires for qualitative data. Tull and Albaum (1973:2) note that as in the above, survey research is a term that is susceptible to a variety of interpretations, although most often it is used to connote an attempt to get information from a sample of people through the use of a questionnaire. Trochim (2001:108) confirms this, stating that a survey involves asking subjects to answer questions, usually via interviews or questionnaires. Generally, surveys are employed to gather information on the background, behaviours, beliefs or attitudes of a large number of people (Neuman, 2006:43). For this reason, Kendall (in Courtney, Timms and Anderson, 2006:51) observes that surveys often leave respondents to 'speak for themselves' with little or no informed interpretation or exploration of the meaning behind their responses. It is believed that this often results in survey researchers producing 'factoids' rather than extrapolating what survey results signify from the perspective of the respondent (Courtney, Timms and Anderson, 2006:51).

In this survey, self-administered questionnaires, limited interviews and observation were used to gather data. The first two (questionnaires and interviews) fall under the auspices of a survey while the latter (observation) was used as a separate data collection tool. Observation was included because in any empirical data collection environment, observation is a natural activity whether done consciously or otherwise. According to the United Nations World Food Programme Office of Evaluation and Monitoring guidelines (n.d:28), "Everyone collects direct observation data knowingly or unknowingly; using the technique simply requires recording and, in the case of qualitative methods, consciously using what we see to help shape our understanding of situations or phenomena." An article on research methods: participant observation from sociology.org (2003:2) points that it (participant observation) allows the researcher "real [...] understanding, through personal experience, what is going on in any given situation". The unbiased impressions of the researcher on web information seeking were thus considered very valuable in this instance. Moreover, observation lends itself very well to the study of patterns of behaviour (such as web information seeking). The above three data collection tools ensured that web information seeking behaviour - a qualitative activity associated with people's emotions, characteristics, opinions, attitudes or experiences - would be sufficiently addressed while allowing the researcher to reach a large population for better representation and to better generalise the findings (Kellar, Watters and Shepherd, 2006:7). Other considerations were that surveys save money and time without sacrificing efficiency, accuracy and information in the research process (Ikoja-Odongo in Dube, 2005:106).

The Harvard Family Research Project (2004:6) observes that deciding which data collection methods to use has significant implications on the cost of a study, hence the use of questionnaires and limited interviews. Chair et al. (n.d:3) also reiterate that surveys provide a speedy and economical way to gather facts about people's levels of knowledge, attitudes, beliefs, expectations, and behaviour.

The downside of the survey, however, seems to be that participants are studied outside of the context of their information seeking environment, which can decrease the level of realism (Kellar, Watters and Shepherd, 2006:7). Westmarland (2001:4) also notes that

criticisms of surveys often focus on the crudeness of survey questions and the resultant data, which are arguably too simplistic to examine the complexity of the social issues being addressed. Again it has been said that the data collected may be superficial (Edwards and Talbot, 1994:37).

3.4.3. Data Collection tools / techniques

In the most general sense, techniques are described as the specific procedures that determine how a researcher gathers data. The most commonly used data collection tools in a survey consist of self-administered surveys or questionnaires, personal interviews and/or focus groups. As already noted, this study employed questionnaires and interviews.

3.4.3.1. Questionnaires

The use of questionnaires to collect data is very popular in a lot of information seeking research. A questionnaire can either be used alone or in conjunction with other methods of data collection. The written questionnaire, whether administered through the mail or as part of a personal interview process, can be a highly effective means of obtaining data (Loose and Worley, 1994:144). The questionnaire's ability to elicit both qualitative and quantitative data on unobservable behaviour, such as feelings, attitudes, ideas, opinions, and viewpoints, made it the instrument of choice. Furthermore, questionnaires give respondents time and the freedom to independently respond to questions, therefore leading to well thought out responses. Because the researcher has less influence on the responses, the respondents' enjoy greater anonymity, resulting in less bias. According to Cockburn and Mackenzie (2000:2), "The main attraction of questionnaires is the relative ease of gathering a large set of responses. Their primary limitations, however, are their narrow scope and their separation from the user's task: they report on the user's perceived, rather than actual, interaction." Often, questionnaires also have a low response rate, some questions are left unanswered, and their inflexible nature leaves no room to follow up or probe reactions and seek clarification on ambiguous or unclear areas. Due to the inherent lack of quality control, questionnaires require very careful question design and are more prone to error than other methods, such as telephone or in-person interviews.

3.4.3.2. Interviews

A limited number of survey respondents were invited to participate in semi-structured interviews during the surveys. This mixed approach balanced the broader, more prescriptive survey questions, providing participants with an opportunity to give more spontaneous, in-depth accounts of their web information seeking situations. In a big way, the interviews sought to reduce the shortcomings of the questionnaire. Interviews are highly efficient in obtaining qualitative data, in this case impressions about and sentiments on the web in higher education. Other benefits of using interviews are that the interviewer can clarify any points that are obscure and probe further whenever the responses are particularly important or revealing (Fraenkel and Wallen, 2000:137). They are far more personalized than questionnaires. Questions are carefully posed, typically in a face-to-face meeting, although interviewing using the telephone is also popular, and interviewing using the Internet is on the rise. The interview is a purposeful interaction between two or more people who are caught in conversation and negotiation for specific purposes associated with some agreed subject matter (Hlatywayo, 2006:38). A variety of interviews have been identified in research, including but not limited to the focused interview, semi-standardized interview, problem centred interview, expert interview and the ethnographic interview. It has often been suggested that respondents are more likely to express their views openly in a semi-structured interview (Flick, 2006:149). For this reason, semi-structured interviews have attracted a lot of interest and are widely used to obtain data about people's behaviour and viewpoints. Semi-structured interviews, which were opted for in this study, follow a pre-defined question set but still allow for a degree of flexibility using a mixture of "open" and "closed" question types.

However, interviews require the cooperation of the respondent in one way or another and involve some kind of intrusion into people's activities. Interviews are a resource-and time-intensive method and occasionally people may react unfavourably to such an intrusion (they may dislike or resent being interviewed).

3.4.3.3. Observation

Observation has been described as a research method as well as a data collection tool. In this study, it was employed as a data collection technique. Marshall and Rossman (in

Kawulich, 2005:n.p) define observation as "the systematic description of events, behaviors, and artifacts in the social setting chosen for study". Observation can be summed up by the following quote by Kawulich (2005:n.p):

> Observation methods are useful to researchers in a variety of ways. They provide researchers with ways to check for nonverbal expression of feelings, determine who interacts with whom, grasp how participants communicate with each other, and check for how much time is spent on various activities. [It] allows the researchers to … observe events that informants may be unable or unwilling to share when doing so would be impolitic, impolite, or insensitive, and observe situations informants have described in interviews, thereby making them aware of distortions or inaccuracies in the description provided by those informants.

3.4. Study population

Neuman (2006:224) defines a population as a large pool of cases or elements from which the sample is drawn. A population is also defined as the group of people on whom the results of a study are intended to apply (Fraenkel and Wallen, 2000:104). The target populations of this study were students and academic staff from the University of Zululand and the Durban University of Technology. As of the 22nd of May, 2007, the University of Zululand's student population (KwaDlangezwa and Richards Bay campuses combined) stood at 8613, with 281 members of staff (Networking Services Unit). The audited headcount of students at the Durban University of Technology in 2006 stood at 21 316 (MIS department), with 595 permanent academic members of staff (Institutional Audit 2007 portfolio report). Campuses that were selected for this study from the Durban University of Technology were ML Sultan, Steve Biko, City and Ritson. Other campuses, i.e. Brickfields, Indumiso and Riverside, were not included because their participation would have required more travel, straining the researcher's already limited budget. Indumiso and Riverside are situated in Pietermaritzburg, and Brickfields, although located in Durban, is still too far from the four selected campuses.

3.5. Sampling

Sampling is a process that allows a researcher to scientifically choose who or what is included in an investigation. According to Trochim (2001:41), sampling involves selecting units (e.g. people, organizations) from a population of interest so that one may fairly generalize the results of a study back onto the population from which they were chosen. Sampling is necessary because surveying every person or a whole set of units in a population is often impossible or, at the very least, very costly in terms of time and money. Moreover, since research requires reliable forms of evidence from which to draw robust conclusions, samples help by enabling the detailed examination of a sizeable group or case to take place.

3.5.1. Sampling methods

Sampling can be divided into two types, namely probability or non-probability sampling (Sarantakos, 1997; Neuman, 2006; Flick, 2006; Best and Kahn, 2006). Some scholars also dichotomise them as random or non-random methods (Australian Bureau of Statistics, 2004). The direction taken when sampling or deciding whether to use random or non-random sampling techniques, quantitative or qualitative approaches, is influenced by the research methodology adopted or followed. In a quantitative study, the intention is often to select samples randomly to achieve representative cases. In contrast, qualitative studies often select samples for their usefulness as opposed to their randomness (Best and Kahn, 2006:249). As already mentioned, this study used both quantitative and qualitative methodologies. Non-probability sampling techniques, quota sampling and convenience sampling were used to ensure that certain characteristics of the population were captured without sacrificing representation.

The survey population was categorized according to faculties using quota sampling. Trochim (2001:57) states that in quota sampling, one selects elements non-randomly according to some fixed quota. Neuman (2006:221) confirms that in quota sampling, the researcher identifies categories into which cases or people will be selected and selects cases to reach a predetermined number in each category. The basic goal of this sampling process, according to Tull and Albaum (1973:38), is to develop a sample that is a replica

of the population of interest. In order to accomplish this, the population is broken down on the basis of key demographic characteristics. A sample is then developed that is proportional to these characteristics, as explained above. Neuman further states that quota sampling ensures that some differences exist in the sample, e.g. age, sex or background. Literature indicates that undergraduate and postgraduate students often exhibit different information seeking behaviour, and this behaviour also differs according to faculty. This was what prompted the use of quota sampling, with faculties identified as quotas. There are two types of quota sampling, namely proportional and non-proportional. Proportional sampling is when sampling numbers must match the proportions in the population, while non-proportional sampling is less restrictive - one simply has to have enough cases or people to ensure that he/she can talk about even small groups in the population. The target population was selected proportionally at institutional population levels as well as at study levels. Thus, there were more students and staff selected from DUT than from the University of Zululand, and more undergraduate than postgraduate students in the population in line with the population distribution at the two institutions.

For various reasons, it is sometimes difficult to gain access to the individuals one intends to interview or distribute questionnaires to within a limited time frame. Some may be busy, others may lack interest, and others may not be reached for a horde of other reasons. Because of this, convenience sampling was used to select respondents for each quota. Fraenkel and Wallen (2000:112) describe a convenience sample as a group of individuals who are conveniently available for a study. Tull and Albaum (1973:38) state that convenience sampling refers to samples selected not through judgment or probability techniques, but because the elements in a fraction of a population can be reached conveniently. The established quotas guided the researcher in selecting the respondents.

In distributing the questionnaire, the researcher took steps to verify which faculty students or members of staff belonged to. Although many related studies show that departments are an important consideration when investigating behaviour among academics and students, this study did not endeavour to examine behaviour according to the specific and manifold departments; instead, the intention was to have as many

departments and course offerings represented as possible. Convenience sampling also proved handy in selecting academic members of staff, the majority of whom, by nature of their jobs or positions, were busy and had less time on their hands to dedicate to this research. For this reason, academics were selected according to their rank whenever this was possible, although not strictly.

3.5.2. Sample size

Chair et al. (n.d:3) stress that there is no simple rule governing what sample size should be used for all surveys. Fraenkel and Wallen (2000:116) agree that the question remains open as to what constitutes an adequate or sufficient size for a sample. Several things need to be considered in deciding how many cases to take in a sample. Key among them is cost, the budget available, the objectives of the study, and the number of cases needed to detect differences of interest. Analysts usually find that a moderate sample size is sufficient for most needs. Nachmias and Nachmias (1996:194) claim that any increase in the sample will increase the precision of the results. This concurs with Seaberg's assertions (in Grinnell, 1994:253) that the general rule of thumb is the bigger the sample, the better. There are concerns as well about the level of accuracy expected.

In deciding on the sample size, all the above mentioned issues were considered. Research design also featured significantly, given Neuman's (2006:149) observation that qualitative research is less concerned with issues of sample size and more with richness, texture and feeling. In other words, qualitative research focuses less on how representative a sample is and more on how it illuminates social life (Neuman, 2006:219). As noted by Seaberg (in Grinnell, 1994:254), a fairly common problem relating to sample size is the failure to consider the number of categories of the sample which may be required to analyze the data appropriately. In this study, this problem was addressed by disproportionate sampling within the predetermined quotas.

Gay and Aisarian's (in Leedy and Omrod, 2005:207) guidelines for selecting a sample were used to select the sample size. They state that if a population is beyond a certain point (at least 5,000 units or more), the entire population size is almost irrelevant and a

sample of 400 should be adequate. To reach this figure, the student sample was calculated at a ratio of 1.2 percent of the total population in each institution, while the staff sample was calculated at 4 percent. A few individuals were randomly selected from these samples for interviews.

3.5.3. Sample frame

A sample frame is defined by Neuman (2006:225) as a list of cases in a population or the best approximation of [a given population]. The table below presents the sample frames used in this study.

Table 3.1: Sampling Frame

University of Zululand student population (8613)									
Questionnaires					**Interviews**				
Faculty	Gender		Level of study		Sample size	Gender		Level of study		Sample size
	M	F	UG	PG		M	F	UG	PG	-
Arts	13	13	20	6	26	-	-	-	-	-
Education	13	14	20	7	27	-	-	-	-	-
Science & Agriculture	12	13	20	5	25	-	-	-	-	-
Commerce, Administration & Law	12	13	20	5	25	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**103**	-	-	-	-	10

Durban University of Technology student population (21316)									
Questionnaires					**Interviews**				
Faculty	Gender		Level of study		Sample size	Gender		Level of study		Sample size
	M	F	UG	PG		M	F	UG	PG	-

Accounting & Informatics (Commerce)	32	32	56	8	64	-	-	-	-	-
Arts	32	32	56	8	64	-	-	-	-	-
Engineering Sciences & the Built Environment	32	32	56	8	64	-	-	-	-	-
Health Sciences	32	32	56	8	64	-	-	-	-	-
Total					**256**	-	-	-	-	15

University of Zululand staff population (281)						
Questionnaires					**Interviews**	
Faculty	Gender	Rank/position	Sample size		Rank/position	Sample size
	Sample chosen by availability	No strict adherence to position or rank			No strict adherence to position or rank	6 members of staff were targeted for interviews
Arts			3			
Education			3			
Science & Agriculture			3			
Commerce, Administration & Law			2			
Total			**11**			**6**

Durban University of Technology staff population (595)					
Questionnaires				**Interviews**	
Faculty	Gender	Rank/position	Sample size	Rank/position	Sample size
	Sample chosen by availability	No strict adherence to position or rank		No strict adherence to position or rank	12 members of staff were targeted for
Accounting & Informatics (Commerce)			6		
Arts			6		
Engineering Sciences & the Built Environment			6		
Health Sciences			6		

					interviews
Total			24		12

3.5.4. Responses

The responses to the questionnaires and interviews at the University of Zululand and Durban University of Technology are summarized in the table below. Guided by the sample frame, the study sought to sample respondents and interviewees in accordance with the numbers set in the sample frame. To a large extent, this was successfully achieved. In sampling members of staff from both institutions, the most accessible sample was often used because of the failure of certain members of staff to respond to the questionnaires or sit through interviews because of their busy schedules. On the whole, however, the response rate was very high.

Table 3.2: Questionnaire responses by institutional affiliation

University of Zululand					
Students target sample	Response Rate	Staff target sample	Response rate	Overall target sample	Overall response rate
103	84 (82 %)	11	9 (82 %)	114	93 (82 %)
Durban University of Technology					
Students target sample	Response Rate	Staff target sample	Response rate	Overall target sample	Overall response rate
256	139 (54%)	24	14 (58%)	280	153 (55%)

Table 3.3: Interview responses by institutional affiliation

University of Zululand					
Students target sample	Response Rate	Staff target sample	Response rate	Overall target sample	Overall response rate
10	10 (100%)	6	5 (83%)	16	15 (94 %)
Durban University of Technology					
Students target sample	Response Rate	Staff target sample	Response rate	Overall target sample	Overall response rate
15	8 (53%)	12	4 (33%)	27	12 (44%)

3.6. Reliability and validity of instruments

The reliability and validity of the research instruments are important considerations when conducting any research. Hopkins (n.d:n.p) states that validity represents how well a variable measures what it is supposed to and reliability tells one how reproducible measures are in a retest. Edwards and Talbot (1994:70) suggest that the validity of information is based on the extent to which the methods pick what they are expected to. Validity is also seen as the extent to which a study is freed from interference and contamination, control or variable manipulation (Sarantakos, 1997:80). Reliability and validity are facilitated in a number of ways. One way involves the construction of appropriate methods of data collection and analysis. Therefore a pilot study consisting of a small number of individuals was done to develop, adapt, and check the feasibility of the chosen techniques. For the pilot study, an opportunity sample (accessible sample) consisting mainly of colleagues in the department was used. The mini-survey consisted of 30 respondents from the University of Zululand (5 members of staff and 25 students), and helped improve the quality of the instruments in areas such as the precision of the questions, how they capture content, and their suitability to the respondents. Frankel and Wallen (2000:169) recognise that the quality of instruments used in any research is important because the information obtained through them is used to draw conclusions. When a researcher is aware of potential errors (exposed in this case through the pilot study), remedial action can be taken quickly before resources are wasted on collecting data whose reliability and validity will (later) be questioned.

A measurement device or data collection instrument is said to be reliable when it will consistently produce approximately the same results when applied to the same sample or different samples of the same size drawn from the same population (Tull and Albaum, 1973:94). According to Frankel and Wallen (2000:128), a reliable instrument is one that gives consistent results. Reliability indicates the precision of measurements (errors in the selected measuring instruments can affect reliability). This differs from validity, where one would be interested in determining if the instrument measures what it is supposed to measure. Frankel and Wallen (2000:128) seem to think that although this definition of validity is frequently used, it is old fashioned. They suggest, "A more accurate definition

revolves around the defensibility of the inferences researchers make from the data collected through the instrument." This was achieved by using triangulation, the use of more than one research instrument (questionnaires, interviews and observation) to investigate a similar phenomenon in one study.

The pilot study also helped familiarize the researcher with what to expect on the field. During the reconnaissance, the researcher gained a lot of insight into web information seeking behaviour. Respondents' reactions to the pilot were useful in a number of ways. For instance, students' and staff reactions to the questionnaire and interviews showed that most did not understand what web information seeking is. It was therefore necessary to clarify the concepts before handing out the questionnaires to the respondents. This observation led to a revision of the final data collection procedure from one where respondents were given questionnaires to take home (and return upon completion), to one where respondents immediately filled in the questionnaire while the researcher was on hand to deal with queries.

On the whole, the researcher was able to restructure the questionnaire and devise a better way to reach out to the target population. Pre-testing the research instrument, as explained above, highlighted the need to oversee the collection of data and addressed the recurring problem of respondents not paying attention to instructions on the questionnaire. As Bechhofer and Patterson (2000:9) would have it, "A good research design is one which gives the researcher confidence in the solidity of the conclusions drawn from the data. Achieving this requires a great deal of control." This important consideration was addressed by adopting a comprehensive sampling technique that ensured the full representation of the demographics of the faculty, department, and the different levels of study. A comprehensive sample was also employed to compensate for the lack of in-depth knowledge about the population under study.

3.7. Data collection procedure

The researcher distributed questionnaires and conducted interviews with students at both institutions in libraries and computer laboratories. These facilities were chosen because of

their convenience as places where students normally congregate when searching for information. Moreover, all the various categories or elements of the sample were often represented in these service areas (undergraduates, postgraduates, and males and females from all faculties). All the questionnaires were administered and collected in person. This data collection strategy partly minimized chances of yielding faulty or unreliable data, especially seeing as the researcher took time to explain everything to the respondents (who were grouped together) before they went ahead with the questionnaire. The researcher was also able to immediately respond to any queries. This gave the researcher control over the data collection procedure and increased the overall response rate.

3.8. Data analysis

Raw data conveys little information until it is compiled, analysed and interpreted. Data analysis is the process of obtaining meaning and implications from raw data. The data analysis methods associated with survey research design are content analysis, descriptive statistical analysis, and a little bit of statistical testing (Edwards and Talbot, 1994:98) The methods used in the analysis of data in this study were dependent on the methods used for data collection. Since both quantitative and qualitative data analysis methods were employed, both qualitative and quantitative data analysis methods had to be used. Descriptive analysis using the Statistical Programme for Social Sciences (SPSS) and qualitative content analysis were the techniques opted for. Quantitative analysis techniques (statistical analysis) were used to summarize the findings in a clear, precise and reliable way, i.e. by tallying the total number (N) of items and the equivalent percentage (%) frequencies.

Not all the information could be analyzed quantitatively; some of the responses to the open-ended questions consisted of lengthy descriptions that were difficult to categorize, let alone quantify, without losing subtle differences in the responses. To retain (as much as possible) the respondents' own views, qualitative content analysis was employed for data obtained from responses to open-ended questions and interviews. Content analysis is defined by Trochim (2001:165) as the analysis of text documents. Typically, its main purpose is to identify patterns in the content of text. Stemler (in Courtney, Timms and

Anderson, 2005:51) defines content analysis as a "systematic, replicable technique for compressing many words for text into fewer content categories based on explicit rules of coding". The actual procedure was as follows: the material was paraphrased, which meant less relevant passages and paraphrases were skipped; similar paraphrases were bundled and summarized; and thematic analyses of text were employed. With this approach, the researcher was able to identify major themes/threads in the responses.

3.9. Challenges and limitations

Several problems were encountered during the course of this study. Often with research that involves institutions of higher learning, problems of access are bound to occur and complicate matters. The researcher had to wait for authorization in order to conduct his study at DUT, and this delayed the commencement of data collection. Funding was also a problem; the study involved travelling to an outside institution (DUT), and funds were needed for travelling, living expenses and accommodation. There was also a problem caused by the delay in the time it took the university's research office to disburse the funds for this study to the researcher. Understandably, the situation may have been that access is heavily regulated because the persons responsible are held accountable for all the funds. However, the delay proved to be considerable. Interaction with some respondents in an outside institution like DUT also proved difficult because some individuals were openly hostile. During data collection, it was difficult to access certain elements of the sample; particularly the postgraduates at DUT (as already pointed out, most of their postgraduate students, e.g. BTech, MTech, are also working and only come to college in the evening). The collection of data at the DUT coincided with the university's exams, and for this reason, students and staff were busy and could not respond sufficiently to the interviews. Moreover, constraints in time and funding limited the period spent on the field at the DUT to just one week, further limiting the response window for students and staff. In the end, the researcher could simply not afford more time distributing questionnaires and conducting interviews at the university. A critical problem arising from not having enough time and resources was that the researcher could not get a sample of optimum size as with interview responses for academics at DUT.

3.10. Summary

This chapter extensively discussed the methodology, methods, instruments and the sampling methods used in the study. Both quantitative and qualitative techniques were employed for data collection. The survey questionnaire provided most of the quantitative data through structured questions, while the unstructured (open-ended) questions, interviews, and general observation catered for the qualitative end. The limitations faced during the course of the study were also highlighted, this to assist anyone venturing out with a similar investigation in mind in the future. In conjunction with the survey discussed above, a review of literature in the preceding chapter was done to answer the research questions as indicated in the appended table below. The ensuing chapter analyzes data gathered from the field.

Table 3.4: Table for research methodology

Research Question	Research Method(s)	Data collection Instrument(s)
What are the web information needs of students and staff in institutions of higher learning?	Survey	Questionnaire, Interview and Literature Review
How, when and where is web information occurring or sought?	Survey	Questionnaire, Interview , Observation and Literature Review
What are the channels used when searching for information on the web?	Survey	Questionnaire, Interview, Observation and Literature Review
What are the challenges faced by students and staff when searching for information on the web?	Survey	Questionnaire, Interview, Observation and Literature Review
How and to what extent has the web affected the information seeking behaviour/ habits of students and staff in institutions of higher learning?	Survey	Questionnaire, Interview and Literature Review

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATION AND PRESENTATION OF RESULTS

SECTION 1: QUESTIONNAIRE RESULTS

4.1.1. Introduction

In this section, the responses to the questionnaires that were handed out to students and staff at the University of Zululand (Unizul) and the Durban University of Technology (DUT) are organized, compiled, analyzed and interpreted. The general aim of the study was to examine how the web affects the way students and members of staff search for information and to uncover some of the inherent similarities and differences in the web information seeking behaviour of students and staff from universities of technology, which offer practically-oriented diplomas and degrees in technical fields, and comprehensive universities, which offer both theoretically-oriented degrees and practically-oriented diplomas and degrees.

A detailed breakdown of the responses obtained was provided in Chapter 3 (Methodology). In brief, 103 students and 11 academics were targeted at the University of Zululand: 84 (82 %) students, and 9 (82 %) academics responded - an overall response rate of 82% (93). 256 students and 24 academics were targeted at the Durban University of Technology: 139 (54%) students and 14 (58%) academics responded. The overall response rate at DUT was 55% (153).

4.1.2. Demographic characteristics

Demographics (age, gender, geographic location, etc.) allow researchers to delineate the identities/characteristics of a study's respondents. In this section, the target populations were classified by their affiliations and various designations. This delineation was informed by the understanding that information seeking behaviour differs in accordance with different demographics.

4.1.2.1. Distribution by campus affiliation at DUT

To reiterate, the DUT is made up of 7 campuses, namely ML Sultan, Steve Biko, Ritson, City, Brickfields, Indumiso and Riverside. The campuses surveyed in this study (ML Sultan, Steve Biko, Ritson and City) are all currently located in Durban. Brickfields campus (also in Durban) was too far from the other campuses. All the faculties at the DUT are also already represented in the other four, meaning that Brickfields' inclusion was unnecessary. Limitations with respect to the time and the costs involved meant that it was untenable to include the two campuses in Pietermaritzburg (i.e. Indumiso and Riverside).

Unizul is made up of two campuses - the KwaDlangezwa campus and the Richards Bay campus. Only the KwaDlangezwa campus was surveyed. It was felt that the environment at the KwaDlangezwa campus is homogeneous with that of Richards Bay, and one would sufficiently represent Unizul. KwaDlangezwa is also the university's main campus and has all four faculties, while the Richards Bay campus only hosts some departments from the Commerce faculty.

4.1.2.1.1. DUT students' distribution by campus affiliation
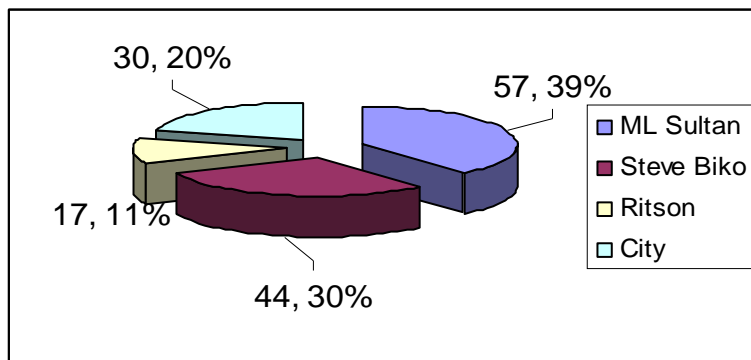
Fig 4.1: DUT students' distribution by campus affiliation

As shown in Figure 4.1 above, the majority of the surveyed DUT respondents were from ML Sultan (57; 39%), followed by Steve Biko (44; 30%), City (30; 20%) and Ritson (17; 11%). ML Sultan and Steve Biko, the two campuses with the most number of

respondents, are also coincidentally the biggest campuses and house the most number of departments.

4.1.2.1.2. DUT staff distribution by campus affiliation

Responses from members of staff were obtained from two campuses, namely ML Sultan (10; 71%) and Steve Biko (4; 29 %). Some of the departments housed within the faculties at Ritson and City are located in ML Sultan and/or Steve Biko. It is therefore likely that some of the staff members from faculties at Ritson and City were actually based in ML Sultan or Steve Biko. A case in point is the Department of Dental Technology, which is in ML Sultan although it falls under the Faculty of Health Sciences at Steve Biko.

4.1.2.2. Distribution by faculty affiliation

Unizul and the DUT each have four faculties. While all of Unizul's faculties are on its KwaDlangezwa campus, the DUT's faculties (see 4.2.1.2) are scattered across all its campuses. The University of Zululand is composed of the Faculties of Arts; Commerce, Administration and Law; Education; and Science and Agriculture. The Durban University of Technology, in turn, is composed of the Faculties of Arts; Accounting and Informatics; Engineering and the Built Environment; and the Health Sciences.

4.1.2.2.1. Distribution of students by faculty

Table 4.1: Distribution of students by faculty

UNIZUL N= 83		DUT N=137	
Faculty	Frequency	Faculty	Frequency
Arts	27 (33%)	Arts	43 (31%)
Commerce, Administration & Law	24 (29%)	Accounting & Informatics (Commerce)	33 (24%)
Science & Agriculture	18 (22%)	Engineering Sciences & the Built Environment	37 (27%)
Education	13 (16%)	Health Sciences	24 (18%)

The response rate across all four faculties in both institutions was relatively high. Most of the students were from the Faculty of Arts, with 27 (33%) respondents from Unizul and 43 (31%) from DUT. Responses from other faculties were also relatively high, i.e. above 13 (16%) at Unizul and above 24 (18%) at DUT.

4.1.2.2.2. Distribution of staff by faculty

Table 4.2: Distribution of staff by faculty

UNIZUL N=9		DUT N=14	
Faculty	Frequency	Faculty	Frequency
Arts	3 (33%)	Arts	-
Commerce , Administration and Law	3 (33%)	Accounting & Informatics (Commerce)	4 (29%)
Science and Agriculture	2 (22%)	Engineering Sciences & the Built Environment	6 (43%)
Education	1 (11%)	Health Sciences	4 (29%)

As revealed in Table 4.2, the faculties with the highest staff representation at Unizul were the Faculties of Arts and Commerce, with 3 (33%) respondents from each. Most staff members from the DUT were from the Faculty of Engineering, Sciences and the Built Environment (6; 43%), followed by the Faculties of Health Sciences and Accounting and Informatics, with 4 (29%) respondents each. No respondents were from the Faculty of Arts.

4.1.3. Medium of information

Media trends have had a huge impact on the academic environment. Users today have to integrate new, changing formats with the traditional formats they have grown accustomed to. The preferred medium of information (in this case) refers to the respondents' most favoured and used mode of obtaining information when searching for information.

4.1.3.1. Students' preferred medium of information
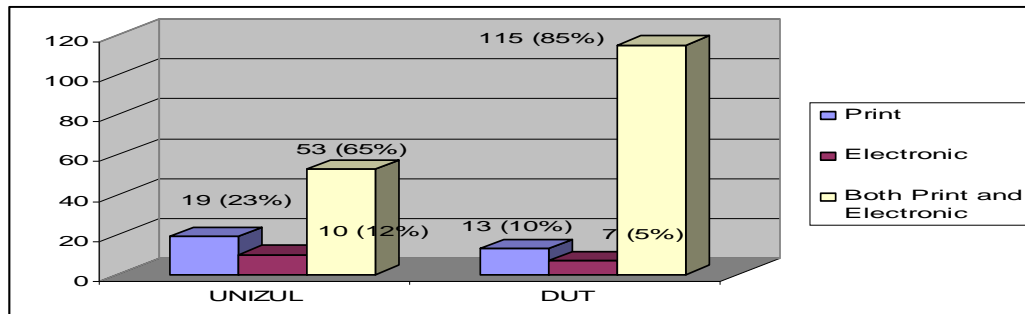
Fig 4.2: Students' preferred medium of information

Figure 4.2 clearly shows that of the three variables (print, electronic, and both print and electronic), the most preferred medium of information, as cited by students from both Unizul and DUT, was both print and electronic sources (53; 65% and 115; 85%, respectively) followed by print sources (19; 23% respondents from Unizul and 13; 10% from DUT). The least preferred medium was electronic, opted for by 10 (12%) respondents from Unizul and 7 (5%) from DUT. These results point to the hybrid use of old (print) and emerging (electronic) sources and not to a total shift or move towards emerging formats. It was nevertheless unexpected that electronic sources would be rated so poorly by students, given the flurry with which they seem to flock to computer laboratories. Evidently, there are still issues to consider when examining students' preferences for information media as these have an effect on how any particular medium will be adopted.

4.1.3.2. Academics' preferred medium of information
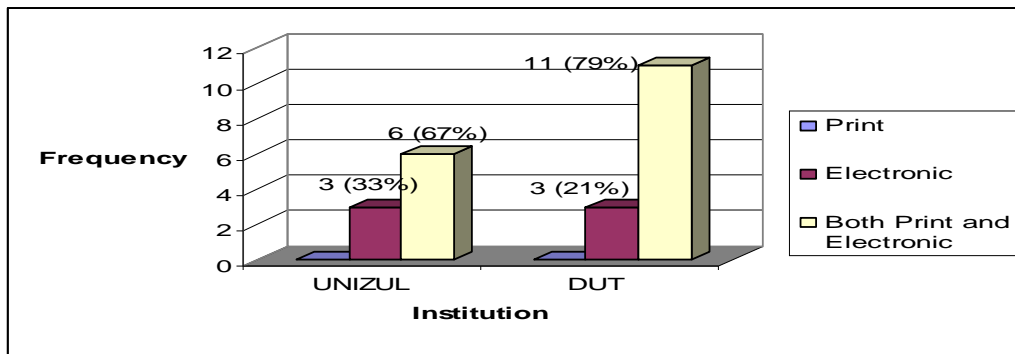
Fig 4.3: Academics' preferred medium of information

Most members of staff at Unizul (6; 67%) and DUT (11; 79%) showed a preference for print media in conjunction with electronic media when searching for information. Electronic media has come to play a crucial role in the information seeking activities of some, as indicated by the 3 (33%) respondents from Unizul and 3 (21%) from DUT. While many declared that they used electronic sources more than they did before, they also stated that they did not solely use them (in place of print sources). Familiarity with and expertise in the use of a variety of electronic media and an awareness of the pros and cons of electronic and print media could perhaps explain this trend.

4.1.3.3. Reasons for choosing an information source

Selecting an information source to satisfy a need is a decision that requires careful consideration. This carries even greater weight when the need is of an academic nature, as would be the case in a university. There is also a wide range of information sources that students and staff members can use to satisfy their needs. In this question, students and staff were required to indicate their reasons for choosing an information source. The results are presented in Table 4.3.

Table 4.3: Reasons given by students and staff for choosing an information source

Reasons for choosing a source	Unizul N=100	DUT N=138
Accuracy	30 (19%)	19 (14%)
Reliability	19 (12%)	17 (12%)
Relevance	26 (16%)	17 (12%)
Convenience/Proximity	4 (9%)	15 (11%)
Accessibility	9 (12%)	13 (9%)
Understandability	27 (18%)	16 (12%)
Speed/ Timeliness	7 (11%)	16 (12%)
Authority	6 (4%)	7 (5%)
Substantiveness, integrity	-	7 (5%)
Completeness	-	6 (4%)
Legal, credible	-	5 (4%)

Although accuracy, reliability, relevance, understandability and timeliness/speed were the reasons alluded to the most, other reasons also recorded high response rates. However, no reason seemed to distinctly stand out in the respondents' choices. This could be taken to mean that a combination of factors influence each of their choices.

4.1.4. Internet connectivity and access

The survey gathered technology access profiles from students and members of staff. The intention was to determine whether respondents had access to the web and how they were connected (types of connections). Also examined was their satisfaction with their connection types. Such knowledge (clients' web user preferences) is necessary for planning and projecting future use.

4.1.4.1. Access to the Internet

In both institutions, all the respondents (both students and staff) had physical access to the Internet. However, there were a few obstacles to optimal access to university facilities (computer labs), particularly for part-time students and students residing outside university residences.

4.1.4.1.1. How students access the Internet

Table 4.4: How students access the Internet

How access to the Internet is obtained	Unizul N=75	DUT N=133
Wired office terminal	10 (13%)	20 (15%)
Wired computer laboratory	46 (61%)	94 (70%)
Wired home PC	2 (3%)	5 (4%)
Wired dormitory PC	-	1 (1%)
Wired both home PC & office PC	2 (3%)	-
Wired office & wired computer laboratory	6 (8%)	-
Wired computer laboratory, wired home	1 (1%)	3 (2%)
Wireless computer laboratory	-	8 (6%)
Wireless dormitory	-	1 (1%)
Wireless office	1 (1%)	1 (1%)
Cell phone	1 (1%)	-

Wired computer laboratories dominated in students' responses as a method of gaining Internet access, as reflected by the 46 (61%) respondents from Unizul and 94 (70%) from DUT. Another appreciably high access point appeared to be the wired office terminal, which was cited by 10 (13%) respondents from Unizul and 20 (15%) from DUT. Students certainly seemed to use more wired campus facilities to access the web than home facilities. Demand for the private use of innovative technologies like wireless access was not reflected in a reasonable surge in use, as indicated by the few instances reported of wireless access at home, in the office, or in laboratories or dormitories at both institutions. Although only one (1%) cited cell phone access, it is believed that a larger number accesses the web this way.

4.1.4.1.2. How staff members access the Internet

Table 4. 5: How staff members access the Internet

How access to the Internet is obtained	Unizul N=7	DUT N=14
Wired office terminal	5 (71%)	5 (36%)
Wired computer laboratory	-	4 (29%)
Wired home PC	-	1 (7%)
Wired home PC & office PC	2 (29%)	4 (29%)

With respect to academics, wired office terminals accounted for most staff members' access to the web (5; 71%, Unizul and 5; 36%, DUT). While no staff members accessed the Internet via the computer laboratories at Unizul, there were 4 (29%) in this category at DUT. The remaining 2 (29%) respondents from Unizul had wired home PC and office PC access, compared to 4 (29%) with the same at DUT.

4.1.4.2. Internet connection types

Various connection services can currently be used to connect homes, businesses, and organisations to the Internet. For access to the Internet in any educational venue, one must be equipped with an Internet connection either by means of a telephone or cable network and a modem, or via a direct connection. Many more evolved states of Internet connectivity are also being explored today, particularly wireless access through mobile technologies. This study investigated the types of Internet connections Unizul and DUT offer their students and staff. The aim was to understand how these two groups connect to the Internet, including the advantages and disadvantages of each particular type of connection.

4.1.4.2.1. Internet connection types used by students

Table 4.6: Internet connection types used by students

Internet connection types	Unizul N=71	DUT N=133
Dial up/ regular modem	9 (13%)	5 (4%)
DSL (Digital subscriber Line)	1 (1%)	-
ADSL (Asynchronous Digital Subscriber Line)	-	4 (3%)
Cable Modem Connection	11 (15%)	4 (3%)
Wireless	2 (3%)	-
I don't know	45 (63%)	117 (88%)
Dial up, cable, wireless	1 (1%)	-
Dial up & cable	1 (1%)	-
ISDN (Integrated Services Digital Network)	-	1 (1%)
Institutional line	-	1 (1%)
Dial up, wireless	2 (3%)	-

Most of the students (45; 63%, Unizul and 117; 88%, DUT) did not know the connection type they used to gain access to the Internet. For this reason, evaluating whether or not they were satisfied with their Internet connection type was difficult. Nevertheless, 11 (15%) respondents from Unizul stated that they used cable modem access compared to 4 (3%) from DUT. There were 9 (13%) respondents from Unizul and 5 (4 %) from DUT who reportedly used dial-up connections. Inconsequential responses of less than 3% were recorded against other Internet connection types.

4.1.4.2.2. Internet connection types used by staff

Table 4.7: Internet connection types used by staff

Internet connection types	Unizul N=11	DUT N=16
Dial up/ regular modem	2 (18%)	-
DSL (Digital subscriber Line)	-	-
ADSL (Asynchronous Digital Subscriber Line)	1 (9%)	3 (19%)
Cable Modem Connection	3 (27%)	6 (38%)
Wireless	1 (9%)	-
ISDN (Integrated Services Digital Network)	1 (9%)	1 (6%)
I don't know	2 (18%)	5 (31%)
Institutional line	-	1(6%)

There were multiple responses to this question; some of the staff members had more than one type of Internet connection. The number of responses therefore does not tally with the responses obtained. Most staff members stated that they connected to the Internet using cable modem connections (3; 27%, Unizul and 6; 38%, DUT). Two (18%)

respondents reported connectivity using dial-up connections, while none had this form of access at DUT. As was the case in 4.4.4.1 with students, academics were not aware of the technical issues pertaining to their access to the Internet.

4.1.4.2.1. Students' satisfaction with method of Internet/Web access

Table 4.8: Students' satisfaction with method of Internet/web access

Method of access	Are students satisfied?					
	N= 93 (Unizul) N = 87 (DUT)					
	Yes		No		Not sure	
	Unizul	DUT	Unizul	DUT	Unizul	DUT
Wired office terminal (desktop/ laptop)	12;60%	23;100%	7;35%	-	1;5%	-
Wired computer lab, library/ info centre	21;37%	16;31%	32;56%	32;62%	4;7%	4; 7%
Wired home PC	6;86%	3;75%	-	1;25%	1;14%	-
Wired dormitory PC	-	-	1	-	-	-
Wired home & office PC	3;75%	1	1;25%	-	-	-
Wireless office terminal	1	-	-	-	-	-
Wireless computer lab/ library/ info centre	-	4;100%	-	-	-	-
Wireless Home PC	1	3;100%	-	-	-	-
Wireless both home PC & office PC	1	-	-	-	-	-
Wireless dormitory PC	-	-	-	-	-	-
Mobile phone access	1	-	-	-	-	-

In general, students indicated that they were not satisfied with access through wired computer laboratories. Only 21 (37%) students from Unizul and 16 (31%) from DUT stated that they were content with this method of access. A large number of students (32; 56%, Unizul and 32; 62%, DUT) were unhappy. However, many students were content with wired office access, confirmed by 12 (60%) respondents from Unizul and all 23 (100%) from DUT. A moderate number from Unizul (7; 35%) said they were not satisfied and only 1 (5%) was not sure. In both institutions, it generally appears as though access to the Internet via wired office terminals is better or more efficient than other forms of access. Regrettably, most students are not beneficiaries of this improved access. A small group had access through both wired office terminals and home PCs: 3 (75%) from Unizul were satisfied and 1 (25%) was not, and the one individual from DUT with this kind of access was satisfied. Other methods of access (such as wireless connections

or cell phone access) were not common, even though the respondents who used them appeared more satisfied.

The use of wireless access could benefit a lot of academic institutions. Two of the main advantages of wireless access are convenience and mobility; wireless networks allow users to access network resources from nearly any convenient location within their primary networking environment (home or office) or outside their normal work environment (airports, etc.). This is in tandem with the growing saturation of laptop computers and other handheld gadgets that provide online access and (unlike desktop computers) mobility. With wireless access, there are no phone lines, extra cords or external modems to get tangled up in. These features offer a lot of convenience in an academic setting, e.g. access in dormitories or outside in recreational areas (parks or playing fields), especially to students. The low use of wireless access reported in this study means that its numerous benefits are not being taken advantage of.

4.14.2.2. Staff members' satisfaction with method of Internet/Web access

Table 4.9: Staff member's satisfaction with their method of Internet/ Web access

Method of access	Are staff members satisfied? N= 11 (Unizul) N = 14 (DUT)					
	Yes		No		Not sure	
	Unizul	DUT	Unizul	DUT	Unizul	DUT
Wired office terminal (desktop/ laptop)	4;57%	9;90%	3; 43%	1;10%	-	-
Wired computer lab, library/ info centre	1;100%	3;75%	-	1;25%	-	-
Wired home PC	2;100%	1;20%	-	2;40%	-	2;40%
Wired dormitory PC	-	-	-	-	-	-
Wired home & office PC	-	-	-	-	-	-
Wireless office terminal	-	-	-	-	-	-
Wireless computer lab/ library/ info centre	-	-	1;100%	-	-	-
Wireless Home PC	-	-	-	-	-	-
Wireless both home PC & office PC	-	-	-	-	-	-
Wireless dormitory PC	-	-	-	-	-	-
Mobile phone access	-	-	-	-	-	-

As reflected in the table above, most of the academics interviewed in both institutions were satisfied with wired office access (4; 57% at Unizul, and a significantly larger

number at DUT: 9; 90%). All the academics from Unizul with home access (2; 100%) were content, while the majority at DUT were either unsure (2; 40%) or not satisfied (2; 40%). Other Internet connection types were not common. The latter are probably for private home use and most users were reportedly pleased with their performance.

4.1.4.3. Availability of time and access to the web for students

The objective of the question: 'do you as a student, have enough time and access to the web from whichever facility you use?' - was to determine whether students had ample time to use their institutions' facilities for web access and if there were adequate facilities for satisfactory access.
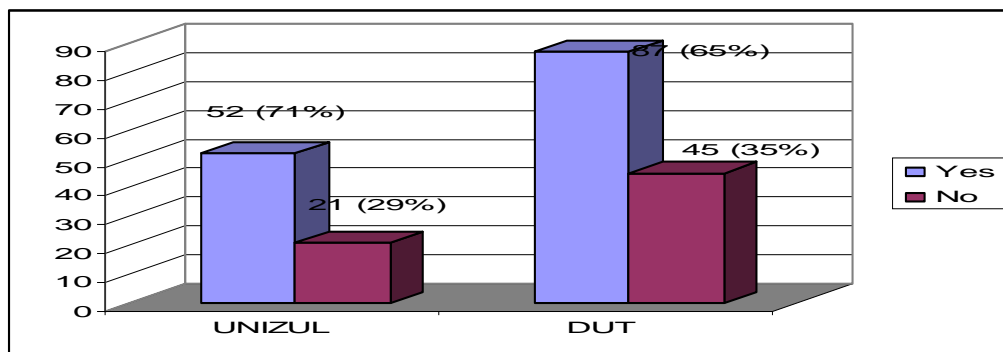
Fig 4.4: Students' availability of time and access to the web

Most students at Unizul (52; 71%) and DUT (87; 65%) stated that they had enough time and sufficient access to the web from the facilities on offer. Twenty one (29%) respondents from Unizul stated that time and access were insufficient, compared to 45 (35%) from DUT. In contrast to the appreciatively positive responses recorded in the interviews, more respondents complained that time and access was insufficient in the questionnaires. Generally, the impression one gets from the students' responses is that there are abundant infrastructural resources to provide ample access to the web. However, this may not altogether be the case; the researcher observed that although students often got the chance to access the web, the time allocated to them in laboratories and libraries was often insufficient. In computer laboratories, they were often limited by restrictive opening hours, clashes with tutorials, and general overcrowding. It is unfortunate that facilities do not correspond with the growing student populations at both institutions.

4.1.4.4. Availability of time and access to the web for academics

Unlike students, it was expected that staff members would enjoy a higher and better provision of Internet facilities. However, it was believed that because of their other duties, they would have problems with sourcing enough time to search for information on the web. The responses to this question are presented in Fig 4.5.
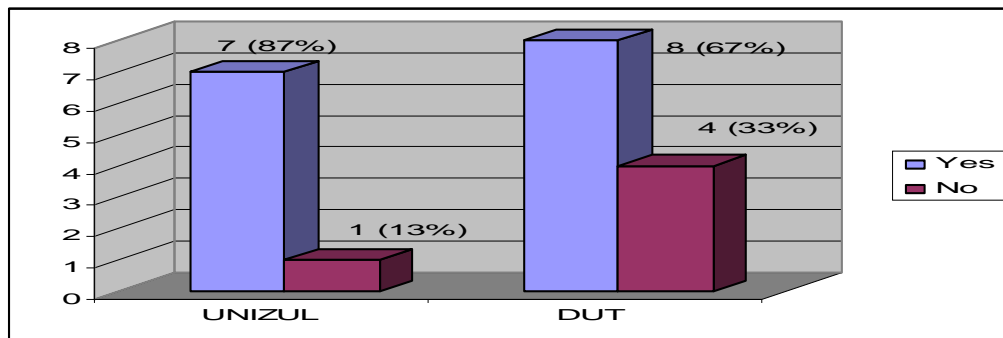
Fig 4.5: Academics' availability of time and access to the web

The results above indicate that most academics in both institutions were satisfied with the time allocated to them for web information gathering activities. Of the 8 members of staff from Unizul, 7 (87%) said time was sufficient, while 8 (67%) of the 12 DUT respondents indicated likewise.

4.1.4.5. Students and academics' reasons for lack of access

Respondents who indicated that they did not have enough time and/or sufficient access to the web were asked to state why they believed this was so. One of the main reasons given was that there was limited space and few computers, which led to overcrowding. There were also complaints about blocked sites. Medical students felt that a lot of medical sites were targeted because screening programs classify some of the content as illicit or pornographic. Complaints were also raised about the unavailability or lack of systems' upgrades, which may often result in the incompatibility of operating systems. Students cited the problems encountered when trying to downgrade from Microsoft Office 2007 to earlier versions, such as the 2003 package. Many respondents with computers or laptops with Office 2007 stated that they failed to open this package in earlier versions. One respondent with Internet access at home intimated that he felt forced to upgrade since hardware that supports Windows 98 is no longer sold today. Others were unimpressed

with the generally poor Internet connectivity. Overall, it seems that constraints of Internet connectivity, particularly on the part of students, are problems both institutions continue to battle with. Academic staff, on the other hand, complained about their lack of time for research because of busy work schedules and heavy teaching loads.

4.1.5. Web information needs

One of the study's main objectives was to identify the web information needs of students and staff. The web has become a major source of information, news and entertainment, making it a medium that students and staff are likely to rely on considerably when attempting to fulfil their information needs.

4.1.5.1. Reasons for searching for information on the web

This question essentially sought to find out what students and staff actually do on the Internet.

4.1.5.1.1 Why students search for information on the web

	Assignments	Research	Study	Communication	Entertainment	General awareness	Job/employment	News
UNIZUL	39	29	14	26	17	16	0	2
DUT	24	25	2	9	3	3	3	0
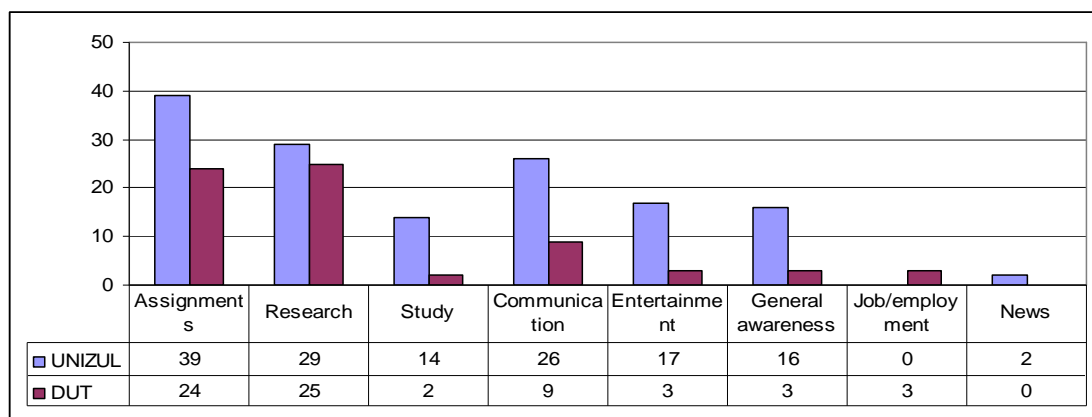
Fig 4.6: Students' reasons for searching the web

Predominantly, students appeared to search for information related to their studies, their research, to be informed of world events, and to communicate and play. While most of the respondents from Unizul (39; 27%) used the web for assignments, their counterparts at DUT primarily sought information for research purposes (25; 36%). Twenty nine (20%) respondents used the web for research at Unizul and 24 (34%) for assignments at DUT. Other reasons cited by a considerably large number of students were communication, entertainment, and general awareness. Insignificant proportions made

use of the web for news or to search for employment. Despite this, there is reason to believe that in academia, the information seeker is gradually embracing the web for purposes outside the core activities of learning, teaching and research. This was reflected by the few instances recorded of 'other' purposes, such as hotel and travel ticket bookings, and banking.

4.1.5.1.2. Why staff members search for information on the web

	Assignments	Research	Study	Communication	Entertainment	Teaching	General awareness	Banking	News	Bookings of air
UNIZUL	3	8	3	8	2	6	5	0	0	0
DUT	4	12	2	6	2	9	3	1	1	3
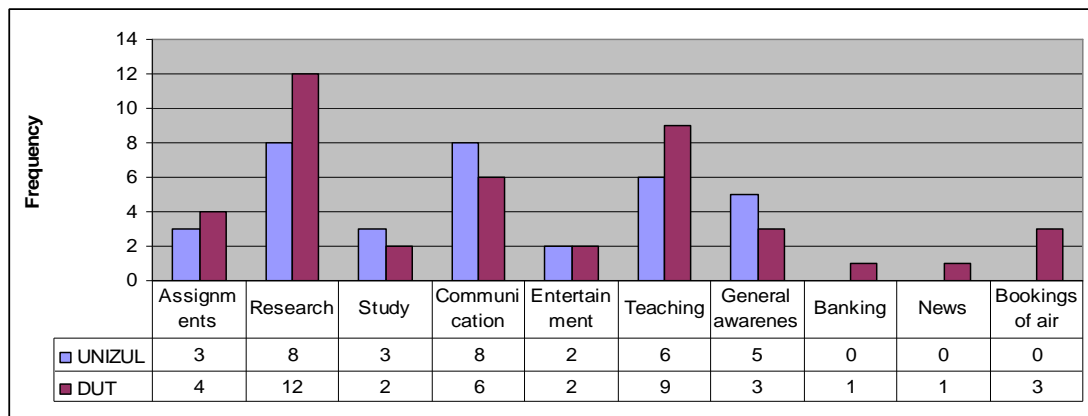
Fig 4.7: Staff members' reasons for searching for information on the web

The results above indicate that most staff members used the web for research at Unizul (8; 23%) and DUT (12; 28%). Teaching was also highly regarded, as reflected by the 6 (17%) respondents from Unizul and 9 (21%) from DUT, as was communication with 8 (23%) respondents from Unizul and 6 (14 %) from DUT. Other purposes were inconsequential.

4.1.6. Web information channels

The web is composed of a number of information channels that host various online resources students and staff can source for information. This study aimed to find out which of these channels students and staff members use or rely on and why. Owing to various reasons, the use of or familiarity with various web channels differs.

4.1.6.1. Students' reliance on web information channels

From the set of identified channels listed in Table 4.10, this question sought to determine which of these channels students rely on the most.

4.1.6.1.1 Students' use of web information channels

Table 4.10: How frequently do students use web information channels?

Channel	Frequency of Use							
	Never		Less than Once a month		Weekly		Daily	
	Unizul	DUT	Unizul	DUT	Unizul	DUT	Unizul	DUT
OPACs	20;28%	26;24%	28;38%	45;41%	18;24%	26;24%	9;12%	12;11%
Online Databases	39;56%	33;32%	16;23%	36;35%	13;19%	25;25%	2;3%	8;8%
Search engines	1;1%	1; 1%	6;8%	10;7%	29;39%	47;36%	38;51%	73;56%
Subject portals	32;46%	35;36%	21;30%	30;31%	11;16%	19;20%	5;7%	12;13%
Discussion lists & Newsgrps	31;52%	21;35%	14;23%	28;47%	14;23%	8;13%	1;2%	3;5%
Websites	3;4%	4;5%	12;18%	4;5%	23;34%	34;41%	30;44%	34;41%
Email	2;7%	3;3%	18;25%	9;10%	19;27%	25;28%	29;41%	53;59%
EDDs	30;50%	29;50%	14;23%	13;22%	14;23%	12;21%	4;3%	4;7%

Students showed, on average, high levels of familiarity with various web channels. This is generally indicative of the growing use of web services in the university environment. As we've seen in Chapter 2, the development of the Internet and the World Wide Web has given rise to a wide range of new services. As noted by Fidel et al. (as cited in Patitungkho and Deshpande, 2005:n.p), because of the web, "Innumerable types of information, in a large variety of containers and in many different locations, are all available in one place." Patitungukko and Deshpande (2005:n.p) agree, adding, "In the modern society, the types of information and the media which present them have become manifold and multifarious, offering men and women a vast selection." Both assertions prove true in the responses. While most electronic resources were used by a large proportion of the respondents, the frequency of use was clearly dominated by a few, specifically e-mail, websites and search engines, while others were unpopular and were only browsed in rare instances. Therefore some information channels are generally perceived to be essential when searching for information, while others are ignored or under-utilized. There is surprisingly very little to show that the web is heavily used for any serious research. Possibly, users consider library resources to be more trustworthy and credible than web search engines, Internet encyclopaedias, and other freely available

web services, although the typical information seeker is still attracted to the web's dynamism and flexibility.

The students' responses to the frequency of use for each of the channels in Table 4.10 are presented and discussed in detail in the subsections that follow. This question assumed that there is a relationship between frequency of use and reliance on a particular channel. As indicated in Table 4.10 above and confirmed by interviews, respondents relied heavily on the channels that they were more familiar with.

4.1.6.1.1.1 Online Public Access Catalogues (OPACs)

The use of online public access catalogues (OPACs) generated a total of 75 responses from Unizul and 109 from DUT. Both Unizul and DUT's students appeared to use OPACs infrequently. Forty eight (66%) negative responses were received from Unizul; respondents indicated that they had either never used OPACs, or had done (or continued to do) so 'at least once a month'. 71 (65%) respondents from DUT reported the same. On the whole, reports of use were very low despite the assistance that online catalogues provide by pointing users to scholarly and scientific information in a library. This could suggest that library use is waning. However, it could also indicate that library instruction and orientation programmes are ineffective. Successful online catalogue searches are very dependent on a user's computer skills and his/her knowledge of OPACs' features (skills that students perhaps do not possess).

4.1.6.1.1.2. Online databases

The use of online databases was unexpectedly low in both institutions. Seventy respondents answered this question at Unizul, of whom 55 (79%) responded negatively. At DUT, 65% also responded negatively. In principal, database retrieval is highly sophisticated compared to most other Internet tools, a likely reason for this outcome. The problem is that these universities both spend a lot of money on licenses paid to online database vendors for quality services that students appear to use flippantly. It would seem therefore that valuable information (contained in databases) is abandoned in favour of easier-to-use but often less reliable, accurate, and objective sources. This dilemma is also noted by Dron and Anderson (2009:n.p), that in the academic web information

environment, the problem now has less to do with information retrieval and more to do with getting students to select relevant resources while ignoring those that are less so. It should perhaps also be noted that most of the respondents in this survey were undergraduates who possibly relied more on recommended textbooks and used the web for other less scholarly activities.

4.1.6.1.1.3. Search engines

As was anticipated, search engine use proved to be immensely popular. Most of the respondents from Unizul reported that they used search engines on a daily (38; 51%) or weekly basis (29; 39%). DUT respondents also used them frequently (73; 56%, daily or 47; 36%, weekly). Perhaps this is because it is the easiest and fastest way to access resources for assignments and research. Web crawling conforms to the principle of least effort, whose boundaries search engines, particularly Google, continue to push (e.g. Google Chrome). Literature (Brophy and Bawden, 2005) suggests that as the web continues to grow exponentially, search engines that cater for the full-text searching of academic texts (again Google leads in this endeavour) will most likely grow more popular than other scholarly channels of information on the web. The two authors contend that searching tools have played a major role in transforming the information environment by providing more rapid access to a greater volume of material. They note that of these, the Google search engine has come to dominate in virtually all respects.

4.1.6.1.1.4. Subject portals

Subject portals proved to be mostly unpopular among the students. Fifty three (76%) of the 69 responses to this question from Unizul were negative (only 16 or 24% responded positively). Similar results were obtained at DUT, with the majority (65; 67%) responding negatively (31 or 33% responded positively). Subject portals collect high-quality, well-researched information, gathered to support research in a particular subject discipline. The resources are formulated and described by information specialists in the field (such as science librarians). Those who do not make use of these portals therefore lose out on tailor-made information. Of course, it is possible that the use of these portals is low because students are unaware that they exist, perhaps because of poor marketing by libraries.

4.1.6.1.1.5. Discussion lists and newsgroups

Globally, discussion lists, newsgroups and blogs have grown in popularity as information channels. Although many often question bloggers' knowledge of the subjects they discuss, blogs are nonetheless an insightful way of obtaining information. Discussion lists and newsgroups were not used by 45 (75%) respondents from Unizul, while 49 (82%) from DUT reported the same. Lists and newsgroups can be valuable because they often provide plenty of up-to-date information and discussions covering different topics, providing, in essence, a free current-awareness service. They also give both experts and novices the opportunity to state their views, which some believe is their undoing. It was initially thought that because of the above and by way of their 'newsy' nature, their use would be relatively high, but this proved not to be the case.

4.1.6.1.1.6. Websites

Searching for information by linking directly to a website's Uniform Resource Locator (URL) is one of the most common ways of finding information on the web. Results confirm that this is very popular at both institutions. Of the 68 respondents from Unizul, 53 (78%) responded positively (23; 34%, weekly and 30; 44%, daily). Likewise at DUT, 76 respondents affirmed their use; 68 (82%) from this set were frequent users (with equal percentages of 34; 41%, weekly and 34; 41%, daily).

4.1.6.1.1.7. Email

Communication has been identified as one of the main reasons students go online. There is a growing preference for the use of the email in official and personal correspondence. Unizul reflected this with 48 (68%) respondents who cited that they accessed their mail on a daily or weekly basis. Similarly, a positive response (78; 87% either weekly or daily) was obtained from DUT. The popularity of email services, as indicated above, could be credited to the fact that they effectively and quickly meet the students' general desire to communicate and/or interact. The Internet is widely considered to be a meeting place that enables students to exchange scholarly and non-scholarly information, and emails make it easier for users to share their work with others and benefit from others' work.

4.1.6.1.1.8. Electronic document delivery services

No single library could ever be fully self-sufficient or single-handedly manage and provide access to all existing information resources because of relentless Net expansion and new additions to already vast reservoirs of information. Electronic Document Delivery services (EDDs) are an important way of supplementing resources that one may not have in one's parent institution. At Unizul, there were 62 responses to this question, and 44 (73%) of these were negative. Correspondingly, 42 (72%) of the 59 responses received from DUT were also negative. EDDs are specialised services that often get offered through selective dissemination in many institutions. These services usually come at a price; the results therefore perhaps suggest that only a limited number of respondents were willing to pay or could afford to pay for additional services/sources. On the other hand, the services that they may have been willing to pay for were simply not offered. Thus it is not surprising that students, and undergraduates in particular, would not rely on EDDs.

4.1.6.2. Academics' reliance on web information channels

4.1.6.2.1. Use of web information channels by academics

Table 4.11: How frequently do academics use web information channels?

Channel	Frequency of Use							
	Never		Less than Once a month		Weekly		Daily	
	Unizul	DUT	Unizul	DUT	Unizul	DUT	Unizul	DUT
OPACs	2;25%	2;22%	3;37%	6;67%	2;25%	1;11%	1;13%	1; 11%
Online Databases	2;29%	-	3;43%	5;36%	2;29%	8;57%	-	8;57%
Search engines	-	-	-	-	2;29%	3;23%	5;71%	3;23%
Subject portals	2;50%	4;80%	2;50%	-	-	1;20%	-	1;20%
Discussion lists & Newsgrps	1;25%	3;43%	2;50%	1;14%	1;25%	1;14%	-	1;14%
Websites	2;25%	1;11%	1;13%	1;11%	-	2;22%	5;62%	2;22%
Email	-	-	-	1;8%	1;17%	2;17%	5;83%	2;17%
EDDs	2;67%	1;33%	1;33%	1;33%	-	1;33%	-	1;33%

Staff members' primary information channels were search engines, websites, online databases and email. These channels are the same channels that students used frequently, as reported in section 4.1.6.1.1 earlier. This would suggest that both students and staff are motivated by the same reasons in their choice and use of these channels.

4.1.6.2.1.1. Online Public Access Catalogues

The libraries' online public access catalogues (OPACs), which serve as a gateway to a multiplicity of information sources, are one of three primary searching tools. Others are databases, including indexes with abstracts, many with full-text content, and the web, including search directories and search engines (Mildred F. Sawyer Library, n.d:1). The use of the OPACs at the two institutions was infrequent; most of the surveyed academics reported using them at least once a month (37% at Unizul and 67% at DUT). Much of the aversion for staff members, like students, could stem from unfavourable perceptions about libraries. Furthermore, it is difficult to entice users into making attempts to locate material through the OPACs because they don't conform to the overall least-effort tendency associated with other searching tools like the web (search engines and directories).

4.1.6.2.1.2. Online databases

The results suggest moderately high use of online databases by members of staff. Online database use was not regular at Unizul, with most (3; 43%) staff members stating that they used databases at least once a month. DUT was more regular, as shown by the 8 (57%) who reported that they used them every week. Unizul's results are out of tune with general expectations, in the sense that it was thought that database use among staff would be high because of research.

4.1.6.2.1.3. Search engines

The use of search engines was very high at both institutions. On a four point scale of daily, weekly, once a month and never, all the staff members reported that they used them either daily (2; 29% at Unizul and 3; 23% at DUT) or weekly (5; 71% at Unizul and 10; 77% at DUT).

4.1.6.2.1.4. Subject portals

Subject portals appeared to be tremendously unpopular among staff members. Use was very low at Unizul, with all the respondents indicating that they either used them once a month (2; 50%) or had never used them at all (2; 50%). Likewise at DUT, 4 (80%) indicated that they had never used them, while only 1 (20%) reported that he/she used them on a weekly basis.

4.1.6.2.1.5. Discussion lists and newsgroups

The general use of discussion lists and newsgroups appears to fall in the low to average category, i.e. some stated that they had never used them, while others indicated that they used them once a month or on a weekly basis. Discussion forums generally contain news-like information, which is not generally viewed as scholarly. This could perhaps explain why they are not highly favoured by academics.

4.1.6.2.1.6. Websites

Websites were found to be one of the most highly used channels by academics. Most respondents stated that they used them daily (5; 62%, Unizul and 5; 56%, DUT).

4.1.6.2.1.7. Email

All (5; 83%) but 1 (17%) of the staff members from Unizul stated that they used email on a daily basis. Nine (75%) staff members from DUT used email daily, 2 (17%) weekly and 1 (8%) only once a month. None of the respondents indicated that they had never used email, which is a measure of its popularity among academics.

4.1.6.2.1.8. Electronic document delivery services

Electronic document delivery services were found to be one of the least used channels on the web. Most staff members at Unizul (2; 67%) claimed to have never used them, with only 1 (33%) citing that he/she used them once a month. At DUT, use was more spread out, with 1 (33%) indicating never, 1 (33%) once a month, and 1 (33%) on a weekly basis.

4.1.7. Web skills

The web is an environment that requires its users to possess a wide range of computer and computer-related competencies. The ability to use the web effectively is crucial to the

successful completion of an information seeking task. Therefore developing and nurturing the skills that enable effective use is vital in today's learning. This means that one of the defining attributes of a web information user today relating to the web information environment is the quality of the information he or she has obtained.

4.1.7.1. Students' possession of web-related skills
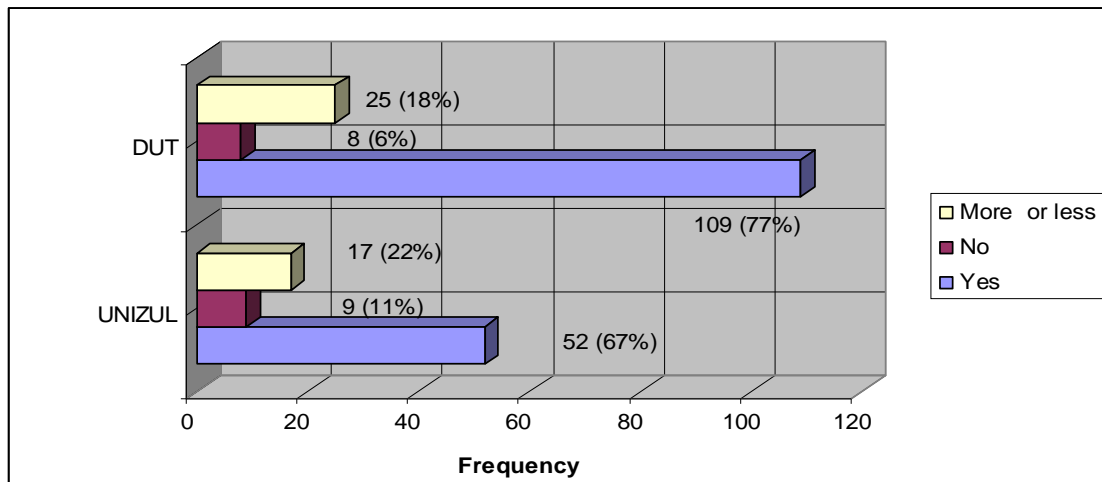
Fig 4.8: Students' possession of web-related skills

The majority (52; 67%) of the students from Unizul reported that they could use the Internet, whereas an even bigger component from DUT (109; 77%) confidently responded that they were skilled web users. These impressive figures appear to contradict the situation on the ground, where behaviour suggested otherwise. While a large number claimed to have skills, it is a fact that a significant number of the respondents first encountered the Internet and World Wide Web at their respective tertiary institutions. Lecturers maintain that many students do not perform well when asked to show how they perform tasks online. Based on the researcher's own observation, students appear to be generally familiar with emailing, web processing, web browsers, and a few other services, and may cope with little assistance. However, many struggle with higher level tasks. This was confirmed when respondents were asked if they had ever received any web training.

4.1.7.2. Staff's possession of web-related skills
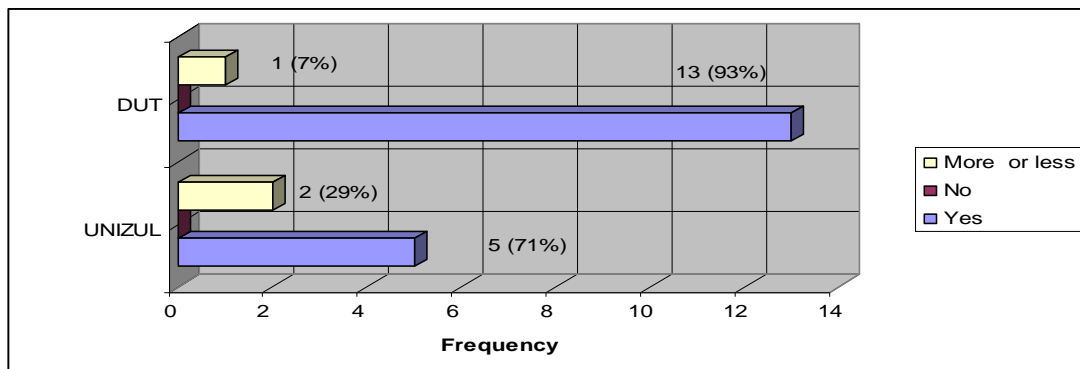
Fig 4.9: Staff's possession of web-related skills

Predominantly, members of staff from both institutions appeared to possess the skills necessary to use the Internet (5; 71%, Unizul and 13; 93%, DUT). 2 (29%) respondents from Unizul and 1 (7%) from DUT indicated that their skills were more or less sufficient. None of the respondents from either of the institutions said they had no skills whatsoever.

4.1.7.3. Formal web training

The Internet and the web are fairly new technologies in the information seeking field, although computer mediated searching is a little bit older. Students and academics may therefore lack skills that would enable them to effectively search the web for information. Users usually have to overcome a lot of skills-related challenges before they can confidently incorporate a new technology into their everyday activities. University students come from different backgrounds; some have been introduced to the web before entering a tertiary institution and find their way around it with ease, while others first encounter a computer at a university. For some members of staff, certain factors would have denied them the opportunity to obtain web information seeking skills. Older generations were schooled when the web was still in its infancy or had not been developed altogether. Notably, as information technologies develop, the information seeking activities of users have to go through changes and adjustments (in order for the users) to keep up. Academics could either have obtained their information seeking skills prior to the popularity of the web-based information services, or attain(ed) new skills through self-teaching with sporadic instances of formal training. With this in mind, the

researcher sought to determine whether the academics and students in the two institutions had received any formal web training.

4.1.7.3.1. Students' formal web training
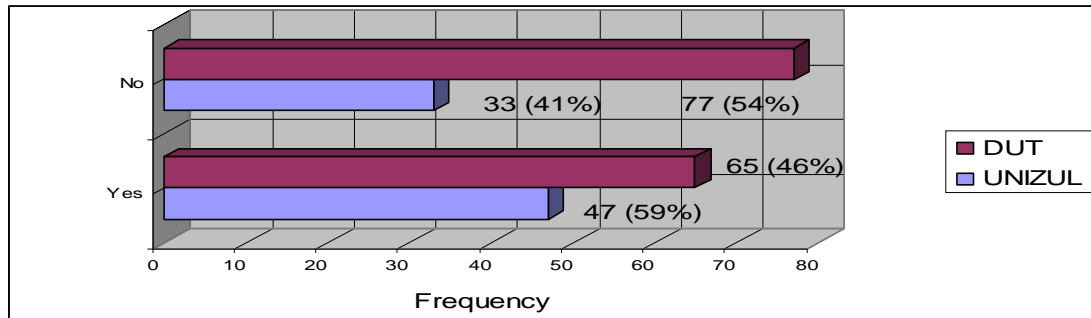
Fig 4.10: Students' formal web training

A number of students stated that they had never received formal Internet/web training (33; 41%, Unizul and 77; 54%, DUT). This suggests that most respondents were poorly equipped in their ability to use web technologies for information seeking activities, particularly at DUT where more respondents had not received any training. Forty seven (59%) respondents from Unizul had received formal training, compared to 65 (46%) at DUT.

4.1.7.3.2. Academics' formal web training
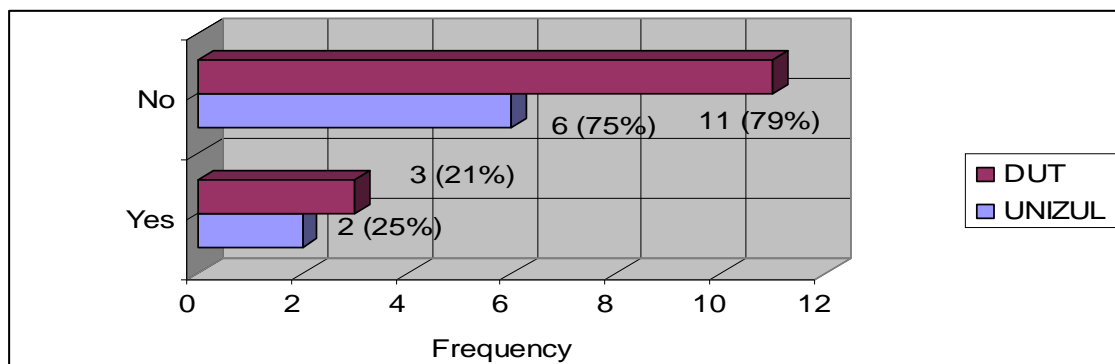
Fig 4.11: Academics' formal web training

Most of the academics had never received any formal web training. Of the 8 respondents from Unizul, the majority (6; 75%), like their colleagues from DUT (11; 79%), had not been trained.

4.1.7.4. Usefulness of the training received

This question was directed at those who had received training to determine whether the training they had obtained was useful. The researcher sought to establish whether there is a need for further training initiatives to be undertaken to equip students and staff with web-related skills. By determining the usefulness of the training received, institutions would be evaluating their training programmes to see where they may need to improve or devise better ways to make the training effective.

4.1.7.4.1. Usefulness of the training received by students
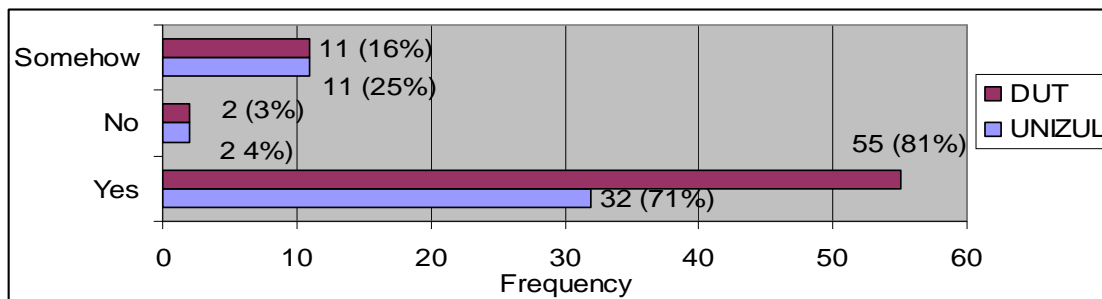
Fig 4.12: Usefulness of the training received by students

There was an overall consensus from students at both institutions that the training received was useful. 32 (71%) respondents from Unizul confirmed that it was useful, while 55 (81%) from DUT also alluded to the same.

4.1.7.4.2. Usefulness of the training received by staff

This question was set to determine the perceived value of the training received by some of the academics because some members of staff see no need for training, arguing that they can learn independently. Others, however, may require training to be provided, and so the question also sought to solicit the nature of the training required. The results obtained are presented in Fig 4.13 below.
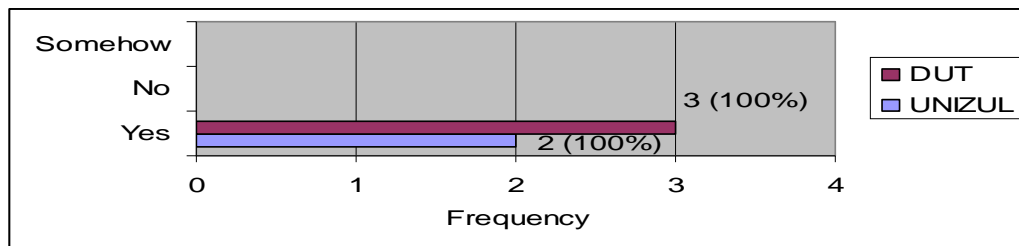
Fig 4.13: Usefulness of the training received by staff

The members of staff who received training from both institutions agreed that the training received was useful (2; 100%, Unizul and 3; 100%, DUT). Thus academics, just like students, appreciate the importance of formalized training when it comes to web information seeking and use.

4.1.7.5. If received, would such training have been useful?

This section sought to determine from the respondents who did not receive any training what they believed the impact of the training would have been. The responses obtained are presented below.

4.1.7.5.1. Supposed usefulness of the training for students

Views were first solicited from the students who had not received formal training on the web. The aim was to determine what the perceived impact they assumed training would have on their web information seeking strategies. The results are presented in Fig 4.14 below.
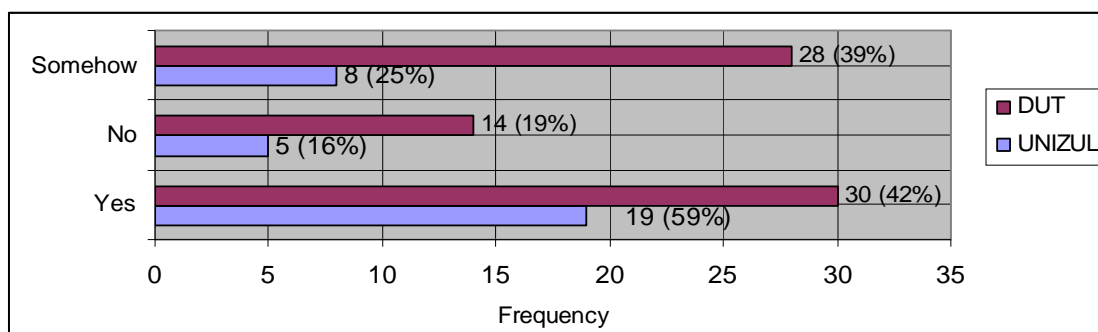
Fig 4.14: Would such training have been useful for students?

Most of the students (19; 59%, Unizul and 30; 42%, DUT) believed that the impact would be positive. Only 5 (16%) and 14 (19%) responded that the impact would be

negative at Unizul and DUT respectively. A moderate fraction of the respondents from Unizul (8; 25%) indicated 'somehow', as did 28 (39%) from DUT. As revealed in Fig 4.14, a large segment of the respondents believed that with formal training, they could become better and more effective web users. All the same, a small portion did not believe that formal training would have made much difference. It is assumed that this group mainly consists of those who were self-taught. This group stands firm in their belief that the web is a medium that allows one to conduct a number of activities (such as basic searching) with little or no training at all. Because web search engines and other Internet services are equipped with various help features (spelling corrections, suggested alternatives to search queries, help functions that lead novices in their searches, etc.), there is support for the idea that armed with an insignificant level of (web) literacy and without much precision, one can obtain results that are usually good enough.

4.1.7.5.2. Supposed usefulness of the training for members of staff

As with the students, the views of staff members who had never received training were assessed to determine what (if any) impact training would have had. Figure 4.15 below presents the responses.
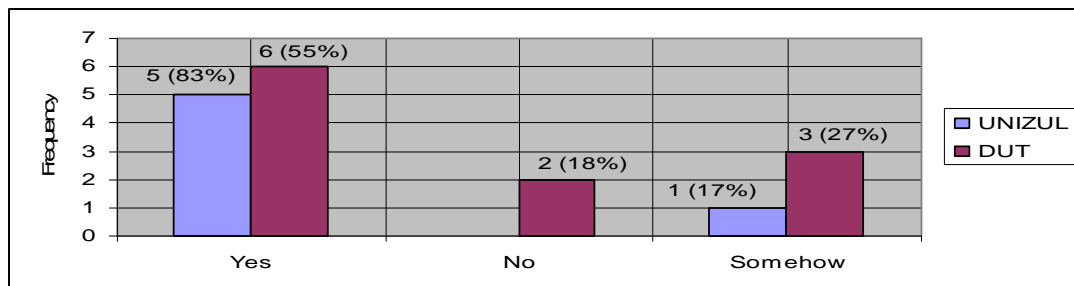
Fig 4.15: Would such training have been useful for members of staff?

Most of the academics appeared convinced that formal training would have had an impact on their information seeking activities. A large number from Unizul (5; 83%) and a moderate number from DUT (6; 55%) confirmed that the impact would be positive. None of the respondents from Unizul stated that it would not have an impact, compared to 2 (18%) from DUT. One (17%) respondent from Unizul and 3 (27%) respondents from DUT were unsure of the impact. Few respondents doubted the impact of training believing that they were competent enough to learn by themselves. The RIN

report, 'Mind the Skills Gap' of 2008 (cited by Fieldhouse, 2009:n.p), raised similar questions about whether researchers perceive the need for skills training.

4.1.7.6. Suggestions on how to equip more people with web skills

A number of suggestions were provided with respect to what the surveyed institutions should do to equip more people with web information seeking skills. There were calls for more lectures, tutorials and short courses for students and more workshops for staff. Further suggestions were that web training should be provided on a periodic basis, with indications that short courses should be offered on weekends. There were suggestions for the expansion of ICT facilities (such as computer laboratories) and increasing the number of computers in both institutions to expand access. The respondents believed that computer laboratories' opening times need to be extended. It was also suggested that in order for effective web skills to be attained, web training should be offered in each program or be included in the general curricula of all students. There were calls for more assistance and help when doing tasks online. Students requested that they be given more online assignments to help them practice. Information literacy was identified as an important course that would equip users with more web-related skills.

4.1.8. How users search the web or the steps they take

Although users may be experienced in searching for information in non-electronic environments, searching the web can often present new challenges. For this reason, the study sought to establish how users search for information on the web and the decisions users make when searching the web, i.e. whether to search independently or with a friend, which channels to use, the steps they would take, etc., to reveal their capabilities.

4.1.8.1. Statements defining how users search for information on the web

Understanding the searching habits of students is very important for the ample provision of web information services by academic institutions. By understanding the way students search, measures can be taken to assist them when they face problems and respond to their information needs better.

4.1.8.1.1. How students search the web

When people search for information on the web, they either search independently or solicit assistance from friends, colleagues or intermediaries. Numerous studies on the information seeking behaviour of various groups of users have noted that there is a tendency to rely on friends and colleagues as intermediaries. In Table 4.12 below, the responses from students on how they search the web (with help or independently) are presented.

Table 4.12: Statements defining how students search for information on the web

Statement defining students web seeking behaviour	Unizul N=79	DUT N= 123
I usually seek information with the assistance of a librarian	4 (6%)	8 (7%)
I usually get assistance from a friend or colleague	9 (11%)	8 (7%)
I usually do the searching myself	63 (80%)	97 (76%)
I usually do not seek information from the web	2 (3%)	13 (10%)

Most of the students indicated that they did not need assistance when using the web (63; 80%, Unizul and 94; 76%, DUT). Because one of the best ways of learning any kind of skill is practice, it is encouraging to note that a considerably large number of the respondents professed that they searched themselves, giving them time to learn on their own. However, this does not mean that expert advice is not necessary. Nine respondents from Unizul (11%) and 8 (7%) from DUT said that they enlisted the help of friends. Friends and colleagues are useful because of their close ties and because they are at the same (age and intellectual) level as the information seeker. Only 4 (6%) respondents from Unizul and 8 (7%) from DUT indicated that they usually asked a librarian or other intermediary for assistance. This small number is indicative of a paradigm shift in information seeking behaviour, from one that was largely intermediary reliant to a self-service or user-end based form of information seeking. Even novices often find their way with little assistance. Most students no longer enlist the services of librarians, and this is not because intermediaries like librarians do not add value to the information seeking process. In general, the responses showed a higher rate of independent, search-related activities than assisted web use.

4.1.8.1.2. How staff members search the web

This question sought to find out whether staff members searched independently or with assistance.

Table 4.13: Statements defining how staff members search for information on the web

Statement defining staff's web seeking behaviour	Unizul N=8	DUT N=14
I usually seek information with the assistance of a librarian	-	-
I usually get assistance from a friend or colleague	1 (13%)	1 (7%)
I usually do the searching myself	7 (87%)	13 (93%)
I usually do not seek information from the web	-	-

Most academics (7; 87%) from Unizul and DUT (13; 93%) indicated that they did their searches independently or unassisted. Few instances of assisted searching were noted: only 1 (13%) respondent from Unizul and 1 (7 %) from DUT cited colleagues on occasion. Experts such as academics would ideally be conversant with searching the web independently, even though, as shown earlier, most had never received training. Their constant engagement with web sources and the online environment through research and teaching would equip them with the relevant skills.

4.1.8.3. How often users perform information seeking steps

Information seeking steps are thought to indicate what strategy users formulate to search the web. Soergel, as quoted by Davis (2005:49), is of the opinion that the conceptual formulation of a search query "…is at the heart of searching". The exact steps, ways or strategies employed when searching the web differ from individual to individual. These steps can convey how well one is able to search for information. This question targeted those who indicated that they usually searched independently. The study sought to determine the steps they took to achieve their tasks.

Table 4.14: How often users perform information seeking steps

Step	Frequency by institution							
	Very often		Often		Seldom		Never	
	Unizul	DUT	Unizul	DUT	Unizul	DUT	Unizul	DUT
Identify a need	29;48%	41;46	25;41%	41;46%	5;8%	4;4%	2;3%	3;3%
Choose a channel	25;41%	35;40	24;39%	45;51%	8;13%	5;6%	4;7%	3;3%
Define search query	22;37%	24;30	13;21%	36;44%	16;27%	14;17%	9;15%	7;9%
Combine terms using natural language	14;23%	24;30	23;39%	26;32%	8;13%	19;23%	14;23%	12;15%
Combine terms using controlled vocabulary	17;30%	13;16	14;24%	21;26%	13;22%	27;33%	14;24%	21;26%
Evaluate results	21;34%	22;28	19;31%	33;42%	12;20%	16;20%	9;15%	8;10%
Synthesize & use information	21;36%	21;2%	21;36%	34;44%	7;12%	12;15%	9;16%	6;8%
Redo the steps again	16;28%	20;25	16;28%	3241%	13;23%	11;14%	12;21%	14;18%

When the respondents were asked to indicate the frequency with which they did certain leading information seeking steps, the responses were inconsistent. The general impression is that the respondents' online behaviour was neither targeted nor direct. Steps that one would ideally follow when searching for information appeared to be followed on an irregular basis. In actual fact, the respondents meandered from one step to the next.

One assumption made in this section was that the use of a controlled vocabulary would be infrequent because it is a bit more demanding for the user, since one must know the right search terms or keywords. Results do not clearly support nor dispel this assertion. However, Lucas and Topi as cited by Buchanan et al. (2005:2), state that experienced, trained searchers use more query terms and exploit Boolean logic more frequently than novices. Thus, a user's level of experience in terms of interactive searching and/or the

effective use of the subject domain are crucial factors in the success of an information seeking task.

Having searched for and retrieved the necessary information, it is important to determine the value of that information and to ensure that the data retrieved during the search process is credible. The process of reflecting on or monitoring the effectiveness of the search process and then refining the process when necessary is an important step for any skilled information seeker. That there was little evidence of search quality assessment, can be attributed to the trend also observed by Debowski (in Markey, 2007:n.p) of users entering the next search statement very rapidly because they search without a solid foundation, and thus fail to really understand the search process.

Very often, users synthesise or use the information they have retrieved. Use depends on whether or not the information seeker understands the results of a search, otherwise translated as their decision on whether the information is relevant, trustworthy and complete enough to meet the requirements of the problem. If, as indicated in Table 4.14 above, half of the respondents do not evaluate their work, then the credibility of the information they use is dubious. As the information resources available to students grow increasingly less filtered and more unregulated, more questions are raised about the authenticity, validity and reliability of source material.

4.1.9. Relevance of the World Wide Web to study and research

Given the extent to which students and staff have come to rely on the web, it was important to determine whether or not it provides them with relevant and useful information.

4.1.9.1. Web search success among students

The students were asked whether they consider their web searches successful. The responses are presented in Fig 4.16 below.
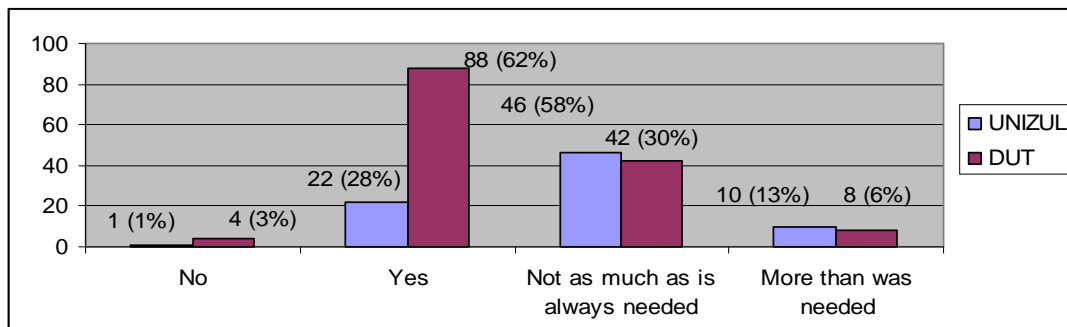
Fig 4.16: Web search success among students

A moderate number of respondents suggested that they often got what they set out to achieve, as shown by the 22 (28%) respondents from Unizul who responded 'Yes' and the 10 (13%) with a 'More than was needed' response. DUT generated a much higher success rate, with 88 (62%) saying 'Yes' and 8 (6%) ticking off 'More than was needed'. However, the number of those who did not conduct successful searches was also fairly large. Forty seven (57%) respondents from Unizul said 'Not as much as is always needed'. DUT produced similar results, as a relatively large proportion (44; 33%) said that their searches were not successful. These numbers are worrying, and highlight the need for institutions to impart web information seeking skills onto their students (assuming training is the main culprit). The problem is exacerbated because most students do the searches themselves with little or no expert assistance.

4.1.9.2. Web search success among members of staff
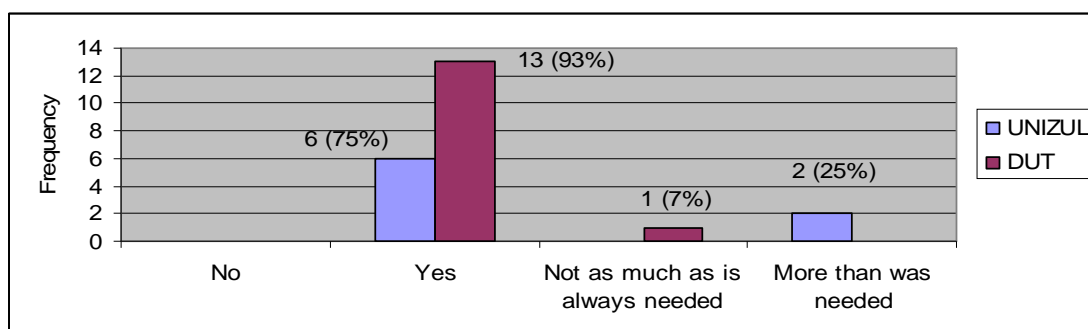
Fig 4.17: Web search success among members of staff

As shown in Figure 4.17 above, academics tend to engage in successful searches on the web. Their search expertise is a contributing factor to the very high success rate reported. At Unizul, all the staff members responded positively, with 6 (75%) stating 'Yes' they often found what they set out to gather, and 2 (25%) stating that they got 'More than was

94

needed'. DUT's trend was similar, with an overwhelming 13 (97%) stating success was guaranteed and only 1 (7%) citing 'Not as much as is always needed'.

4.1.9.3. Relevance of the World Wide Web to work/studies

This question sought to assess the relevance of web material to the respondents' needs, seeing as the web has become the biggest information source for students and staff.

4.1.9.3.1. Relevance of the World Wide Web to students
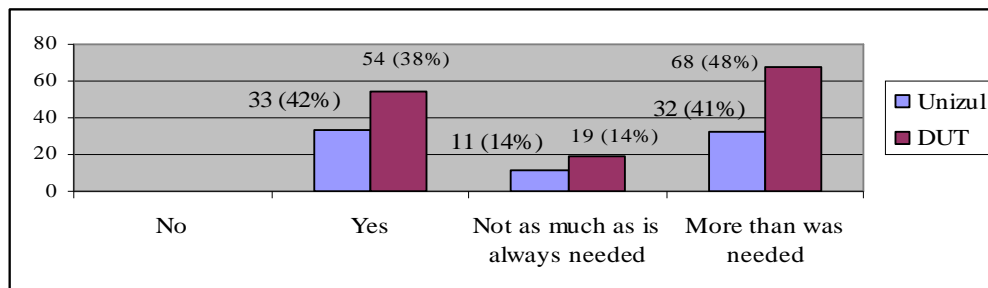
Fig 4.18: Relevance of the World Wide Web to students

The results in Figure 4.18 show students' perceptions of the relevance of the web to their information seeking practices. A significantly large proportion believed that the web was relevant to their work. Of the 76 respondents from Unizul, 65 (83%) stated that the web was either relevant or very relevant to their work or studies. One hundred and twenty two of the 141 respondents from DUT indicated that the web was either relevant or very relevant. Fewer respondents said the web was slightly irrelevant (11; 14%, Unizul and 19; 14%, DUT). No single respondent in either institution stated that the web was irrelevant. Based on these results, it is safe to say that the web is considered by many to be relevant to their tasks, although a few respondents still mull over its relevance. The figures above are perhaps an indication of how comfortable many are with the web today and confirm the notion held by many researchers that the web is fast becoming the first port of call for students and staff in their search for information in higher education. This is also reflected in the amount of time spent when searching the web, presented in the sections that follow.

4.1.9.3.2. Relevance of the World Wide Web to staff
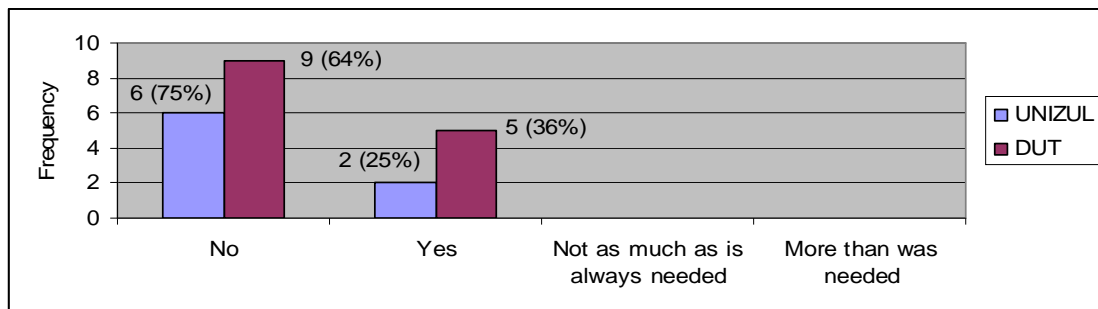
Fig 4.19: Relevance of the World Wide Web to staff

Academics from both institutions were in agreement that the web is relevant to their information needs. High responses were obtained from Unizul, where 6 (75%) stated that it was 'very relevant', while for the remainder (2; 25%) it was 'relevant'. Likewise at DUT, for the majority (9; 64%) it was 'very relevant', while 5 (36%) considered it 'relevant'. No qualms or doubts were raised from either institution about the relevance of the web, which highlights the (principal) role it now plays in academics' information seeking activities.

4.1.9.4. Amount of time spent on the web searching for information

Time is limited in (and for) everything and this extends to searching for and gathering information. It was believed that the time spent searching for information would be used economically and judiciously. Measuring the time expended on information gathering activities was intended to assist policy makers in scheduling. For example, academics might, as a result of their teaching loads, have less time for information gathering activities, such as research for papers. The researcher also sought to determine whether length of use correlates with ability.

4.1.9.4.1. Time students spend on the web searching for information

Table 4.15: Time students spend on the web searching for information

Time on the web searching for information	Unizul N=79	DUT N=141
Less than 15 minutes	3 (4%)	9 (6%)
15 minutes- One hour	14 (18%)	44 (31%)
One hour - two hours	27 (34%)	56 (40%)
Two - four hours	23 (29%)	18 (13%)
More than four hours	12 (15%)	14 (10%)

Students reported that they worked on some of their tasks for over a period of several hours, while others spent minutes, or occasionally a few hours, on an information seeking task. Most (27; 34%) respondents from Unizul indicated that they spent between one to two hours, while 56 (40%) from DUT did the same. There were more respondents who spent between 2 – 4 hours at Unizul (23; 29%) than at DUT (18; 13%). Perhaps this is because most students at Unizul reside on campus, while a considerable proportion of the DUT student population stays at home and studies on a part-time basis. A large component of the part-time students are also senior students (BTech and MTech) who may also be working, or perhaps have Internet access at work or at home. There were 14 (18%) respondents who spent between 15 minutes - 1 hour on the Internet at Unizul, compared to 44 (31%) at DUT. Very few respondents spent less than 15 minutes or over four hours online in both institutions. Therefore, no single amount of time appears to dominate. As mentioned earlier, the respondents were a mixed group of people (with significantly more undergraduates than postgraduates), and the results could be a reflection of how undergraduates rely more on the core readings recommended by lecturers for their studies. Access restrictions could also play a role, forcing students to spend less time in the laboratories to pave way for classes at certain intervals. Excess numbers of students resulting in the overcrowding of laboratories' could also contribute, while the unavailability of the Internet, processing speed and so on also amount to less time. As for the increased times, some respondents may have included their time spent playing games or chatting (or other entertainment-related activities).

4.1.9.4.2. Time staff members spend on the web searching for information

The responsibilities and duties of academics vary, with a lot of pressure stemming from deadlines and time management. While information seeking is an important activity for academics, it needs to be balanced with other activities such as teaching, marking, and supervision and examination, to name a few. Bearing this in mind, the researcher sought to determine how much of the academics' time is allocated to or spent on web information seeking activities.

Table 4.16: Time staff members spend on the web searching for information

Time on the web searching for information	Unizul N=8	DUT N=13
Less than 15 minutes	-	1 (8%)
15 minutes- One hour	2 (25%)	5 (38%)
One hour - two hours	4 (50%)	4 (31%)
Two - four hours	-	-
More than four hours	2 (25%)	3 (23%)

The highest recorded time spent by academics at Unizul was, on average, 1 - 2 hours (4; 50%). At DUT, 15 minutes - 1 hour was cited by the largest number of respondents (5; 38%). There were 2 respondents (25%) from Unizul and 3 (23%) from DUT who reported spending more than four hours a day on web-related activities. It was revealed that generally, these sessions are often punctuated by other activities, and it is rare that they are undisturbed. Academics at DUT, for instance, mentioned that time is allocated to them for course material preparation, which may translate to some of the valuable time spent on the web. Unlike students, staff members seemed to prefer shorter and more effectively managed time slots.

4.1.10. Challenges faced when searching for information online and suggestions on how to address these challenges

Respondents were asked to state the challenges they faced during their information seeking activities. A number of challenges were identified, namely:

- Slow Internet or poor Internet connections
- Access restrictions, web filtering and censoring
- Lack of help or assistance
- Overcrowding due to inadequate facilities (computers and computer laboratories)
- Journal licensing/ no subscriptions to important journals
- Inability to evaluate information and lack of searching skills
- Lack of local content on the Internet
- Inability to reference Internet sources
- Information overload
- Restrictive opening hours
- Retrieving general information

- Computer viruses

- Popups, spam (unsolicited mail) and adverts - the barrage of advertising material

- Power blackouts

Ways to address the above challenges, as suggested by the respondents, were:
- Provision of training/ information literacy

- Offers of more assistance or help

- More accessible passwords

- Provision of more facilities (computer laboratories and computers)

- Increased bandwidth

- Governing use or more controlled stations

- Effective antivirus software

- Increased opening hours

- Hardware upgrades

- Wireless access

- Extending access to student halls/ dormitories/ residences

- Uninterrupted power supplies (UPS), e.g. generators

4.1.11. The web and other information sources

Since the introduction of the Internet, web users have acquired or developed different search experiences and responses. One of the implications of projected experiences and sentiments is that at some point, web users begin to wonder whether to continue using other information sources or not. In this respect, the researcher sought to establish whether electronic sources make it easier or more difficult to gather and use information, and also the effect of the web on the use of and visits to other information sources.

4.1.11.1. Effect of electronic sources on gathering information

Preferences for certain types of information sources and their form of delivery and reasons for these by various user groups are well articulated in information seeking literature. Electronic resources, both scholarly and non scholarly, are now available in abundance because of the web. Not only are materials increasingly available in the

electronic medium, but the nature of the medium also allows for new ways of presenting information. People are no longer limited to the standard book format. Information may now be presented in a manner that is interactive and dynamic, and in multiple source formats that are easily updatable. Even in its infancy, there are already exponential numbers of users taking advantage of the web's possibilities (Facebook, You Tube, etc.). This study therefore sought to determine what impact this may have on the gathering of information by students and staff.
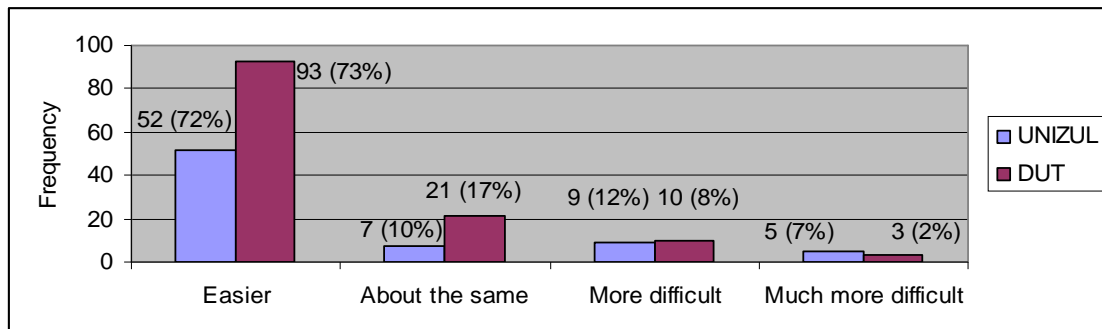
Fig 4.20: Effect of electronic sources on gathering information

As reflected in Fig 4.20 above, most of the respondents reported that the Internet made the gathering of information much easier. Fifty two (71%) respondents from Unizul stated that the Internet made gathering information easier compared to 93 (73%) respondents from DUT. Generally, most respondents stated that information gathering is now easier, although the Internet has also brought along new problems, such as proper web referencing. The ease reported could be attributed to the copy, cut, and paste functions of Internet documents which tend to save users tremendous amounts of time otherwise spent retyping text, and the diversity and range of information that the web offers. While the copy, cut and paste functions are beneficial, because of them plagiarism also seems to have become rampant. Very few respondents stated that they had not seen any changes in their information seeking or gathering processes, as indicated by the 7 (10%) responses from Unizul and 21 (17%) from DUT. Inconsequential figures were recorded for those who claimed to find obtaining information more difficult or much more difficult in both institutions.

4.1.11.2. Effect of the Internet & World Wide Web on the use of or visits to other information sources

The question – 'Has the Internet and World Wide Web affected your use of or visits to other information sources (e.g. books and print journals)?' - aimed to understand how the Internet has affected the respondents' use of or visits to other information sources and providers. As more resources go online, users are likely to be less informed about the resources offered by other information facilities, such as the library, because these resources would be in competition with the Internet. Bell, as quoted by Brophy and Bawden (2005:n.p), says that "Google has become the symbol of competition to the academic library" and Google is but one of many new information services available to students and members of staff. The debate of the Internet and World Wide Web versus traditional sources should be at the forefront of information service providers' concerns because it is vital in profiling the media preferences of users in academic institutions.

4.1.11.2.1. Effect of the Internet & World Wide Web on students' use of or visits to other information sources

One of the mooted outcomes of the spreading use of the web has been the lesser use of other information sources. This question asked students if the web has had any visible impact on their use of other sources, particularly traditional print-based sources or information storehouses. Many students reported that the Internet has had a definite impact on their use of and visits to other information sources. At Unizul, just below half of the interviewed 32 (44%) stated that it had an effect, while 78 (62%) from DUT also thought so. The remaining 40 (56%) from Unizul and 48 (38%) from DUT reported that they still accessed and used other resources (as they did before). Overall, more students now use the Internet, although a significant number of the respondents noted that it hadn't affected their use of or visits to other information sources. Perhaps this is because of the numerous access and infrastructural challenges that affect users' reliance on technology-based information sources, or even just plain scepticism about the benefits of the Internet.

4.1.11.2.2. Effect of the Internet & World Wide Web on the staff's use of or visits to other information sources

This question assessed the impact of the Internet and World Wide Web on the use of or visits to other information sources by academic members of staff. It was found that the web has affected academics' use of or visits to other information sources. This was the trend at both institutions (5; 71%, Unizul and 9; 64%, DUT). Two (29%) respondents from Unizul disagreed, as did 5 (36%) from DUT. From the above, academics, unlike students, appear to be more thoughtful users of various information media. They are not 'shifty' and do not subscribe to general trends because they are 'savvy'.

4.1.11.3. Reasons for changes in searching behaviour

Respondents were asked to indicate what has affected their use of traditional information sources. Their responses are listed below:

- Speed: it's faster to retrieve web material
- Saves time: no need to retype material; one can copy and paste
- Entertaining: the web appeals to respondents because it satisfies the dual needs of study/work and play
- Ease of use and simplicity of the web
- Currency of information - library material is often outdated
- Relevance
- Wide subject/ topic coverage – 'I get everything I want'
- Conducive environment, unlike the library
- Laziness (physically getting up and visiting the library)
- Easily available and accessible: work from the office or home
- Availability of multimedia: the web combines text, video, pictures & sound
- Sometimes it is the only available source of information

4.1.12. Summary

This chapter presented the results from questionnaires distributed to students and staff at the University of Zululand and the Durban University of Technology. It emerged that the web is increasingly dictating the activities of students and staff members, as revealed by

the various purposes for which it is consulted. Although there are facilities available that allow students to access the web, these are strained by the large volumes of (and growing) student populations. Staff members, in this respect, voiced no complaints. Students and staff members both complained that bandwidth is particularly low at Unizul. There were no significant differences in the skills of the respondents at the two institutions. It was observed that students from both Unizul and DUT appeared to struggle with higher level web activities and moved within the limited parameters of a few common features, such as email, search engines, and the use of general websites.

SECTION 2: INTERVIEW RESULTS

4.2.1. Introduction

Qualitative data obtained from the interviews was analyzed and interpreted and subsequently presented in this section. Interviews were used to augment the data collected (quantitatively) through the questionnaire. This combination (called triangulation) has a number of advantages which have already been explained in Chapter 3. But in brief, the two research instruments were used together because of their ability to crossover or complement each other. The questionnaire was successfully used to reach a large population, while the interviews were used to gain qualitative data on web information seeking behaviour.

The researcher conducted a limited number of interviews with students and staff to investigate the reasons behind the behaviour recorded in their responses to the questionnaire. A total number of 15 (94%) interviews were conducted at Unizul, and 12 (44%) at DUT.

4.2.2. Medium of Information

4.2.2.1. Information Media Preferences

Students and staff members from the University of Zululand and the Durban University of Technology were interviewed to determine what influences their choice in a medium when searching for information. Generally, the respondents revealed their preference for a combination of print and electronic sources, followed by electronic media and lastly print media. There were no outright differences in the medium preferences of students and staff from either university (a university of technology vs a traditional comprehensive university). This suggests that one's academic dispensation does not play an influential role on one's choice in an information medium.

Location appeared to have little influence on students and staff's preferences for information media in either the urban-based Durban University of Technology or its rural based counterpart, the University of Zululand. The only general distinction noted by the

researcher is that urban students are more likely to have been introduced to electronic media earlier than students from rural institutions. Hence for the former, the Internet would potentially be a more familiar source of information. More students (7 of 8) and staff (4 of 4) at DUT than at Unizul (6 of 10 and 4 of 5 respectively) preferred using electronic media.

In explaining the popularity of the combined use of electronic and print media, one respondent suggested that despite the enthusiasm shown for electronic media, users lack confidence in their ability to use electronic resources effectively and have to balance this with the print resources they are used to. Another reason students cited was a general lack of trust in most users' approach to many electronic sources. The results do not appear inconsistent with reports in literature of rapid growth in the use of electronic sources. Students and staff alike have not altogether discarded print media, which they still view as an important reference point. However, the interviews suggest that the use of print sources has taken a bit of a nose dive.

4.2.2.2. Factors of medium preference

The factors affecting medium preference were, to a large extent, similar across Unizul and DUT. Most respondents stated that they relied on electronic sources because a lot of the sources they required for research, teaching and their studies are increasingly available electronically. This corresponds with the current growth in electronic publishing. According to one respondent, this has diminished the library's direct role as a provider of information.

An interesting theme that emerged was that the students' ability to use the medium in question had an impact on whether or not they used it. This was particularly the case with electronic media. Although many preferred the medium, their inability to effectively use it meant that a lot of students opted for print media instead. Perhaps this explains why staff members are heavy users of electronic media - they possess the skills that allow them to do so.

The caution shown towards electronic sources in the questionnaires was not evident in the interviews, as both students and staff claimed to use the web more. They did, however, feel that it is a transient medium - once material is lost, it is not easy to retrieve. An example would be of a website that is available the one day and then gone the next because it cannot be retrieved again using the same Uniform Resource Locator (URL). However, the electronic medium is still preferred because of its convenience, incorporation of multimedia, depth and range of information, and because it can reveal hard to find information. Print media, on the other hand, is selected for its credibility - respondents believed that publishers make efforts to establish facts.

4.2.3. Internet connectivity and access

4.2.3.1. Provision of appropriate ICT infrastructure

The state of general Internet connectivity and access at both institutions was remarkably good. All the interviewed respondents (i.e. 10 students and 5 staff members from Unizul and 8 students and 4 staff members from DUT) had Internet access. In terms of infrastructure, Unizul and DUT presently have a number of computer laboratories through which they provide Internet access to students. Access is provided in the main computer laboratories, departmental laboratories, libraries, and a few small rooms or areas provided by departments or centres (e.g. postgraduate facilities in various departments). Each academic member of staff is provided with at least one work station with Internet access. Problems mentioned by the interviewees had more to do with the quality of the electronic services, e.g. Internet connection speed (a result of low bandwidth), laboratories' ability to deal with growing student populations, and the quality of the facilities (hardware). Although the provision of Internet facilities was fairly impressive, both institutions still lag behind in comparison to other academic institutions in the country, particularly the University of Zululand. Both have not moved significantly forward in offering Internet access in student residences or halls, an initiative that would greatly reduce the congestion that both institutions currently face. The institutions still rely on traditional Internet connection types and have not embarked on or started to use other innovative connection types, such as wireless access. For instance, many students' residences at Unizul (specifically those that housed postgraduate students) already had

wireless receivers installed, but these hadn't been activated. Generally, while both institutions have taken commendable measures towards providing appropriate ICT infrastructure to support web information seeking, it appears as though DUT, with its extensive technology and professional orientation, has done much more than the University of Zululand. One progressive area has been its incorporation of web-based learning. The University of Zululand is also taking steps in this direction, although the situation on the ground is more in the direction of ICT-aided teaching and less of web-based learning (e.g. equipping lecture rooms with computers and projectors).

There was also evidence of growing home access and use of the Internet, mainly by academics. The respondents that fell into this category reported satisfaction with their modes of access.

Generally, the respondents called for their parent institutions to put in place and provide access to appropriate ICT infrastructure, which is the backbone of optimal Internet connectivity and ultimately effective web information seeking. As the situation stands, students and staff from both institutions felt that a lot still needs to be done before this milestone can be achieved.

4.2.3.2. Efficiency of Internet connection types/ access types

Respondents were found to rely on cable modem access and regular modem or dial up access more than on any other Internet connection type. Both students and staff were also incredibly unaware of or had very little technical knowledge about how they were connected to the Internet. This made it difficult to assess what particular connection type they used. It was unclear which institution offers better and more efficient Internet connectivity as respondents from both universities were generally unhappy. Suffice to say that whatever the access type, 7 of the 8 students successfully interviewed at DUT were not satisfied compared to 6 of the 10 students from Unizul. More staff members were unhappy at Unizul (4 of 5) than at DUT (2 of 4). Exactly what the respondents were unhappy about could be grouped into three categories: speed/connectivity, access/time, and quality of the facilities. Unizul's respondents were particularly unhappy with speed

and connectivity, while the DUT respondents were mainly concerned with overcrowding or lack of access. Hardware was found to be fairly up to standard, with pockets of unhappiness here and there.

1. Speed

In terms of speed, respondents unanimously concurred that Internet connections were very slow. 8 of the 10 students interviewed at Unizul felt that the speed of the Internet was very poor. Only 4 of 8 shared similar sentiments at DUT. It is unclear what is behind this, with some citing poor bandwidth and others blaming large volumes of traffic. Poor planning was also cited as a cause. Sharing bandwidth was said to be one of the most common contributory factors to slow access and breaks in communication/transmissions. This was especially the case when people opted to download large amounts of data, such as films, programmes or music, which often caused congestion and delays or interruptions in access. The respondents believed that the bandwidth available did not realistically correspond with users' requirements. For this reason, the slow speed encountered when downloading documents was terribly frustrating for both students and staff, even though staff members were in a far better position. Any downloads that they attempted were frequently interrupted by breaks in Internet connectivity.

2. Access/Time

In terms of access or time, some mixed reactions were given by the respondents. Clearly, DUT students were unhappy (7 of 8) with the amount of time they were given to access the web. While most students at Unizul stated that they did not get the chance to access the university facilities owing to overcrowding, lectures/tutorials, and restrictive opening hours, others felt that time was sufficient (4 of 10), arguing that the challenge lay instead in students' ability to organize themselves within the times provided. For instance, it was observed that the main computer laboratory at Unizul generally closed at 23:00 hours during term, allowing those who wished to work ample time to access the facility at night. Other respondents suggested that the crux of the problem did not necessarily stem from the unavailability of facilities, but rather from lack of access to or hindrances to access at these facilities. However, it should be noted that although fairly impressive, the

facilities' situation is not one of overabundance but rather of sufficiency. Swelling student numbers are straining these facilities and both institutions are failing to accommodate them. It was felt that the available computer laboratories should not be used for classes; each department should have a separate computer laboratory dedicated to their students. Time limitations remained an issue for academic researchers, with respondents citing research and teaching engagements. This was voiced by several staff members, more so at Unizul than at DUT. However, one member of staff from DUT revealed that in their planning schedules, time was allocated for research. Students appeared to be content and flexible with time, their major worry being lack of access.

3. Quality of facilities (hardware)

The state of the facilities at both institutions was reportedly fairly high. Most academics were provided with modern computers, either a desktop or laptop, while the laboratories contained the latest computers (e.g. Pentium 4s) with the latest operating systems, Microsoft Office packages, and other useful programmes. Respondents also gave the impression that upgrades were frequently conducted.

4.2.3.3. Challenges relating to connection to the Internet/ World Wide Web

The main challenge relating to Internet connectivity was cited as retrieval difficulties. Given that the connection to the Internet was (described as) always either slow or down, respondents said that they often failed to download the documents they required for research, assignments, or the like. It was suggested that both institutions should purchase more bandwidth for improved connectivity.

4.2.4. The web and information needs

4.2.4.1. Information needs (reasons for searching the web for information)

For staff, the three most important information needs cited were research, teaching, and communication, whereas for students, assignments, research and communication were highly regarded. For both user groups, studying and general awareness were regarded as moderate reasons to go online. Another reason was employment seeking, mainly by senior students (starting from third year level, BTech and above). The information

activities respondents mostly engaged in were study (assignments, research) and work (teaching) related. A significantly large number also said that they used the web for entertainment and communication, further highlighting the growing social role of the Internet. Both students and staff appeared to engage in very few commercial activities. The only reported commercial activity was banking, and again there were very few who indicated that they did their banking online. The interview responses indicate that despite the poor use of some channels by students and staff, a growing number has started doing more and more things on the Internet.

4.2.4.2. Factors influencing the choice of an information source

Students revealed that they mainly relied on the web because it guarantees the retrieval of information (3 out of 10, Unizul and 3 out of 8, DUT). Recourse to the web was also very common when students couldn't find information in print. The questionnaire responses confirm this; most respondents stated that convenience and access to the medium were the main reasons for their choice in an information source. This trend was particularly evident among students from both institutions. Perhaps the most lamentable factor emanating from the interviews is that authoritativeness and credibility are not perceived as influential when deciding on a source to use. It is disappointing in the sense that when students are not concerned with the quality of the information they retrieve, lecturers later have to contend with questions about what is and isn't accurate. As to why students would not care about what they retrieve, the reasons put forward were frustrations with retrieval difficulties and/or not knowing how to screen information for quality. Often, a good and useful article cannot be downloaded because the Internet is slow, or is in a journal that the institution does not subscribe to. Add to this a laboratory that is overcrowded, and one has a plethora of problems preventing access. However, it does appear as though those with more knowledge of the web appreciate it more and stop using it only because they will get/retrieve something. This was particularly the case in the responses of senior students and academics. Their reasons for relying on the web were more vivid; they raised issues such as the currency of material, meaning staying up to date in their fields of research, and questions about how informative a source is bearing in mind that information about many new areas of research can only be found online,

particularly in emerging research fields. With the move towards electronic publication, some journals are now published in electronic format only.

4.2.4.3. Web information channels

There is consistency in the types of resources or information channels that are most valued when searching for information online by both students and staff in the questionnaires and interviews. For students, use was dominated by a few channels, namely search engines, email and websites. When asked to justify why they relied on these channels, students stated that they obtained enough information from these channels to no longer see the need for other channels. Others said that they knew very little about other channels, for example specialized services such as electronic document delivery services. This would suggest that there is a correlation between experience and the use of various web channels, because staff appeared to use a wider range of web information channels. There were no significant differences in the use of web channels across the two institutions.

4.2.4.4. Reasons for not using or using less of the other channels

In terms of web information channels, familiarity proved to be a major determinant of use. Most users of web information channels, students in particular, appear to rely on the same information channels for various information needs, with little or no exploration of other web channels. Channels that are considered to be very demanding or too complex are generally avoided. This assertion was confirmed by a student at DUT, who said that he relied on Google only because it was very easy to use and was the only search engine that he was familiar with. Some channels, like document delivery services, were avoided because users are required to pay to use them. Other channels were used infrequently owing to the fact that respondents were not aware of their existence or importance. For example, some respondents claimed that that they did not know what subject portals are, and argued that online public access catalogues (OPACs) are not important because they could find the relevant library materials without them. Some also felt that OPACs often misled users by indicating that material is available in the library that users simply cannot locate. A Library and Information Science student from DUT bluntly stated that he did not use OPACs because they reported that material was available in the library when it

wasn't. He felt that libraries need to constantly update their OPACs to keep track of all their material, which would help when a book has been lost or is out for binding.

4.2.4.5. Relevance of the information sought from the web

The web was considered to be very relevant by students and staff from both institutions. Most students agreed that the web successfully met their information needs (7 of 10, Unizul and all students at DUT). Special mention was given to search engines, most notably Google. Staff members also regarded the web to be of immense relevance to their information needs (all at Unizul and 3 of 4, DUT). For staff members, the web was cited as particularly relevant given that many have to conduct research (publish or perish), and the material required for this is often housed in databases, journals, and conference proceedings that are offered online. Proof that the web is highly relevant to respondents' information needs was also evident in the increased amount of time respondents allocated to web information sources. Regrettably, this has come at the expense of other traditional information media.

4.2.5. Searching strategies and skills

4.2.5.1. Independent or assisted web information seeking/searching

Although most of the respondents claimed that they used the web on their own, this did not necessarily mean that they were competent users. It was found that the poor skills of junior students (1st and 2nd years) or undergraduates generally contributed immensely to retrieval difficulties. Most of the students that fell into this category were not familiar with databases and how to use them, let alone how to use the library. Retrieval difficulties appeared to have a profound effect on the extent of use, regardless of whether or not respondents sought information independently or solicited assistance. Lack of confidence or fear of ridicule about their inability to use the Internet was also cited by many as why they would rather go it alone. Others felt that this was the only way they could learn to do it on their own.

4.2.5.2. Steps or strategies users follow when searching

The strategies that users follow to search for and retrieve information appeared to be the same amongst students at all levels and academics of all rank at both institutions. From first year students through to senior professors, no significant differences were noted. This revealed that demographic differences, such as level of study, play no major part in terms of search strategies on the web. The only noted difference was of the level of skills applied during the formulation of search queries. Senior students and members of staff were found to use higher level search techniques, such as Boolean logic, truncation, and wild cards. When the respondents were asked to indicate how often they formulated a search strategy modelled on Kuhlthau's information seeking steps, no consistent trend could be established. At a glance, students did not seem to critically analyse queries and formulate search strategies; they rather opted for keywords they created themselves (evidence of natural language searching) which could potentially retrieve something useful. Use of the retrieved documents appeared to depend on the judgment that they assigned to them, i.e. whether the results met their needs or not (if not, a new search was initiated). Members of staff appeared more informed about how to search various databases and web channels and seemed to vary their strategies depending on the database they used or the nature of their needs. For example, they stated that they used more Boolean operators in their queries and also consulted the search tips provided by search engines and databases. In general, the search functions, terminology and refining mechanisms all appeared to be inconsistent. Notably, academic dispensation (as far as strategies for searching are concerned) did not play any part whatsoever.

4.2.5.3. Web search success

In the questionnaire responses to the question "Do you find what you are looking for on the web," most of the respondents indicated that they usually found what they were looking for. In the interviews, most of the students (8 of 10, Unizul and 7 of 8, DUT) and all of the staff members from both institutions also said that their searches were often successful. Upon closer examination, however, web search success was not always guaranteed, especially with students. Perhaps the most worrying trend noted was the students' willingness to accept or make do with results that did not fully address their

queries or needs at the time. Remarks of one first year student at DUT tell it all: he only searched for information using Google, and if he couldn't find anything there, he aborted the search. It must not be forgotten that there are many like him. The trend here is to rely on resources that are easily available or in close proximity. When these do not yield the expected results, few go the extra mile and perform higher level information seeking tasks. In fact, many of the students suggested that it is only on rare occasions that they sought information anywhere else if they could retrieve it through a general search using Google. Although retrieval is (virtually) guaranteed, questions persist about the quality of the retrieved information. Students openly admitted to doing very little to assess the quality and authenticity of the information they retrieved and ultimately used.

4.2.5.4. Skills necessary to use the Internet/World Wide Web

Most of the respondents believed themselves to be very skilled or partially skilled users of the web, with only a few saying that they did not know how to use the web. A considerable number who had not received any formal training believed that they were sufficiently skilled. This trend was especially voiced by members of staff. Data obtained with respect to how the respondents gained their Internet skills suggests that almost all of them learnt these skills on their own. This was particularly true for members of staff. Members of staff from both institutions (5, Unizul and 4, DUT) all claimed to be sufficiently skilled in the use of the Internet and the web. A small (but significant) group of students also learnt on their own, while the majority reasoned that the training they received at high school was helpful. In terms of skills, DUT appeared to have an edge over the University of Zululand. More students (6 of 8) at DUT (compared to 6 of 10 at Unizul) believed that they were competent web users. A closer look also indicated that this may be true. A considerably large number of students at DUT were schooled in urban areas, hence most entered university having already attained basic web and Internet skills. These students generally develop their web skills much faster than rural students, who constitute the bulk of Unizul entrants. Furthermore, because of the practical, hands on approach of the programmes at DUT, students quickly learn Internet and web skills. This is in contrast to the largely theoretical focus of many programmes at Unizul. Right now,

it is not rare at Unizul to find final year students (3rd or 4th) who are completely lost on the Internet or web.

The above is compounded by trainers or assistants who some students described as unfriendly or hostile. These students were upset about often being laughed at or ridiculed for not having web skills, forcing them to hide and pretend rather than seek help.

4.2.5.5. Training

Both staff and students were articulate about their desire to get training, even those who had received some training on Internet use at some point. Very few respondents said that they had sought training (web skills) outside what was provided by the institutions. Staff particularly felt that they were a neglected group as far as training is concerned, with some indicating that their institutions had never formally trained them or assessed their training needs. One staff member at Unizul who had recently joined the institution commented that she was never orientated on the new technologies she was to use, such as a new library system which had not been furnished with passwords to online databases, or the use of the intranet. Respondents felt that both institutions lacked human capital and were faced with resource constraints preventing effective ICT training.

4.2.5.6. Suggestions on equipping students and staff with web information seeking skills

Academics reported that the Internet plays an important role in their contributions to research and suggested that the management team should come up with better measures to provide them with adequate access to the Internet. Other measures suggested were periodic workshops for staff and tutorials for students. There was also a strong call for the inclusion of web information seeking training in the institutions' curricula. The respondents also appeared to believe that the most opportune time to conduct web training sessions was on weekends. Others felt that the orientation programmes their institutions' libraries offered were ineffective. These programmes are optional, and their timing at the beginning of the term arguably did not fit well with students' schedules.

Information literacy was mooted as a course that would address this dilemma, but only if it were offered as a compulsory and examinable course.

4.2.5.7. Changes in the access, retrieval and use of information as a result of the web

Most of the interviewed students revealed that they used the Internet every day. There was a mixed reaction about the effect of the amount of time spent on the web by students and staff on a given day. While responses from the questionnaires showed that the use of the web has grown significantly (albeit with no marked influence on visits to the library and the use of traditional information sources), a different picture emerged when interviewing the same respondents. At Unizul (4 of 10) and DUT (6 of 8), students concurred that the web had affected the way they accessed other information sources, particularly the library. The effect of changes in the access, retrieval and use of information was even more pronounced amongst staff. Generally, physical visits by members of staff to the library have become few and far between, and although staff members still recommend library resources to their students, they also encourage students to use the web. Many factors have contributed to this, one being that they rarely find time to go and browse the shelves in the library. Because they can now access the library from their desktop/laptops, physical visits to the library have grown less. A large number of the resources needed for research, which would have previously forced a number of them to visit the library, are increasingly offered electronically through institutional repositories.

Thus, this study confirms one reality of the networked world, which is that the more time students and staff spend on the Internet and web, the less time they dedicate to traditional media. Evidently, traditional media is competing with the Internet with respect to time. Respondents suggested that the impression of the library as a place to search for and gather information is not good. It seems as though many of the interviewed students were not aware of the benefits of using libraries or how to use them optimally, confirmed by users' comments to the effect that they believed they could do without them. Instantaneous access to information was one of the main reasons cited for the heavy

reliance on electronic media. Online material is also never 'borrowed out', meaning that a number of respondents can enjoy simultaneous access.

4.2.6. Summary

In a nutshell, the results show that information seeking behaviour on the web is diverse and volatile. However, students and staff members' perceptions about information seeking have not changed much. The motivations for using print and electronic sources appear to be the same, although competition in terms of the format of resources shows a greater leaning towards electronic and/or web-based sources.

A major theme voiced in the interviews had to do with connectedness and wanton media preferences based on ease of access and availability, including the inadvertent as well as the intentional relegation of traditional media in terms of preference (the library versus web debate). Questions still abound about the quality of the information that students use. The interviews also raised concerns about web skills in general and students' evaluative skills in particular. Respondents often demonstrated poor skills and lack of sound judgement while evaluating web information.

The implications emanating from these results are that web information seeking can be optimally achieved if there is appropriate infrastructure on the ground. The responses also highlight the essentiality of information and computer literacy for successful web information seeking. The university was identified by academics as a very late stage to implement these skills, meaning that they need to be imparted on students at an early age. There is a need for institutions to seriously re-evaluate their training needs with respect to web information seeking, and from there come up with ways to address these needs.

This chapter has revealed potentially insightful information about the searching habits of students and academics. The ensuing chapter (Chapter 5) comprehensively discusses the findings.

CHAPTER FIVE: DISCUSSIONS

5.1 Introduction

The study's main objective was to investigate information seeking on the World Wide Web and how information services delivered via the web influence student and staff's searching behaviour. This chapter discusses the findings in relation to the research questions of the study, i.e.:

1. What are the web information needs of students and staff in institutions of higher learning?
2. How, when and where is web information sought?
3. What are the channels used when searching the web for information?
4. What are the challenges faced by students and staff when searching the web for information?
5. How and to what extent has the web affected the information seeking behaviour/habits of students and staff in institutions of higher learning?

The research questions listed above were addressed by reviewing literature and analyzing empirical (survey) data. Specifically, Questions 1, 4 and 5 were addressed by analysing empirical data, while Questions 2 and 3 were addressed by reviewing literature and analyzing empirical data.

5. 2. Discussion of findings by research questions

5.2.1. What are the web information needs of students and staff in institutions of higher learning? Research question 1

5.2.1.1. Web information needs

The information needs that students and staff wish to fulfil online, as revealed in the findings, are multifarious, which explains the popularity of the topic (students' and academics' information needs) in the Library and Information Science field (Ocholla, 1999; Fidzani, 1998; Bates, 1996). It was generally uncovered that the use of the Internet by students and staff has grown. The typical information seeker in a university setup uses the Internet and the web for all thinkable reasons, ranging from scholarly work to communication and entertainment. Information needs can generally be grouped into three

major categories, i.e. study or research, work or teaching, and communication and entertainment. Academic orientation does not appear to affect web information needs, as the needs of the respondents from Unizul and DUT coincided. While the needs of students and academics overlap, they also differ - the information students search for online mainly relates to their studies, research, communication and entertainment, while work (teaching), research, communication and general awareness are the dominant needs of staff [see Figures 4.6 and 4.7 in Chapter 4]. Commercial activities such as banking were uncommon, although the online booking of airlines and hotels by members of staff appeared to be on the rise. This, together with entertainment, signifies the growing social role of the Internet. Students affirmed their reliance on the web for both study and entertainment-related purposes, which certainly indicates that the web is now more than just an academic or educational tool. This trend is confirmed by Huang et al. (2007:n.p), who wrote: "The Web can act as an instrument of communication, education, business, entertainment, finance, staying informed, passing time, relaxing, escape, socialization, work, surveillance, etc."

The growing number of activities that students and staff now engage in online perhaps indicates the medium's growing acceptance in academia. This, together with increased home access, means that more activities can be performed with better success. Governance and control on use and access, however, has tended to limit activities in most institutions to academic-related functions only. Commonly, institutions filter information or try to limit respondents' online movements to ensure that they only engage in scholarly activities. Therefore popular social websites and programmes such as Facebook, Skype and Google chats are blocked amid considerable protests from students. Instead of ignoring these channels, institutions should identify their strengths and use them for academic purposes. Over the past few years information transfer, particularly with the youth, has evolved from websites, email and chat rooms, to blogs, Skype and discussion forums; presently, social websites (Facebook, You Tube) are the channels users rely on most. Institutions should therefore be proactive and desist from sticking to traditional service methods/models while ignoring trends that have proliferated throughout all spheres of life and changed how people search for and handle information. Because of

the multiplicity of channels, any channel information service providers may choose can only ever reach a fraction of the population they intend to serve. It is therefore imperative that they reach out to more users by using as many avenues as possible. More progressive educational institutions have started using mobile supported learning, having noticed the increased use of mobile technologies by students. Molotech (2007:n.p) reports that the Meraka institute in South Africa aims to explore these opportunities within the field of youth education, in and out of schools, and reports that there has been keen interest in the project from the educational sector. This has been successfully piloted three times in South African schools; the first two involved basic mobile phones and the audiowiki, which was first seeded with content relevant to the pilots. The third pilot looked at the use of more advanced mobile phones with multimedia capabilities. Matthee and Liebenberg (2007:n.p) also report on the use of Mixit for teaching mathematics in some Eastern Cape schools in South Africa.

To surmise, the Internet revolution together with electronic publishing is transforming the way students and scholars communicate and search for information. Consistent with current trends in online behaviour, the results illustrate that the use of the Internet is generally on the rise as more and more people become web literate. On average, most people can now use a wide variety of web information sources or channels.

5.2.2. How, when and where is web information sought? Research question 2

5.2.2.1. Provision of ICT infrastructure

Both institutions were found to provide respondents (students and staff) with physical access to the Internet. Registered students access the Internet/web mainly through university facilities (e.g. computer and departmental laboratories, libraries, etc.), while staff members have access through work stations with Internet access. Generally, the status of access is remarkably high. However, there are numerous challenges that hinder effective access, such as ballooning student populations, restrictive opening hours and erratic Internet connection speeds (bandwidth).

In light of these problems, the effective use of the web is not achieved because the provision of online information presupposes the existence and access to appropriate ICT infrastructure. It therefore stands to reason that academic institutions with a strong ICT infrastructural background would take the lead in the uptake of web information services. During fieldwork observations, the researcher noticed that while the status of infrastructure at Unizul and DUT appeared to be almost at the same level (no correlation of infrastructure per student/staff member was obtained), students and academics at DUT seemed better off in terms of the ICT resources availed to them. Of course, this could stem from South Africa's historical imbalances - DUT had a stronger foundation on which to build than Unizul. Amazingly, the general tone when interviewing students concerning the provision of access was that it is poor at both institutions. The number of facilities available at DUT generally serves a much bigger population of students and staff. Therefore even while DUT may be better resourced, its large student population tends to negate this advantage. Conversely, although itself large, most of the student population at Unizul resides on campus, which gives them the opportunity to juggle their time and access the Internet facilities at odd times, such as late in the night. In fact, it appears as though the DUT has more access problems than the University of Zululand, which battles more with connectivity. Generally, historically advantaged and urban institutions have access to better ICT infrastructure.

From these results, one can safely say that in today's South African educational environment, the role of ICT in information seeking is profound. In terms of awareness and the use of ICTs, the two institutions look to be fundamentally the same. Almost a matching range of all the ICTs (methods of Internet access and Internet connection types) available at DUT were also available at Unizul [see Chapter 4, Tables 4.4, 4.5, 4.6 and 4.7]. Both were dominated by wired access to the Internet (access was provided via cable modem); most of the respondents were still unaware of the technicalities of Internet access.

In comparison to other countries in Africa, the educational ICT landscape in South Africa is healthy, and the institutions are well resourced. The Council of Higher education

(2007:4) went as far as to state that: "Computers have become a ubiquitous feature of South African universities". The ICT infrastructure at both institutions was found to be of reasonably high-quality. But while it is appreciated that basic facilities such as computers and computer laboratories are 'ubiquitous', the same cannot be said about connectivity or actual access to the web. With regard to the latter, the main problem stems more from connectivity (bandwidth) and less from physical access - a hurdle that institutions have seemingly subjugated. Physical access, at least as the status of infrastructure reports, is fairly high, while connectivity is generally poor. This highlights a trend that is common to most developing countries, i.e.: "A tendency to overlook other logistics in favour of hard and software in the wrong assumption that integrating ICT in development means precisely installation of computers and networks full stop. End product." The right approach now is to invest in connectivity without losing sight of other salient factors supportive to transfer of technology" (Mohamed, 2006:10).

5.2.2.2. Media preferences

Research into the impact of media trends on information seeking behaviour allows one to draw from a large pool of studies in LIS literature (Bilal, 2000; Dresang, 2005; Ocholla 1999; Siatri 1998; Marchionini, 1997). Generally, media trends have had a huge impact on academic institutions.

Most respondents' preferred medium when searching for information was the hybrid combination of electronic and print media. There were no outright differences in the medium preferences of students and academics from a university of technology or a traditional comprehensive university, suggesting that one's academic dispensation does not play an influential role in one's choice of an information medium. While both print and electronic sources remain the most favoured medium by academics, electronic or web resources were also popular. The relatively low placement of electronic media by students from both institutions is inconsistent with results from similar studies (Mgobozi and Ocholla 2002; Harley et al 2006; Miller 2000). In most of these studies, electronic sources were rated highly. It is quite likely, particularly for students, that the low rating was influenced by retrieval difficulties (mainly due to low bandwidth or poor connectivity). Students, unlike staff members, are also more likely to use the library in

search of recommended books and articles for their courses, while staff members generally prefer material to be availed to them in their offices and thus seldom make trips or visits to the library. The interviews with both students and staff, however, painted a slightly different picture. While the combination of electronic and print media still recorded the highest preference, electronic use alone was elevated above print media (alone). This response may be attributed to a number of factors that influence media preferences. Notably, electronic media was not favoured by some because it is regarded as transient - here today, gone tomorrow - while its incorporation of multimedia and its currency were generally cited as advantages. Print media is thought of as reliable and authoritative, albeit that it is often out of date. This perhaps explains why the respondents opted for the balanced use of both print and electronic media.

The shift in preferences from print to electronic information sources has many implications for academic institutions, especially the sections responsible for information provision (i.e. libraries and information centres). They are not only expected to integrate new formats with traditional ones, but also review their collection development policies and balance resource allocation to suit what users want. It should be reiterated that the use of traditional print-based information sources is still relevant and important in spite of the growth of digital media. Most respondents from the two institutions cited the unreliability of going 'totally digital' given the lacklustre nature of Internet infrastructure and connectivity. It is as though the respondents were saying that one is better off with print sources than with nothing at all. Increasingly, as the findings suggest, students and staff will go online when they require information even though critical factors still limit effective use.

To a lesser extent, the study also reaffirms assertions by earlier scholars (e.g. Nicholas et al., 2000:98) that the Internet has become the information world's primary obsession. However this obsession has not gone unchecked given [the Internet's] relatively measured use. It must also be stated that factors that have checked this headlong thrust towards going online or solely using electronic sources are fortuitous and unplanned by

both institutions. Students stated that were it not for retrieval difficulties or poor bandwidth, they would rely more on electronic materials.

5.2.2.3. How students and academics search (what measures they take)

By all appearances, there seems to be little difference in how students and staff from a comprehensive university and those from a university of technology search for information on the web. For the most part, both students and staff search the web independently and with no assistance. Assistance with help from colleagues was the second most frequently cited measure taken when searching the web. The respondents suggested that they did not follow a clearly determined pattern or steps, but rather meandered from one step to next.

While there was no clear pattern emanating from the results, it appears as though the factors that affect how one would search for information online play an important role. For instance, staff members from both institutions were generally more knowledgeable about the web than students and tended to use more Boolean logic and more evaluative techniques. Although this may not indicate much because of the minor differences (see Table 4.14), it does suggest that their knowledge and web experience could be a mitigating factor. To a lesser extent, DUT students appeared to have an edge over their counterparts at Unizul in terms of search processes and how they are done - a likely indication of how their urban background puts them at an advantage.

Attempts to model what exact steps information seekers take when gathering information from an information system are numerous in literature. Researchers agree that the steps taken by users differ and are dependent on a number of factors, such as experience, knowledge and information needs (Marchionini, 1989; Hsieh-Yee, 2001). Hansen and Karlgren (in Hansen, 1998:n.p) are of the opinion that: "The users' information needs, knowledge, experience and goals may vary and influence the information seeking process within information retrieval (IR) systems, and need to be identified and supported in the user interface design, especially when offered via WWW." Sridhar (1984:5), in turn, suggests that: "The three clusters of factors which affect user's utilisation of information

are psychological factors, effectiveness of available services and characteristics of the user and his environment."

The findings of this study concur with observations by the Research Information Network Consultative Group on Librarianship and Information Science (n.d:n.p), which surmises that web searching does not follow the "neat stepwise progression from a state of unknowing ("information need") to one of knowing". The results dispute the thinking that information seeking is a tier process with users moving from one logical step to next. Perhaps what this serves to confirm is that there are multiple and diverse ways to reach meaningful results.

5.2.3. What are the channels used when searching the web for information? Research question 3

Overall, a high level of familiarity with various web channels was indicated, although use was mainly concentrated on a few channels. The most popular channel by a long way among students was search engines, followed by email and general websites. Among staff, search engine and online database were very popular channels. The high level of familiarity shown is indicative of the growing use of the Internet and web services in the educational environment. Online information seeking is proliferating in unprecedented ways, as most of the respondents had supposedly encountered all or most of the eight web information channels cited. Low use was probably recorded for channels that have to be paid for, or specialized services (e.g. document delivery services). The only channel some respondents claimed they did not know about was subject portals and this mainly because of poor marketing by the libraries of the respective institutions. Students were interested in finding out more about the various web information channels, particularly online databases. Arguably, this indicates that students understand the value of databases in research. It could also stem from incessant calls by members of staff on students to use more scholarly information.

The institutional differences between Unizul and DUT in terms of academic orientation and historical background played no significant role in the students' and staff members' levels of familiarity with web information channels, particularly in the questionnaire

responses. Although there was no marked difference in the interviews, the impression was that students from DUT were more familiar and comfortable with various web information channels than their counterparts from Unizul. Again, this can be attributed to a greater familiarity with the Internet and the web owing to their urban educational upbringing.

One of the often mentioned advantages of the web has been its ability to present a wide variety and diversity of information. This reason obviously suits students and academics, who have at their disposal a diverse range of information choices for their studies, research and work. The results confirm this assertion. Respondents reported that one of the reasons they used the web was because it collates all the online channels with which they can access information. This is concurred in Koneru's (nd:1) observation, i.e.: "Proliferation of information in varying formats and amounts made the contemporary era 'information intensive' with manifold choices to information access and retrieval."

Literature reviewed for this study shows that students and staff use many different channels and their choices are motivated by a variety of factors. The results show no significant deviation from earlier studies by Mugwisi (2002) and Tenopir (2003), which report that emails, search engines and general websites are heavily relied on. The younger generation, mostly students, showed that they were comfortable and familiar with the various media and technology, asserting the findings by Radom (n.d:n.p) that younger users find it much easier to use the web. The ease of use of some channels (e.g. search engines) was a motivation for many, while for others the comprehensiveness and authoritativeness of the content (of specific channels, e.g. online databases) was the primary motivation.

The frequency with which a channel was used revealed a lot about the channel itself and the user in particular. Respondents appeared selective about the channels they relied on. For example, staff members stated unequivocally that they generally did not use discussion lists and newsgroups. This tells us a lot about the channel; for example discussion lists contain information that is 'newsy', and academics consider this kind of

information to be subversive to research. This suggests that the use of channels depends on what the channel is built for and how its contents meet the needs of the user. Upon evaluation, most respondents opted for channels that satisfied their immediate needs. For example, although online databases are more authoritative for research, many students said they would rather use search engines. This brings to the fore questions about the usability of the channel, ease of use, and assumed benefits when deciding what channel to use.

5.2.4. What are the challenges faced by students and staff when searching for information on the web? Research question 4

Various challenges were identified in the two institutions. Although these took on many shapes, they seemed to revolve around the central question of how to provide adequate support for the information seeking process.

5.2.4.1 Web searching skills

Most of the students claimed that they could effectively search the web. However, these claims did not transfer to meaningful results in class, with lecturers arguing that they (the students) were not, in fact, very competent users of the web. There are many skills-related challenges that students and staff face when searching for information online. In various questions regarding skills, positive responses at DUT were consistently higher than those at Unizul, although by a very small margin (e.g. possession of Net skills by both students and staff, receipt of formal web training by both students and staff, usefulness of training received by students and staff, etc). This would suggest that there are more skilled web users at DUT than at Unizul. These findings are consistent with earlier findings that indicate that there are slightly more web information seeking skills at DUT than at Unizul.

An earlier study comparing historically advantaged and historically disadvantaged higher education institutions by Davis (2005) showed that students and staff from the former institutions were more skilled than those from the latter. Although the study did not investigate the skills difference between rural and urban students, the fact of the matter is that generally an institution whose pool of students comes from urban areas tends to be

better skilled than those from rural areas. The earlier that one is introduced to the Internet and mandatory web information and communication channels, the greater the chances that one would know how to use them. Certain scholars (Mathee and Lindberg, 2007; Davis, 2005 etc.) have argued that the university is not the first level at which Internet skills should be introduced to students; rather earlier introductions (in primary and high school) are necessary, justified by how urbanites (DUT) tend to perform better than rural dwellers (Unizul).

Going back to the contradiction noted regarding claims by students that they are capable of using the web, and the staff's subsequent refutal of these claims, the most frequent criticism cited by the latter is the questionable quality of Internet information and the supposed inability of users to evaluate that information. Further disparities are in contradictory comments that cite the independent use of the Internet, and simultaneous claims that Internet use is difficult and most successful when mediated by a librarian. The general complaint of most of the staff members was that the students' use of online resources and information is alarmingly un-informed. This is surmised in observations by Millard (2000:220), who suggests that "[T]oo much attention is paid to the "button pressing" aspects of ICTs and insufficient attention to "usage skills". Too many people are taught how the technology works rather than how to use the technology to achieve results". This idea is reiterated by The Research Information Network Consultative Group on Librarianship and Information Science (n.d:n.p), which noted that most research about acquiring information skills focuses on information retrieval rather than on information management. In order for people to be deemed proficient computer users or computer literate, emphasis should not only be placed on button pressing skills, but also on higher level search competencies and the ability to use the information retrieved. All this highlights the growing importance of information literacy skills amongst students, particularly more advanced search skills

5.2.4.2. Training
Significantly, large numbers of students claimed to have received training on how to find and use online information (47; 59% - Unizul, 65; 46% - DUT). Conversely, 33 (41%) students from Unizul and 77 (54%) from DUT stated that they hadn't received training,

as did large numbers of academics (6; 75% - Unizul, and 11; 79% - DUT). There was consensus amongst both students and staff (including those who never underwent training) that training, if or when received, is useful. The results therefore attest to the fact that training is very valuable. Students and staff with formal training have a foundation upon which they can later build through self teaching.

5.2.4.3. Insufficient facilities (computers, laboratories)

The expanding student population is straining the available resources at both institutions, more so at DUT, which has a much higher student intake than Unizul. There are not enough computers for all the students to access the Internet at once. Students are forced to schedule their times according to when laboratories are free, such as late in the night. However, since not all students stay in campus residences, some are inconvenienced. Departmental laboratories can ease the pressure or congestion experienced in the main computer laboratories, but not all departments have them. The DUT goes as far as to penalize students with fines to deter them from staying in the library laboratories for long periods. However, these fines are very minimal and are infact, ineffective as a deterrent measure.

5.2.4.4. User-friendliness of intermediaries (lab assistants)

One of the challenges cited by the respondents, particularly the students, was that of unfriendly intermediaries. There were calls for more user-friendly computer laboratory officials; a student at DUT stated that if lab assistants were more user-friendly, more students would approach them for assistance. Respondents complained that when they made requests for assistance, the lab assistants made fun of them. To avoid this treatment, they stated that they would rather work alone for fear of being exposed or ridiculed. For this reason, many would rather ask a friend for assistance or find their own way through trial and error. These findings are substantiated by results obtained on the measures that respondents take when they search; very few respondents solicited help or assistance from intermediaries during a search [see Table 4.13, Chapter 4]. Although intermediary unfriendliness is not the only reason users don't seek assistance, it was identified as a significant deterrent.

5.2.4.5. Evaluation skills

A useful comment was provided by one student, who intimated that: "In my department especially, I find that people usually tend to perceive information on the net as the 'gospel'". This thinking is not only confirmed in the responses, but also apparent in global trends. Agee and Antrim (2003:474) report that: "Many students assume that the Internet satisfies all their information needs, as confirmed by The Pew Internet and American Life Study (2001)". Already highlighted in previous chapters was the over reliance of students on web information with little or no critical evaluation. One lecturer at DUT voiced concerns about the need to teach students how to use online information without plagiarism. A notable group of the interviewed respondents felt that the referencing of Internet sources was very difficult. Hur-Li Lee (2008:211) noted that in previous studies of undergraduates' information seeking behaviour, two common themes emerged, the first being the enormous challenges they face in finding the right information to meet their needs, and the second, that they would prefer to make the least possible effort when searching for information. Perhaps this explains why success is not often achieved and why the use of search engines is so rampant.

5.2.4.6. Access restrictions/ web filtering

The two institutions restrict access to certain sites whose content is deemed inappropriate, such as pornographic sites. This noble endeavour, however, adversely affects access to certain sites that respondents may require for their studies. The problem is that the institutions often tend to cover all sites that contain nudity, all versions of which get blanketed as pornography. Health related sites are therefore also blocked in the process, denying students and staff scholarly information. Although governing the use of the web is encouraged, it needs to be readdressed and viewed from a more objective stand point. For example, a lecturer at DUT indicated that some sites dealing with HIV/AIDS have been blocked, making it difficult to obtain HIV/AIDS-related information. The lecturer suggested that the university needs to upgrade its filtering system and engage in consultations with various departments before making decisions about such issues.

5.2.4.7. Lack of access to specific/relevant information and information overload

As noted by Shafi and Rather (2005:n.p), the web has grown from an esoteric system for use by a small community of researchers to the de-facto method of obtaining information for millions of individuals, many of whom have never encountered or have no interest in retrieving information from databases. This raises a lot of questions about the relevance of the information that these users retrieve. Shafi and Rather continue: "A plethora of search engines ranging from general to subject specific are the chief resource discoverers on the Web. These engines search an enormous volume of information at apparently impressive speed but have been the subject of wide criticism for retrieving duplicate, irrelevant and non-scholarly information." A considerable number of respondents from Unizul and DUT complained that although large volumes of documents were retrieved, most were irrelevant. The over reliance on search engines means that users usually gain access to general information - search engines often index information in the public domain. However, information of value is often stored in subscription databases that users can't access. Tied in with the inability to evaluate information, respondents decried the fact that when they used search engines such as Google, too many results were displayed and it took them a lot of time to sift through them. A student at Unizul said that when searching online, particularly using Google, enormous amounts of documents are retrieved without knowing which are relevant. The main problem with search engines, as Shafi and Rather (2005: n.p) argue, is that they "…do not sift information from a scholar's point of view, though some search engines like Google have developed separate applications for disseminating scholarly information like 'Google Scholar'". The researcher did not determine to what extent applications like Google scholar were used by the respondents, particularly students, although the assumption is that few use them.

A consistent problem associated with the popular search engines students rely on is that of information overload or in the students' exact words, 'too much information'. Atsaros, Spinellis, and Louridas (2008:44) conclude that, "As the Internet is sharply increasing; the amount of data available via the web is increasing as well. That is why Internet users use search engines in order to locate the data they want, without wasting much time and

avoiding the risk to get lost into the immense amount of data available through the net".
It appears in this case that using search engines has not thwarted the problem of students
getting lost in the maze of information they obtain.

5.2.4.8. Hardware Incompatibility

There are still a number of workstations using Microsoft Word 2003, which is a problem
because new Microsoft packages, particularly Microsoft Word 2007 and Microsoft
PowerPoint 2007, cannot be opened in [Microsoft 2003] and earlier versions.

5.2.5   How and to what extent has the web affected the information seeking behaviour/ habits of students and staff in institutions of higher learning? Research question 5

5.2.5.1. The web and other information sources

Ernest, Level and Culbertson (2005:93) are of the view that electronic access has
dramatically affected information seeking behavior. Individuals now have the option of
checking electronic resources in addition to consulting friends, visiting an information
site such as a library or government agency, and communicating by phone or sending
mail electronically. There is no doubt therefore that the web has engineered a shift in the
way people visit and use other information sources. The networked environment has
already changed the way libraries and librarians serve readers. This study sought to
determine the potential impact of the web on the use of and visits to other information
sources, such as libraries. Although significantly high uses of the web were recorded, it
appeared to have had no significant impact on the respondents' use of or visits to
traditional information-service providers. Hybrid use was the order of the day, with both
traditional print-based environments and the new environments given almost equal
attention. This is interesting because earlier ICT authors mooted that one of the
implications of users' experiences and sentiments of the web would be that they would
eventually have to decide whether to continue using other information sources or not. It is
this kind of thinking that saw people predicting the demise of the paper, and terms such
as the paperless office were coined. Given the Internet's unique characteristics and the
scientific community's need to access information and rely on electronic communication,
it is conceivable why this view was held. In a report by OCLC (2005:vii), De Rosa and

others wrote: "It has become increasingly difficult to characterize and describe the purpose of using libraries because the relationships among the information professional, the user and the content have changed and continue to change." This thinking has been popularized by the growing dissonance between the environment and the content that libraries provide, and the environment and the content that information consumers want and use.

There is a lot to read from the suggestion by Agee and Antrim (2003:474) that "the university library is a quiet place, not because students are studying but because very few of them are there. Students use library resources; they just do not come into the building for them". If we are to go by the responses obtained, there is some credence to this statement at the two institutions. A sizeable number of the respondents agreed that they no longer frequented the library as much as they used to because of the web. The web purportedly satisfies people's voracious appetites for information; instead of strolling through library stacks to find a book, people can stay put in their homes and offices and retrieve full texts with a click of a button. However, responses show that this has not resulted in drastic changes or a total disregard for the print medium. Most respondents believed that the web had not affected their use of other information sources. Students and staff also unanimously agreed that electronic sources make it easier to gather and use information. Evidently, increased Internet and web connectivity in all of the students and staff's daily activities (work, research, study, entertainment, etc) will ultimately change the nature of how they view and use other information sources, although print sources will obviously remain a vital channel for information. In the words of Tenopir (2003:32), "Print remains important for at least some information for all subject disciplines and as part of the research process". It would be interesting to study if or by how much student and staff numbers are dwindling in libraries. Unfortunately this was outside the scope of this study.

As mentioned earlier, the web is popular because it is easy to use. Respondents' comments were in the vein of, "You just log on to Google and you are done." As discussed in earlier sections, it appears as though this ease of use is associated mainly to

search engines, given that they are the channels most users visit when online. Through the web, one can retrieve a great deal of information, but this comes hand in hand with problems of evaluation. In the words of one respondent, "Sometimes I feel like I have gathered enough information from the Internet only to find out that most of what I get is irrelevant".

Although the use of library resources appears to be dwindling, the library is still highly regarded as a place for study. Some of the reasons cited for the continued use or non-use of the library/traditional print resources because of the web are summarised in the table below.

Table 5. 1: Reasons for the continued use or non-use of the library/traditional print resources because of the web

Library	Web
Conducive environment for study	General information/ irrelevant
Print resources are easier to reference	Quick to find information on the web
Outdated information	Ease of use of Internet resources
Often material is relevant	Currency of Internet sources
Help or assistance from librarians	Difficult to reference
Comprehensive information	Information overload
Responsible use/ rules/ governance	Wide subject/ topic coverage/ sometimes the only source for certain information
Credible sources	Entertaining/ savvy
-	Links to related sources
-	Irritating popups/ adverts
-	Viruses
-	Lack of local content/ African and South African material
-	Multimedia - text, video, pictures and sound
-	Unreliable content
-	Access restrictions/ licensing/ subscription/ filtering

-	Sometimes slow
-	Often ungoverned use/ hate speech, pornography, etc.
-	Lack of help (human factor)
-	Need for evaluation skills

5.2.6. Summary

This chapter discussed the findings of a survey on the web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology. In general, the findings suggest that the use of the web is relatively high. Significant differences between the institutions in responses to the survey were not evident in many areas - the range of ICTs used was similar, and the reasons or motivations behind the use of the web were also similar. However, during interviews with the respondents, DUT appeared to be better off than Unizul, particularly when measured according to the information and communication resources in relation to the target populations, although the margin is believed to be small. A clear distinction was exposed in the skills sector, with the more urban populace at DUT generally finding it easier to search for information and communicate online than their counterpart population at Unizul. The next chapter provides the summary and conclusions of the study, recommendations for improvement at the two institutions, and suggestions for future research.

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1. Introduction

This chapter summarizes the findings of the study, provides the conclusion and recommendations, and suggests directions for further research. The study set out to examine the web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology. A summary for each objective is provided, in each case highlighting various observations and important findings. The objectives of the study were as follows:

1. To identify the web information needs of students and staff in institutions of higher learning;
2. To determine how, when and where web information is sought;
3. To establish the channels used when searching the web for information;
4. To identify the challenges faced when searching the web for information; and
5. To recommend optimal ways of web information seeking and use within higher education institutions.

6.2. Summary based on the research objectives

6.2.1. To identify the web information needs of students and staff in institutions of higher learning

In the surveyed institutions, research, teaching, studies (assessments, tutorials, etc.) and communication were cited by students and staff as the main reasons for using the web. The web is also gradually being used to fulfil needs that are considered unscholarly, such as banking, searching for employment, or making hotel and travel arrangements. This partly shows how much the medium has permeated the daily lives of the university community.

The study revealed that the nature and type of information sought online is not in any way different from what students and staff members normally seek from traditional print-

based sources. However, the motivations behind web use appear to have changed. The widely held view that web-based information lacks credibility is gradually losing ground, demonstrated by the high levels of web use recorded in the findings. In the early stages of electronic information services, many believed that the speed, diversity, and amount of information would easily discredit web content. This was reason enough to see a number of people (scholars in particular) shunning its use. Although questions about the quality of web information are still prevalent, they appear to have little effect on its utilization.

Important concerns were raised about the nature of the information obtained by students and their ability and desire to evaluate online information. Academics were sceptical about the students' ability to evaluate and effectively use web-based information. Increased engagements with the web have, however, gone a long way in generally improving the skills of students and staff. The learner-oriented teaching model that institutions now follow encourages students to search for information themselves.

6.2.2. To determine how, when and where web information is sought

How students and staff search for information online is dependent on a number of factors, such as experience, skills levels, and/or the nature of the problem or need that they wish to address. What studies of information seeking have achieved is a rough indication of the process users follow when searching for information. As such, various models and theories have been suggested.

Consistent with literature, this study showed that more and more people are independently searching the web and there is less consultation with intermediaries. Steps to determine how these independent seekers go about their work - modelled around Kuhlthau's information seeking steps - were used to examine how students and staff search for information online. The results showed no clear pattern, but it was clear that because of the huge amount of information available on the web, users typically locate useful web pages by using a search engine. Most of the interviewees claimed to use search engines daily. Search engines, most notably Google, have thus become the first step in searching for information resources on the web.

The use of the web and its diffusion is highly dependent on the development of related infrastructure. It was revealed that although facilities are available, they are not enough to cater for the growing student populations. Some of the existing infrastructure is also in bad shape and needs to be renovated. On the whole, both universities seemed to have the basic infrastructure to facilitate web access, although the DUT had slightly better facilities than Unizul. Some of these disparities in infrastructure and support are direct descendants of apartheid. There is a general need for improved access to these facilities.

6.2.3. To establish the channels used when searching the web for information

The web has been identified as a medium that has greatly improved access to information resources of various kinds and quality. Although various channels are now being used and there is growing familiarity with them, most users seem to focus on a few channels, particularly search engines, email and general websites. This tells us that many online users scratch the surface or use the web for its most basic services, such as communication via email and acquiring general information with the help of search engines. There was generally limited exploration of channels that host more scholarly material (e.g. databases and subject portals). Those with more web experience, such as postgraduate students and academic members of staff, showed a greater appreciation for other information channels such as online databases and electronic document delivery services. On the whole, the respondents demonstrated a high level of familiarity with the Internet and various web channels. Despite the significant increases in the use shown, print sources were still cited as important.

6.2.4. To identify the challenges faced when searching the web for information

Many challenges affecting effective web information seeking were revealed in the two institutions. Key among them were inadequate infrastructural resources (computer laboratories and computers), skills shortages (lack of skilled personnel to assist with information seeking processes and lack of skills on the respondents' part to search for and evaluate information), lack of time (to use web facilities) and expertise (to determine the most useful sources), and lack of access to computer facilities (restrictive opening hours

or overcrowding). There were also challenges relating to access to resources on the web because of control or governance issues. Certain useful sites were blocked, passwords for some journals were unavailable, and institutions did not subscribe to some journals. Another annoyance (as opposed to a serious challenge) was the issue of popups or unsolicited mail or adverts.

6.2.5. To recommend optimal ways of web information seeking and use within higher education institutions

Mechanisms or ways that could improve the web information seeking processes at the two institutions are discussed under the recommendations section.

6.3. Conclusion

Educators' lives and the lives of on-campus and off-campus students are rapidly being altered by the encroachment of the web into mainstream education. It is not surprising to find that the impact of the Internet has been quite profound on the two institutions. Relatively high levels of awareness and use were recorded for the various web technologies, suggesting that they fulfil certain needs and are generally considered to provide genuine benefits. Staff from both institutions demonstrated a reasonably high level of awareness and use of online facilities.

However, it is clear from the results that although students said that they benefit from the ease of access offered by Internet resources, there is also a corresponding lack of critical evaluation. According to the lecturers, students' online skills are generally poor, albeit with no marked negative changes towards web use.

For all the hype about the web, the use of other sources has not been adversely affected, although how they are perceived has. Students and staff members' web information needs were shown to be diverse, although the web is mainly used to address/satisfy a specific few (needs). Respondents expressed a strong desire to learn more about other channels, particularly databases.

There were a number of significant barriers to the identified uses. When asked about the changes they might like to see, support for greater access and training were cited.

Among the main findings of the study were the following:

- **Access**. A number of computer laboratories are available at both institutions, including main laboratories, departmental computer laboratories, and library laboratories. Although facilities for web access are available, they do not seem to (sufficiently) cater for the massive student populations at the two institutions.

- **Connectivity and connection types**. Most of the respondents gained access to the Internet by means of wired computer laboratories and wired office terminals. A fair number of the respondents had home access. The connection types that seemed to dominate were modem access and dial up connections, although most of the respondents did not know the type of connection they had.

- **Satisfaction with mode of access.** Most of the interviewees were not satisfied with their mode of access. They complained about poor Internet connections, arguing that they always failed or were down.

- **Preferred medium of information.** Most respondents said that they combined both print and electronic media in their search for information. Significant growth was recorded in the use of the electronic medium, although print media has still remained important. Although there is generally widespread scepticism about the notion of a total shift or reliance on electronic media and a total disregard for print sources, respondents' (students and staff) impressions were that electronic sources are increasingly growing more relevant.

- **Reasons for searching for information online**. The web is used to meet a variety of needs, ranging from work, to research, studies, entertainment and leisure. For academics, use at work and at home is not necessarily the same, with more peripheral (or less academic) needs addressed at home. The web seems to be more holistically used by students in educational institutions, perhaps because most do not have access (to the web) at home.

- **Levels of literacy**. While staff members demonstrated a fairly high level of online literacy, a lot of improvement is required from students. A considerably large

number of the respondents were self taught, particularly members of staff. The latter stated that training would not be of much benefit to them as they have managed, over the years, to learn on their own. While the staff members cast doubt on students' online skills, it appears not to deter those (students) from using the web. Many students had received training. Those who hadn't, felt that it would make a difference. There is generally a growing awareness of the advanced role computers play in searching for information (perhaps as a result of the push from jobs or studies). Students and staff are taking the initiative and learning on their own. It seems reasonable to expect that with proper training, they would fare even better online than they do now.

- **Range of information technologies and channels used.** Both institutions have recognized that recent advances in ICTs have altered the pattern of delivery of academic services in higher education and significantly modified the information seeking behaviour of the students and staff served by these institutions. The web has led to a fundamental paradigm shift in information seeking behaviour. It is a low-cost technology that provides access to multiple channels of information that can be exchanged in a manner beneficial to higher education users. The institutions have taken steps to cater for this change by providing facilities for (or in support of) web information seeking. At the University of Zululand, a new postgraduate lab has recently been commissioned, while the DUT has finally started to offer e-learning. Efforts to do the latter are at advanced stages at the University of Zululand. At this stage, these initiatives are not on a grand scale, although there are intentions to broaden them in the future.

- **Challenges**. The main or recurring challenges in both institutions were as follows:

i. **Lack of web searching and evaluation skills.** Although a number of respondents appeared to have received training, this also didn't seem sufficient for optimal web use. Specifically, respondents complained that they could not (or did not know how to) reference certain Internet sources. They also did not know what to

do about information overload (they often retrieved general or irrelevant information).

ii. **Poor connectivity and access.** Effective access to facilities was cited by the respondents as a problem. Some of the barriers to access reported include few computers, overcrowding, sharing lab facilities with lectures or tutorials, and restrictive opening hours. Technical difficulties were also cited as a serious problem, particularly the unpredictable performance of the Internet.

iii. **Lack of technical support or assistance**. There were also a lot of claims that laboratory assistants harass students.

Other concerns had to do with the lack of local content, journal licensing, viruses, popups, and unsolicited mail or adverts.

- **Use of or visits to other sources.**

While some respondents indicated that they no longer needed to use print sources or visit traditional information storehouses (such as libraries), an equally large group argued that these traditional information resources still have a role to play. The library's image to information seekers in general is not good, and needs to be improved. Reasons for discontinuing visits to the library were cited as lack of speed, saving time (no need to retype material obtained online), entertainment (the web appeals to respondents because one can work and play at the same time), ease of use and simplicity, and the currency of online information.

6.4. Recommendations

On the whole, the institutions should provide comprehensive training programs that address the skills deficiencies noted in students and members of staff. It is also necessary for mechanisms to be instituted that improve both physical and intellectual access to web resources. Other recommendations are as follows:

- Investment in ICT infrastructure (e.g. computer laboratories and computers) to ease up congestion.

- Information literacy/web literacy training - infrastructural investments should be followed up by training to impart high end information seeking skills on all members of the university community. There should also be a greater emphasis on information literacy to mould students into responsible users who are concerned about the value of the information they use. IT skills are the precursor to or the foundation of effective web information seeking strategies.

- New and more creative connectivity types offering greater mobility and ease of access, such as wireless technology, need to be instituted (this could expand Internet access to residences).

- Bandwidths should be increased for greater Internet speed.

- Computer courses must be included in all aspects of curricula development, and should perhaps be offered in every program.

- Web information seeking courses need to be offered at regular intervals (training programmes can be offered on weekends).

- There should be more online workshops for staff at regular intervals. The professional development of academics has received sparing attention. It is often taken for granted that they may not know how to effectively work online. A large contingent of the staff members interviewed was untrained; how effective are the web information seeking skills that they impart on students if they themselves never had any proper training?

- More information about all the various web information channels should be provided, particularly details about those that proved unpopular (e.g. databases).

- Proper marketing and education/awareness. Libraries are urged to engage in bigger orientation drives to educate users about the importance of OPACs in information retrieval and to generally increase the university community's awareness of their services. Libraries also need to improve their image; it is alarming that users would prefer not to visit them simply because they are not cool or the library environment is deemed old fashioned.

6.4.1. Recommendations for further research

- The impact of ICTs on education and its impact on users in the African academic environment have yet to be determined. The relationship between the use of technology and educational reforms continues to be one that inspires an enormous quantity of research. This study focused on the web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology. Further research could broaden the criteria of the study and explore how students and staff from other colleges and universities behave online in their endeavours to meet their information needs. The study population in later studies could also be widened to get clearer indications of the web information seeking behaviour of students based on their levels of study and faculty affiliations, and staff by designation and faculty affiliation.

- The two institutions need to create conducive environments for future researchers in the field. Ethical clearance should not take unnecessarily long periods that cause major delays in the commencement of research.

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APPENDICES

Appendix 1: Table for research methodology

Research Question	Research Method(s)	Data collection Instrument(s)
What are the web information needs of students and staff at institutions of higher learning?	Survey	Questionnaire, Interview and Literature Review
How, when and where is web information occurring or sought?	Survey	Questionnaire, Interview, Observation and Literature Review
What are the channels used when searching for information on the web?	Survey	Questionnaire, Interview, Observation and Literature Review
What are the challenges faced by students and staff when searching for information on the web?	Survey	Questionnaire, Interview, Observation and Literature Review
How and to what extent has the web affected the information seeking behaviour/ habits of students and staff in institutions of higher learning?	Survey	Questionnaire, Interview and Literature Review

Appendix 2: Questionnaire (students and staff)

A comparative analysis of the web information seeking behaviour of students and staff at the University of Zululand and Durban University of Technology

Dear Respondent

I am seeking your help in a survey on the analysis of the web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology. I am interested in knowing how the World Wide Web (web) affects the way students and staff search for and acquire information. The main purpose of this research is to better understand your information needs and to analyze the way in which electronic environments, in particular the web, meets them.

I kindly ask for your time to complete the following questionnaire and return it at your earliest convenience. Your free and frank feedback will be taken as an important contribution to the present research work. The results of this questionnaire are essential to the completion of my Masters degree. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this study.

NB: Technical terms appearing in the questionnaire are explained using footnotes.

Your invaluable effort in completing this survey is greatly appreciated.
Thanking you in advance for your time.

Ntando Nkomo (Mr.) Masters Student
Student Number: 200711315
Department of Library and Information Science (035)902 6484
Mobile: 0842735420 Email: nkomontando@yahoo.co.uk

BACKGROUND INFORMATION

Please tick where appropriate

1. Gender   Male   ☐   Female   ☐

2. University affiliated to   UNIZUL   ☐   DUT   ☐

      If DUT indicate Campus   M. L. Sultan   ☐
                                          Steve Biko   ☐
                                          Ritson   ☐
                                          City

3. Faculty   ………………………………………………………

4. Department   ………………………………………………………

5. Please indicate your level of study (students)

    Undergraduate   ☐
    Honours   ☐
    Post graduate certificate   ☐
    Post graduate diploma   ☐
    Masters   ☐
    Doctorate   ☐
    Post Doctorate   ☐

6. Please indicate your rank/position/designation (members of staff)

    Junior Lecturer   ☐
    Lecturer   ☐
    Senior Lecturer   ☐
    Associate Professor   ☐
    Professor   ☐
    Senior Professor   ☐

SECTION B

Please tick where appropriate

7. If given the option, how would you prefer to obtain information/materials relevant for your work, research or studies?

Print copy ☐

Electronic copy ☐

Both: Print & Electronic ☐

8. What determines your choice of an information source in your line of work?

Accuracy ☐

Reliability ☐

Relevance ☐

Convenience ☐

Accessibility ☐

Proximity

Understandability ☐

Timeliness ☐

Speed ☐

Authority ☐

Other……………………………………………………………………………………

9. Do you have access to the Internet?   YES ☐   NO ☐

If your answer to above is NO, explain why and thereafter do not proceed.

……………………………………………………………………………………………

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If YES, how do you gain access to the Internet?

Wired office terminal (desktop or laptop)

Wired computer laboratory, library or information centre

Wired home PC

Wired dormitory PC

Wired both home PC and office PC

Wireless office terminal (desktop or laptop)

Wireless computer laboratory/ library or information centre

Wireless office computer

Wireless home computer

Wireless both home PC and office PC

Other……………………………………………………………………………

10. Which of the following Internet connection types do you use?

Dial-Up/ regulator modem connection

DSL (Digital Subscriber Line)

ADSL (Asymetric Digital Subscriber Line)

Cable Modem Connection

Satellite Connection

ISDN (Integrated Services Digital Network)

Wireless

I don't know

Other……………………………………………………………………………

11. Are you satisfied with your connection/method of access to the Internet in terms of processing speed? *Check against the access method you have only.*

Method of Access	Satisfaction		
	Yes	No	Not Sure
Wired office terminal (desktop or laptop)			
Wired computer laboratory, library or information centre			
Wired home PC			
Wired dormitory PC			
Wireless office terminal (desktop or laptop)			
Wireless computer laboratory, library or information centre			
Wireless home PC			
Wireless home PC and office PC			
Wireless dormitory PC			
Other………………………..........................			

12. Do you as a student have enough time and access to the Internet from whichever facility you use? YES ☐ NO ☐

If NO, Why?

………………………………………………………………………………………………
………………………………………………………………………………………………
…...………………………………………………………….………………………………..

13. Do you as a staff member have enough time among your other duties to seek information from the web?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

14. For what purposes do you seek information on the World Wide Web?

Check all that apply

Assignments

Research

Entertainment (e.g. downloading music/ playing online games)

Communication/Networking (e.g. email, net meeting, chatting)

Study

Teaching

General awareness

Other…………………………………………………………………………

15. Which of the following channels of information do you rely on most when seeking information on the web and how often do you use them?

Check against each of the channels below that which applies to you

Channel/ Source	Frequency			
	Never	Less than once a month	Weekly	Daily
Online Public Access Catalogues (OPACs) e.g. Unicorn				
Online Databases[1] (Full text Journal Sources like EBSCO, Emerald)				
Search Engines (e.g. Google, Yahoo)				
Document delivery & Current awareness				
Subject Portals[2]				
Discussion lists, Newsgroups[3]				
Websites				

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[1] Usually a large collection of data organized especially for rapid search and retrieval by a computer. It lists articles and may include abstracts or full text articles.

[2] A web-based mechanism for accessing a collection of high quality, evaluated resources identified to support research in a particular discipline where the resources are evaluated and described by information specialists in the field, such as science librarians; a subject portal is considered to be a website which as an entry point to other websites by being an aggregation of subject specific links.

[3] Permit widespread sharing of information among people with similar interests.

Email				
Electronic document delivery services[4]				
Other……………………………………				

16. Do you think you possess the necessary skills to use the Internet/World Wide Web?

YES ☐   NO ☐   More or less ☐

17. . Have you ever received any formal training or orientation on how to use the World Wide Web?   YES ☐   NO ☐

If "YES", do you think that such training was useful?
YES ☐   NO ☐   Somehow ☐

If "NO", do you think that such training would have been useful?
YES ☐   NO ☐   Somehow ☐

18. Suggest what you think can be done to equip more people (students and staff) with web information seeking skills in your institution.

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19. Which of the following statements best define how you go about seeking information on the web?

I usually do not seek information from the web ☐

I usually seek information from the web with the assistance of an intermediary/proxy (e.g. Librarian, Lab assistant, etc.) ☐

I usually get assistance from a friend or colleague ☐

I usually do the searching myself ☐

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[4] A service for the ordering and delivery of documents by electronic means or otherwise; the term document delivery more specifically means the supply of journal articles and other copies on a personalized basis, with the library charging the user or his academic department for the fees that are involved.

20. If you indicated that you usually do the searching yourself above (question 19), how often do you normally use the steps listed below when seeking information on the web?

Step	Frequency			
	Very Often	Often	Seldom	Never
Identify a need/task definition - when you determine the need for information (e.g. assignment, research problem, etc.)				
Choose a channel/source - think of all the places you might go to find resources that would help you answer your questions (e.g. search engines)				
Define search query, for example by identifying or gathering keywords (brainstorming)				
Combine the terms/keywords using Boolean operators (AND, OR, NOT) or combine terms using natural language (your own terms)				
Evaluate results - determine whether the search process was a success				
Use of information or synthesis (write your report, assignment, etc.)				
Finish or redo again (conclude your search)				

21. In general, do you find what you are looking for on the web?

No ☐

Not as much as is always needed ☐

Enough ☐

More than was needed ☐

22. How would you rank the World Wide Web in terms of relevance to your work?

Very relevant ☐

Relevant ☐

Slightly relevant ☐

Irrelevant ☐

23. Please indicate the amount of time you spend on the web per day in information-gathering activities.

Less than 15 minutes ☐

15 minutes - One hour ☐

One hour – two hours ☐

Two hours - four hours ☐

More than four hours ☐

24. What challenges, if any, do you face when searching for information on the World Wide Web in the university?

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Suggest what can be done to address the challenges you have stated above.

……………………………………………………………………………………………

……………………………………………………………………………...………………

25. Do electronic sources make it easier or more difficult to gather and use information?

Easier (I have more time for other tasks.) ☐

About the same (I spend about the same amount of time on information gathering with or without electronic sources.) ☐

More difficult (It takes more time to gather and sort through information.) ☐

Much more difficult (There is too much information for me to sort through efficiently.) ☐

26. Has the Internet and World Wide Web affected your use of or visits to other information sources (e.g. books and print journals) YES ☐   NO ☐

If YES, please explain how?

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Additional comments regarding the issues above

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Thank you very much for your valuable comments /suggestions and time.

Appendix 3: Interview (students and staff)

A comparative analysis of the web information seeking behaviour of students and staff at the University of Zululand and Durban University of Technology

Dear Respondent

I am seeking your participation in a survey on the analysis of the web information seeking behaviour of students and staff at the University of Zululand and Durban University of Technology. I am interested in knowing how the World Wide Web (www) affects the way students and staff search for and acquire information. The main purpose of this research is to better understand your information needs and to analyze the way in which electronic environments, in particular the web, meets them.

I kindly ask for your time in a short interview. Your free and frank feedback will be taken as an important contribution to the present research work. The results of this interview are essential to the completion of my Masters degree. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this study.

Your invaluable effort in completing this survey is greatly appreciated.
Thank you in advance for your time.

Ntando Nkomo (Mr.) Masters Student
Student Number: 200711315
University of Zululand
Department of Library and Information Science (035)902 6484
Mobile: 0842735420 Email: nkomontando@yahoo.co.uk

DEMOGRAPHIC DETAILS

1. Gender   Male ☐   Female ☐

2. University affiliated to   UNIZUL ☐   DUT ☐

    If DUT indicate Campus   M. L. Sultan ☐

          Steve Biko ☐

          Brickfields ☐

          City ☐

3. Faculty   …………………………………………………………

4. Department   …………………………………………………………

5. Please indicate your level of study (students)

    Undergraduate ☐

    Honours ☐

    Post graduate certificate ☐

    Post graduate diploma ☐

    Masters ☐

    Doctorate ☐

    Post Doctorate ☐

6. Please indicate your rank/position/designation (members of staff)

    Junior Lecturer ☐

    Lecturer ☐

    Senior Lecturer ☐

    Associate Professor ☐

    Professor ☐

    Senior Professor ☐

GENERAL CONNECTIVITY

7. Do you have access to the Internet? Yes ☐ No ☐

8. If YES, where do you access the Internet?

………………………………………………………………………………………

If NO, please explain why

………………………………………………………………………………………

………………………………………………………………………………………

9. How would you rate the efficiency of your institutions' Internet connection in terms of the following;

I) Speed……………………………………………………………………………

II) Access/Time……………………………………………………………………

III) Quality of facilities (hardware)……………………………………………..

10. What are the challenges you usually face relating to connection to the Internet/ World Wide Web?

………………………………………………………………………………………

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11. How can the challenges indicated above be addressed?

………………………………………………………………………………………

………………………………………………………………………………………

MEDIUM OF INFORMATION

12. If given the option, how would you prefer to obtain information/materials relevant for your work, research or studies and why?

Print copy

………………………………………………………………………………………

Electronic copy

………………………………………………………………………………………

Both: Print & Electronic

………………………………………………………………………………………

13. What determines your choice of an information source in your line of work?

………………………………………………………………………………………

THE WEB AND INFORMATION NEEDS

14. Do you use the Internet? Yes ☐   No ☐

If Yes for what purposes do you seek information on the World Wide Web?

....

If No what could be the reason?

…………………………………………………………………………………………

15. Does the web play a major role in your gathering of information for your studies, research, and work? Justify

…………………………………………………………………………………………

…………………………………………………………………………………………

16. How often? (Estimate the time you spend per day on the web)

…………………………………………………………………………………………

17. Of the following web channels of information: library catalogues, online databases, search engines, subject portals, discussion lists, electronic document delivery services, email and websites; which do u rely on most? Justify

………………………………………………………………………………....…

…………………………………………………………………………………………

18. What are your reasons for not using or using less of the other channels you left above?

……………………………………………………………………………….…..

…………………………………………………………………………………………

SEARCHING STRATEGIES AND SKILLS

19. Do you often search the web independently or with the assistance of friends or colleagues, etc?

………………………………………………………………………………....…

…………………………………………………………………………………………

20. Explain how you usually go about seeking information on the web?

…………………………………………………………………………………………

21. In general, do you find what you are looking for on the web?

………………………………………………………………………………………………

22. Do you think you possess the necessary skills to use the Internet/World Wide Web?

YES ☐   NO ☐   More or less ☐

23. Have you ever received any formal training or orientation on how to use the World
Wide Web?   YES ☐   NO ☐

If YES, do you think that such training was useful?

YES ☐   NO ☐   Somehow ☐

If NO, do you think that such training would have been useful?

YES ☐   NO ☐   Somehow ☐

24. Suggest what you think can be done to equip more people (students and staff) with
web information seeking skills in your institution.

………………………………………………………………………………………

25. What challenges, if any, do you face when seeking information on the World Wide
Web at the university?

....

....

26. Suggest what can be done to address the challenges you have stated above.

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27. In your opinion has there been any change in the way you access, retrieve and use
information as a result of the web? Justify your response

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Additional comments regarding the issues above

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Thank you very much for your valuable comments /suggestions and time.

Appendix 4: Permission to conduct research at DUT

DURBAN UNIVERSITY of TECHNOLOGY

Centre for Research Management and Development
Durban University of Technology
Tromso Annexe, Steve Biko Campus
P.O. Box 1334, Durban 4000
Tel.: 031-3732576/7
Fax: 031-3732946
E-mail: gansen@dut.ac.za

5th November 2007

Mr. N. Nkomo
Department of Library and Information Science
University of Zululand

Dear Mr. Nkomo

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your letter dated 30th August 2007 in respect of the above refers. I am pleased to inform you that the Institutional Research Committee (IRC) has granted permission for you to conduct your research at the Durban University of Technology.

We would be grateful if a summary of your key research findings can be submitted to the IRC on completion of your studies.

Kindest regards.
Yours sincerely

PROF. D. PILLAY
DIRECTOR: RESEARCH MANAGEMENT AND DEVELOPMENT

cc: Dr. D. Jacobs: Department of Library and Information Science - University of Zululand