USE OF ELECTRONIC DATABASES BY POSTGRADUATE STUDENTS IN THE FACULTY OF SCIENCE AND AGRICULTURE AT THE UNIVERSITY OF KWAZULU-NATAL, PIETERMARITZBURG
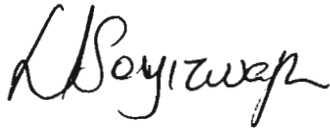
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Declaration

The author hereby declares that the contents of this dissertation, unless specifically indicated to the contrary, are her own work and that the dissertation has not been submitted simultaneously, or at any other time, for another degree.
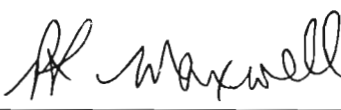
Ida Lindiwe Soyizwapi

As the candidate's supervisors we have approved this thesis for submission.

Signed: _____   Signed: _____

Name: Ruth Hoskins   Name: P. S. MAXWELL

Date: 15/12/2005   Date: 15/12/2005

Dedication

This thesis is dedicated to my mother, E N Soyizwapi, and my children, Mbulelo (Pumbaa) and Vuyelwa (Vuvu).

Abstract

The purpose of this study was to investigate the use of electronic databases by postgraduate students in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg, with a view to proposing a set of recommendations based on the findings that would contribute to a more effective use of these databases. The study focussed on the use students made of electronic databases provided by the University of KwaZulu-Natal, Pietermaritzburg Library and any other electronic databases which provided information and were needed for their studies.

The study population consisted of 500 registered postgraduate students. The survey instrument used to elicit data was a self-administered questionnaire that was distributed to a sample population of 100 postgraduate students. The questionnaire sought to establish if postgraduate students used electronic databases, which electronic databases postgraduate students used and the reasons for their choice, to identify problems postgraduate students encountered, how students became aware of the databases and how often they used the available databases. A total of 65 postgraduate students responded, a response rate of 65%. The results were analysed in terms of frequency responses and they are graphically displayed in the form of tables and graphs.

The study found that postgraduate students did use the electronic databases, but a few of the databases were not used. A number of problems were experienced when using the databases. Students became aware of the availability of electronic databases from a variety of sources such as friends, library orientation programmes and academic staff. Search engines were identified as a resource that was very popular with almost all the students. There was a need for training on use of the databases and a need for improving access for all campus and off-campus users. Recommendations for action and further research, based on the conclusions of the study, are made.

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List of acronyms and abbreviations

CAB	Commonwealth Agricultural Bureau
CATNIP	Cataloguing Network in Pietermaritzburg
CD	Compact Disc
CD-ROM	Compact Disc-Read Only Memory
COUNTER	Counting Online Usage of Networked Electronic Resources
CSIR	Council for Scientific and Industrial Research
e-journal	Electronic Journal
Hons	Honours
ILL	Inter-Library Loan
IP	Internet Protocol
ISI	Institute for Scientific Information
IT	Information Technology
LAN	Local Area Network
NAL	Novell Application Launcher
OCLC	Online Computer Library Center
OPAC	Online Public Access Catalogue
PhD	Doctor of Philosophy
Post-Doc	Post-Doctoral studies
UKZNP	University of KwaZulu-Natal, Pietermaritzburg
URICA	Universal Real-time Information Control Administration
WAN	Wide Area Network

Web	World Wide Web
WWW	World Wide Web

Chapter 1

Introduction

This chapter introduces the study by outlining the mission of the Library of the University of KwaZulu-Natal, Pietermaritzburg. It gives an overview of resources available at the Life Sciences branch library and outlines the problem and scope of the study.

1.1 The mission of the Library of the University of KwaZulu-Natal, Pietermaritzburg

The mission statement of the Library of the University of KwaZulu-Natal, Pietermaritzburg (UKZNP), is to "provide resources and information services to support the learning, teaching, research and development endeavours of the University community" (University of Natal 2003). The UKZNP Library caters for the information needs of the University community, the priority target audience being staff and students based on the Pietermaritzburg campus. Members of the general public are also allowed to use some resources in the Library. Brach (2001) gives a warning that those who "walk in" to the library have access to fewer and fewer resources. The long-held concept of free public usage of library materials is becoming harder to provide because of licensing agreements.

In their quest to meet the needs of their users, libraries have made use of a number of information sources. The formats of these information sources continue to change. Print sources continue to be used in addition to other sources, for example electronic, networked and digital resources. Online Public Access Catalogues (OPACs) are used to obtain records of books and other media available in libraries. To obtain journal articles, abstracts and indexes are used. Abstracts and indexes also give references for chapters in books, conference proceedings, reports and reviews.

Dubbeld (1989) outlines what she calls the first decade of online searching in KwaZulu-Natal. Information searches were done by dialling-up into vendor databases to access resources such as DIALOG, BLAISE and DATA-STAR. The library acted as a broker between researchers and institutes that performed the information searches.

As the role of libraries continues to change, librarians are now making electronic databases available for use by end-users themselves. The process of developing the UKZNP Library's website began in 1999 and many of these databases are clearly listed there. Aitchison (2001) states the main aim for this development as giving access to a variety of resources as well as providing information about available library services.

The UKZNP Library makes it possible to access electronic databases via the local area networks (LANs). The library subscribes to most of these databases and their format is online. The Compact Disc-Read Only Memory (CD-ROM) databases can only be accessed on-campus, using Novell Application Launcher (NAL), which allows access to these databases from anywhere on the LANs. NAL is software that is made available on the desktop of any UKZNP campus computer which is linked to the LAN. However, there are a few CD-ROM databases that can only be accessed from a specified computer in the UKZNP Library and its branch libraries, because of licensing agreements. The other online databases can be accessed on or off-campus, using the Internet.

Pathways have been developed to access online databases via the UKZNP Library's website from anywhere. Chisenga (1998) states that the World Wide Web (WWW) offers libraries the opportunity to provide library and information services. It offers access to electronic databases for both local and international communities. This has been made easier through the creation of library home pages.

As library databases can be accessed from remote locations, students no longer have to walk into the library to use them. This raises a number of questions about the usage of such databases and about the profiles of people using the databases. Nicholas, Huntington and Watkinson (2003: 42) state that the massive choice of instant access

may create a combination of useful resources, but libraries never know how useful they are. They are of the opinion that libraries need to know, as libraries have to justify the use of large portions of their budgets in providing access to digital resources.

1.2 Brief overview of resources available at the Life Sciences branch library

The Life Sciences Library is one of the branch libraries of the UKZNP Library. The main library is known as the Cecil Renaud Library. The other branch library is the Law Library. At the time the study was conducted in 2004, the following resources were available to all students at the Life Sciences Library.

The following public computers were available:
- Five OPAC terminals;
- Two dedicated CD-ROM terminals; and
- Two multimedia terminals for accessing online library databases.

The following CD-ROMs were available:
- Commonwealth Agricultural Bureau (CAB);
- Life Sciences Collection (Life Sciences); and
- Institute for Scientific Information (ISI) Citation Indexes.

The following online databases were available:
- African Healthline, African Studies, AIDSearch, CabDirect, ATLASerials, BioOne, Child Abuse, Child Welfare and Adoption, Computer Literature Index, EbscoHost, Digital Dissertations, Ecology Abstracts, ERIC, JSTOR, LexisNexis, Library Literature, LISA, NEXUS, Philosophers Index, Sabinet Online, South African Studies, SwetsWise, Water Resources Worldwide, Westlaw, Wildlife and Ecology Studies, and Web of Knowledge.

1.3 The problem

This section gives a description of the problem.

1.3.1 Description of the problem

The problem investigated in this study was the extent of use of electronic databases by postgraduate students registered in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg. There were 500 postgraduate students officially registered in this faculty. The UKZNP Library has made available a number of electronic databases that can be accessed via the Library's website (whether on-campus or off-campus), via NAL, or in the Library. These resources are there to help students and staff to meet their information needs (Nsanzya 2003: 7). It is necessary, therefore, to ascertain the level of usage of these resources and how often students utilise them to meet their information needs.

1.4 The purpose of the study

The purpose of this study was to investigate the extent of use of electronic databases by postgraduate students registered in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg, to meet their study-related information needs and to find ways of improving the use made of these databases.

1.4.1 The research objectives

The objectives of the study were:

- To establish if postgraduate students used electronic databases;
- To find out which electronic databases postgraduate students used and why;
- To identify problems postgraduate students encountered using electronic databases;

- To find out how often the postgraduate students used the available electronic databases;
- To explore how postgraduate students became aware of the available electronic databases; and
- To make recommendations based on the findings.

1.4.2 The research questions

The following research questions were arrived at:

- Did postgraduate students use the electronic databases?
- Which electronic databases did the postgraduate students use and why?
- What problems did postgraduate students encounter when using electronic databases?
- How often did postgraduate students use the available electronic databases?
- How did postgraduate students become aware of the available electronic databases?
- What recommendations can be made, based on the findings?

1.4.3 Justification for the study

When libraries make resources available for use, it is important to find out about the usage of such resources. It is important to determine and understand which available databases are currently being used, as the cost of information resources could be justified by usage. If other databases are not being used as much, it may be important to know, so as to make recommendations regarding possibilities of improving usage of the resources. Nicholas, Huntington and Watkinson (2003) are of the opinion that libraries and their parent organisations need to give reasons for spending large parts of their budgets on providing access to digital resources.

Brach (2001: 18) states that libraries put tremendous effort into providing access to electronic resources. Librarians provide gateways to electronic collections and portals

to online information. This does not stop library users from going to the World Wide Web (Web) first, to look for articles, while the carefully selected and very costly resources lie waiting for them via library websites.

Brach (2001: 19) warns that library websites may be complicated, as they provide many pathways. Librarians should then investigate and try to eliminate obstacles that patrons encounter when using library electronic resources.

The library is by no means the only source of information at the disposal of students. The Internet provides many other possibilities and pathways. The Internet can also present problems of quality and the user has to evaluate the sources available (Brach 2001). The present study will contribute to a better understanding of the sources students consult in an environment of ever-increasing electronic resources.

1.4.4 Scope and limitations of the study

The study was confined to a representative sample of the total of 500 postgraduate students registered in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg, as they used the Library resources to meet their study-related information needs. This study was limited to the use students made of electronic databases. This study did not focus on how students used the information which they located. It focussed on which databases students made use of, to locate and obtain relevant literature.

The study examined the use of bibliographic and full-text databases. It excluded the use of electronic journals (e-journals). In this dissertation a host (an aggregator of databases) has sometimes been treated as a "database". Usage statistics were not used, as it would not have been possible to single out usage made by postgraduate students.

1.4.5 Definitions of terms used in the study

For the purposes of this study, the following key terms used are defined as follows:

1.4.5.1 Use

The *Chambers Dictionary* defines use as to put to some purpose or deploy as a means of accomplishing or achieving something (Schwarz 1993: 1916). This study will use the term to refer to accessing electronic databases for the purposes of fulfilling a study-related information need. Feather and Sturges (2003: 300) define information seeking behaviour as complex patterns of actions and interactions that people engage in when seeking information in whatever kind and for whatever purpose. These actions and interactions can be viewed as various steps to paths pursued by individuals in an attempt to resolve an information need (Chen and Hernon 1982).

1.4.5.2 Electronic databases

Reitz (2002) defines a database as a large updated file of digitized information related to a specific subject or field, consisting of records of uniform format organized for ease and speed of search and retrieval and managed with the aid of database management system software. This information lists bibliographic references, abstracts and full-text documents, amongst others. The digital data is stored in a computer or on an optical disk (Feather and Sturges 2003: 126). The database producers lease it to the vendors, who then compile the content, which the vendors convert to machine-readable form and provide electronic access to the data.

Libraries subscribe to these electronic databases (whether on CD-ROM or online via the Internet) and make them available to their users. For the purposes of this study electronic databases are bibliographic databases and full-text databases. Bibliographic databases include OPACs and electronic indexes and abstracts. Some aggregators or hosts, such as EbscoHost, have been considered as databases in this study.

1.4.5.3 Postgraduate students

Refers to students undertaking their fourth year and postgraduate years of study. Such students already have a primary or bachelor's degree. The postgraduate qualification may be a higher diploma or a degree such as an Honours (Hons), Master's, Doctor of Philosophy (PhD) and post-doctoral (post-doc) level qualification.

1.4.6 Structure of the study

In this chapter the research problem, purpose and parameters of the study were outlined. Chapter 2 reviews the literature relevant to this study. The research methods used for the study are explained in Chapter 3. Chapter 4 presents the results of the study and the interpretation of the results follows in Chapter 5. The final chapter deals with the conclusions and recommendations of the study. The appendices are found after the list of works cited.

1.5 Summary

Chapter 1 introduced the entire study. It outlined the problem areas with which the study concerned itself. It explained the purpose, including the rationale and scope, of the study. The study was carried out within these defined parameters. Brief definitions of terms used in the study have been provided and the structure of the study briefly outlined.

Chapter 2

Review of the literature

This chapter reviews related literature.

2.1 Introduction

The use of the literature to support research is seen as involving more than a simple search. The thought and preparation beforehand is seen as a vital part of the process (Gash 2000).

Literature searching is "a systematic and thorough search of all types of published literature in order to identify as many items as possible that are relevant to a particular topic" (Gash 2000: 1). These types of published material include books, journal articles, reports, conference papers, and theses.

Most students require some literature searching skills in order to find references that will help them prepare for essays, reports, seminar papers and other coursework required for their studies. Very often, though, students have limited basic literature searching skills and even find difficulty searching the library catalogue. Training and advice on literature searching techniques is essential, especially for senior students. Senior students increasingly do not only rely on material available from the library, but have to search for relevant publications available from a larger pool of resources. This larger pool may include materials from other libraries in the country or even materials from anywhere in the world. Aitchison (1998: 132) explained that there is an expectation that postgraduate level students would need more resources than those available at their local library. She cautions that students would need to make inter-library loan (ILL) requests in good time, so that they would receive the material in time to use for their assignments or seminars.

Gash (2000) points out that many academic libraries offer user education programmes that assist students on how to use resources made available by the library. He also warns that the timing of such programmes is important, as some user education programmes are arranged for students well before they need to use the information. This may result in students not attending these programmes, because the relevance and usefulness of them is not apparent. If they do attend, the knowledge they acquired may be forgotten by the time they need to use it.

2.2 Historical development of electronic searching

Information retrieval systems are designed for users with specific information needs. Chowdhury (1999) identifies two broad groups of information retrieval systems, the in-house and the online. The in-house systems have information catalogued within the library such as the OPAC. The online systems are databases that are commercially available in CD-ROM format or web-based.

There are various kinds of databases that make bibliographic information available and some include full-text. Chowdhury (1999) provides the following examples:
- Large discipline-oriented databases;
- Interdisciplinary databases;
- Cross-disciplinary databases;
- Smaller, more specialized databases; and
- Databases covering specific types of publication.

Advances in information retrieval systems are linked to developments in computer systems. These systems have, over a period of time, developed capacity to store vast amounts of data, to process the data and then make it available to users. Studies such as those conducted by Large, Tedd and Hartley (1999) provide an historical overview of such developments. The 1940s and 1950s are seen as the initial period of digital computers that were used for processing numerical data. The 1960s and 1970s saw developments in their ability to store and retrieve textual data. Facilities for performing literature searches thus became available. This period saw developments in abstracting and indexing services, which helped make journal literature accessible.

The 1980s are known for the availability of mediated online searches for users. The 1980s are also known for strides made in which many CD-ROM bibliographic databases became available. This period would also be known as the beginning of the era of the independent end-user. The 1990s saw information storage and retrieval being transformed by developments such as the Internet and WWW. The shift in information was now about access to information, instead of collection development. Online libraries were paying for access to resources, instead of buying such resources (Large, Tedd and Hartley 1999).

2.3 Electronic sources

Gash (2000: 39) defines the online searching of bibliographic tools as "a method of retrieving information from large computer-mounted databases". The database being searched is geographically remote from the user, who makes use of a workstation connected to telecommunications networks to access the information. Dubbeld (1989) and Chowdhury (1999) explained online searching as interactive computer searching of machine-readable databases. For CD-ROM specifically, Chowdhury (1999: 250) gives a definition of CD-ROMs as "optical storage media that can store huge amounts of data on a single 12 cm disc and are now used extensively in information retrieval". More broadly speaking, though, electronic sources include the searching and retrieval of information by computer resources such as the OPAC, CD-ROM and online databases.

Gash (2000) acknowledges that electronic databases are of central importance to anyone performing a literature search and that they cover a variety of subject areas. They provide access to millions of systematically organized references of different types of literature such as journals, newspaper articles, books, reports, conference papers, patents, standards, theses and dissertations and government publications.

Academic libraries make a variety of electronic resources available to their community, which is primarily their staff members and student population. As the role of libraries continues to change, librarians are making electronic databases available for use by end-users themselves. The process of developing the UKZNP

Library's website began in 1999 and many of its databases are made available here. Aitchison (2001: 1) states that the aim of the design of the website was "to design a site that provided information about the Library, its services and holdings and also gave users access to online information resources to which the Library subscribed or which were free".

The study by Chisenga (1998) states that research and teaching relies heavily on the flow of up-to-date information and the Internet provides an infrastructure through which this can be achieved. University libraries increasingly use their home pages to support the education and research programmes of their parent institutions, by providing access to relevant information sources.

2.3.1 Online searching

The rapid growth in the publication of journals soon after the Second World War is seen by Gash (2000) as a source of problems for the producers of abstracting and indexing journals. The provision of abstracting and indexing journals was at the time very labour-intensive. This resulted in unacceptable delays between the publication of a journal article and its inclusion in one of the bibliographic sources. The production of annual and cumulative indexes showed even greater delays. Gash (2000) estimates these delays to be two years or even more. The development of computer technology relieved a desperate situation. From the late 1950s and early 1960s computers were starting to be used increasingly in the compilation of indexes. Initially they were used to sort and manipulate the indexes, but soon techniques for automatic indexing were developed and this helped in speeding up the production of the indexes. Chemical Abstracts and Biological Abstracts are mentioned as the two pioneers in this field.

The next step in this development of the use of computers was the need for all information to be converted to machine-readable format, in order for computers to be able to manipulate the information. It became important for standards and guidelines to be introduced on indexing terms, abstracting and components of bibliographic records (Gash 2000: 51).

Producers of these services began to offer, at a price, to conduct searches and send results. This service saw the development and rise of current awareness services, where searches were conducted at intervals in order to keep updating the information. The user had to send a description of a desired search to a central point. Batch searches were then conducted and results sent off. There were days or even weeks between the time the request was made and the results were received.

The 1970s could be regarded as the foundation decade (Chowdhury 1999) of finding tools used in libraries. During this decade the card catalogue, one of the key finding tools in libraries, gradually gave way to the online catalogue. The online catalogue later expanded from a single library finding tool to a gateway of vast resources held locally and at other libraries (Herman 2001).

The 1980s were a decade where information sources such as books, periodicals, indexes and abstracts were still predominantly available in print. The bibliographic databases enabled items to be located by researchers. This decade saw developments in the use of CD-ROM databases. These were either mounted locally or could be networked. Interrogation of remote databases was still performed by intermediaries on behalf of the researcher (Chowdhury 1999).

The 1970s and 1980s saw further developments in the computer and communications technologies, Gash (2000: 51-2) lists the following as key areas:
- Improvements in computer memory technologies that allowed the construction of very large databases, while still allowing very fast retrieval of the information;
- Developments in networking technology that enabled simultaneous; interactive, online access to the databases by a very large number of users;
- Developments in national and international telecommunications technology that enabled users on the other side of the world to have access to these databases with a fast response time; and
- Improvements in the command languages, which allowed really sophisticated searching for experienced searchers and also a subsequent development of easier menu searching to attract untrained users.

The 1990s to date saw the development of the independent library user, who was empowered to search databases directly. The access to these databases could be from the library and or from the user's desktop.

2.3.2 OPAC

The automation of libraries heralded the migration from the use of manual to automated processes in the workings of libraries. This resulted in the movement from the use of card catalogues to OPACs. The library system currently used at the University of KwaZulu-Natal libraries is the Universal Real-time Information Control Administration (URICA) system. Jones and Rea (1989) stated that the beginnings of the development of URICA software were in the late 1970s. By 1983, URICA had developed modules in all main areas of library work such as acquisitions, cataloguing, circulation, serials control and enquiry facilities. The study by Pretorius (1995) stated that the installation of URICA at the University of Natal, Pietermaritzburg, occurred in 1982, with the OPAC module coming into use in 1990.

Advancements in information technology have had an impact on OPAC developments. Bilal (2002: 159) provides an overview of the historical development of OPACs. The first-generation OPACs were replicas of the card catalogue and provided searching by author, title and subject. The second-generation OPACs had enhancements, which included searching by author, title, subject, and keyword, boolean operators and allowed for limiting search results by specific fields, such as publication date, location or type of material. The third-generation OPACs have taken advantage of information technology (IT) improvements by using the Z39.50 standard and client/server computing. The type of OPAC currently in use at the University of KwaZulu-Natal libraries can be classified as a second-generation OPAC.

A number of studies discuss the various problems users encounter when utilising OPACs. The study conducted at the main library of Florida State University by Blazek and Bilal (1988) discusses problems with second-generation OPACs. These include not being able to conduct combined searches by author and title; jammed

terminals, logon procedure problems, arrow keys not working, lack of the help option on the OPAC system and having to use controlled vocabulary for subject searching. The findings of the Blazek and Bilal (1988) study were that more problems arise in subject searching. They also found that most problems were of a technical or procedural nature. The computer locking or jamming was also a major problem. They concluded that the library must develop a response such as planned instruction for both staff and students.

Hunter (1991) conducted a study of transactional logs at the North Carolina State University, which sought to conduct an analysis of problems encountered by users when using the OPAC. The findings were that the users had problems using controlled vocabulary when subject searching and manipulating the system. Hunter (1991) found that users experienced problems of failed searches, for example an author's first name being entered before the last name. Another finding was that some failed searches were due to users' typographical errors. One of the suggestions made was that users should be prepared to take the time to learn when library staff offer training.

The study conducted by Bilal (2002: 162) discusses problems experienced when using second-generation OPACs and even web-based OPACs, as both packages were founded on traditional cataloguing principles. These principles were the use of main and added entries, the use of classification numbers and the use of controlled vocabulary, due to the use of subject headings. The findings by Bilal (2002) are that the continued use of controlled vocabulary increases the difficulties of searching the OPACs. There should be a movement that allows for increasing use of natural language, instead. Standards for selecting appropriate terminology should be developed so that users understand the terminology better, without having to consult subject heading lists.

2.3.3 CD-ROM databases

The literature on CD-ROM development points to the 1980s as the time when this resource became available on the market. Munoo (2000: 11) states that in 1982 the CD-ROM available could store up to 74 minutes of high-quality music. Later, in about 1985, when CD-ROMs could store much more data of over 650 megabytes, the data could be stored in varied forms of text, graphics, audio and other media. Rowley (1998: 241) and Ramaiah (1998: 376-7) point out that the application of CD-ROM technology to the library was part of the automation of libraries and library processes. Ramaiah (1998: 376-7) identified categories of usage of CD-ROMs in libraries. These included:

- CD-ROMs were used as tools for cataloguing materials and in publishing or printing library catalogues;
- CD-ROMs were used as bibliographic databases, with coverage of a particular subject; and
- CD-ROMs were used as reference tools, such as dictionaries, encyclopaedias, directories and yearbooks. Full-text multimedia compact discs (CDs) were also available.

The study conducted by Munoo (2000: 26) revealed that CD-ROM use in libraries was initially on stand-alone workstations. With advances in technology, they then could be networked across either a LAN or a wide area network (WAN). Libraries were faced with negotiating licensing terms. The number of users accessing the databases simultaneously had an influence on the price to be paid by the individual library. This resulted in some libraries having restrictions on use due to the licensing terms reached with vendors or publishers. CD-ROMs are part of an era where libraries paid for access. With some of the licensing terms the CD-ROMs had to be returned to the vendor annually, or upon cancellation of a subscription.

With the passing of time, CD-ROM technology has matured, especially with international developments and standards for various media being set. Chowdhury (1999: 252-253) states that the standard agreed to by major companies producing CD-ROMs was the High Sierra Standard, which later became known as ISO 9660. The

standard was for a logical file structure. Nevertheless, a number of advantages and disadvantages of using this format are documented. There exist a number of advantages for libraries and for users using CD-ROM databases, such as the high storage capacity of the media. Munoo (2000: 13-14) states that libraries save shelf space by not keeping the print abstracts and indexes. CD-ROMs are portable and, in instances where they can be issued to the user, this is convenient. These databases can be networked, if licensing restrictions permit. This gives the advantage of users accessing them from their workstations, or anywhere on the LAN. The study conducted by Tefera, Wood and Ford (1999) showed that usage of CD-ROM databases in an academic library was high, due to the availability of workstations. Libraries, though, have to manage the networked CD-ROM service. They have to be able to do basic troubleshooting in case the users experience problems with accessing the CD-ROM. It is also possible for the user to save or print the search results. For libraries, CD-ROMs are a more affordable option (Chowdhury 1999: 279).

The study by Munoo (2000) also gives some disadvantages of the use of CD-ROM databases. The main problem is that of speed. The networked CD-ROM databases can be slower than online connections. In order to improve the speed, there would be cost implications of purchasing faster disc drives. There is a problem of lack of standards for the retrieval of some software. Librarians have to receive training on all the different packages in stock and they then have to provide continuous end-user training on the use of these databases. The library staff would need to be able to install the CD-ROM databases as new updates are received.

2.3.4 Online databases

The longitudinal study conducted by Crawford, de Vicente and Clink (2004) on the use and awareness of electronic information services by students at Glasgow Caledonian University reveals that the OPAC was no longer the main source consulted, but online databases. The findings revealed that there was a decline in usage for the databases that were password protected. Despite the availability of off-campus access, few, but growing numbers of, students were accessing the online databases from off-campus. Academics were seen to have an increasing role in

promoting the use of online databases. Dewald (2005) views academics as playing a significant role in promoting such resources to students, but a problem exists when academics are not aware of the availability of library online databases. There also exist some advantages and disadvantages of online databases.

The online databases are generally considered to be faster than CD-ROM databases. Problems of slow access can occur with online databases, experienced especially where bandwidth problems exist. Online databases allow for wider and more diverse access to sources of information (Herman 2001: 453). They provide more efficient ways of information-seeking; access to the full-text of documents; ability to search the databases from one's desktop and bypass the constraints of using the library, such as opening hours, missing items and the delays in arrivals of new journal issues.

The report by Tenopir, Hitchcock and Pillow (2003) points out that the perceived advantages of online databases are convenience of being able to access the databases from anywhere and also being able to use it at any time. Timeliness is also considered to be an advantage, because the search gives the results immediately and one is able to conduct a search across a number of titles and a number of years, all at once. The ability of linking to information is considered important and also being able to explore other related links. The availability of full-text is an advantage and so is being able to manipulate the result and then print, e-mail or save them. Another finding was that online databases were considered important for speed and ease of access.

Tenopir, Hitchcock and Pillow (2003: 36-7) discuss a number of disadvantages with the use of online databases. These include the increase in usage as more resources become available. This makes it even more difficult for the user to select an appropriate source. It also highlights the need for libraries to provide training. The discomfort of reading long documents from the screen was considered a problem in the Tenopir, Hitchcock and Pillow (2003) study. This necessitated the need to print, instead. Some documents online were considered to be of poor quality and difficult to read. Another finding was that users remained unaware of relevant resources. This means that librarians have to improve on how they promote or market such resources. This links to the need for training to be provided for users.

2.3.5 Development of online searching in academic libraries in KwaZulu-Natal

Dubbeld (1989) outlines what she calls the first decade of online searching in KwaZulu-Natal, then called Natal. The paper by Dubbeld was based on various surveys. Information searches were done by dialling-up into vendor databases to access resources such as DIALOG, BLAISE and DATA-STAR. The library acted as a broker between researchers and institutes that performed the information searches.

In South Africa, the Institute of Medical Literature, the information service of the Medical Research Council, pioneered the online searching of foreign database vendors. Its first search was conducted through the United States National Library of Medicine in 1976. In 1977 the South African Council for Scientific and Industrial Research (CSIR) began conducting searches and soon thereafter it became the largest searcher of foreign database vendors for South African researchers (Dubbeld 1989: 72). Medical libraries, such as the Witwatersrand University Library in 1977 and the University of Pretoria Library in 1982, pioneered online searching in the academic libraries of South Africa. By 1984, approximately 35 South African organizations were engaged in online searching. The most popular databases were DIALOG, ORBIT, ELHILL/MEDLARS, Info-Line, Questel and BLAISE (Dubbeld 1989).

In the Durban region of KwaZulu-Natal the CSIR established online searching facilities at its regional offices in 1979. Another terminal was available at the University of Natal, Durban, Science and Engineering branch library, where searches were performed by CSIR staff on behalf of the user. The Medical branch library, at the University of Natal, Durban, also had access to online facilities, but high costs were an obstacle and researchers still used postage requests instead of a dial-up link. The Natal Provincial Library Service and the UKZNP Library had the service available in the early 1980s. The searches were mediated searches, in which users submitted requests and librarians performed searches. The initial costs for institutions were those of infrastructure, telephone charges, connection time and printing. By 1989 the total costs for a search was about R200 or more, per session.

Dubbeld (1989) states that CSIR staff conducted the initial training of library staff, from all interested institutions, twice a year. Thereafter, vendors provided such training. The end of the 1980s saw the development and use of CD-ROM databases. The CD-ROM databases were seen as a cheaper alternative to the mediated online searches.

2.3.6 Impact of end-user searching on academic library staff

The growth of end-user searching had a significant impact on the role of academic library staff. The library user was empowered to grow more independent by easy access to electronic databases. Some users believe that, because access is from their own desktop, it should be easy and they can figure it out for themselves. Librarians are challenged to be familiar with a variety of databases, so that they are able to assist the user with queries on how to use the databases. Librarians are increasingly expected to assist with trouble-shooting problems encountered by users and to help with software issues (Chowdhury 1999: 274).

New skills are now expected from librarians, such as being able to market the library's services, resources and training programmes. More IT competencies are expected from librarians as a result of technological developments. Ongoing training or continuing education would be essential (Hoskins 2002). The librarians' role, therefore, has changed to cater for all users who come to the library or who access the resources remotely (Large, Tedd and Hartley 1999: 269).

2.4 Use of electronic databases

Students registered in the Faculty of Science and Agriculture at the UKZNP are expected to conduct their own literature searches to locate relevant information for their studies. Such information is found mainly in books and articles. Students are expected to be able to find information within the Library, or request it via the ILL service.

This section of the literature review examines studies that have researched the use of electronic databases and other strategies used by students to gather information. Many studies conducted in the field of use studies have focused on the use of the library. The area of the employment of electronic databases is relatively new, but is a growing area of interest. Most studies conducted on the use of electronic databases have been conducted in the United States of America.

2.4.1 Use studies

Ondrusek (2004), from the Hunter College Library at the City University of New York, reviewed 163 studies that examined end-user online searching behaviour. The recurring themes found by Ondrusek (2004) were end-user searching techniques; relevance judgment about the information found, degree of satisfaction with results found and prior knowledge. The types of databases within the scope of the present study were OPAC systems, CD-ROM and online databases. Internet use behaviour was excluded. Students encountered problems generating appropriate search terms for searching databases. Designing an effective search strategy was identified as another challenge. Other problems identified were that of search reformulation that involved the broadening or narrowing of a search and motivation and over-reliance on printouts. There was a trend to prefer any item available in full-text, instead of trying to find a more relevant one; this was due to the expectation of immediate results by the students.

Wilson (2003) reported on three comprehensive studies conducted in the United States, in which she comments that, in the digital world, the field of information is inextricably interwoven with user needs and preferences. The first study by the Online Computer Library Center (OCLC) fully examined the information habits of college students. The study found that students who used campus libraries and library websites to meet information needs encountered a number of barriers and frustrations.

These were (Wilson 2003):

- Not being able to access databases remotely, due to password requirements and licensing restrictions;
- Difficulty in searching and navigating the library and its website;
- Costs of copying and printing at the library;
- Shortage of knowledgeable librarians; and
- Lack of customer service they expect as customers.

Wilson (2003) reports on the recommendations published in the OCLC study. The library's electronic resources should be integrated with the campus's website. There is a need to open access to remote users that is within the restrictions of the licensing agreements. This emphasizes that users need access after hours, when working from home or when they are away from campus. There is a need to offer clear and readily available navigational guides, both online and onsite. There is also a need to provide continuous promotion of services, instruction and customer service.

The second study that Wilson (2003) reports on is the study by Outsell, which was commissioned by the Digital Library Federation and Council of Library and Information Resources. The survey involved over 3 200 faculty, graduate students and undergraduates, from nearly 400 institutions. The study focused on campus users of scholarly information. The findings were that users feel comfortable and confident with electronic resources. Onsite library use remains substantial, but this is changing, as libraries themselves continue to develop digital content and online services. Libraries are also providing in-house computer facilities for users.

As with the OCLC study, Wilson (2003) reports that academic library users in the Outsell survey all encountered problems and barriers such as:

- Not having enough time to explore available resources;
- Not knowing what is available;
- Not having access to all information from one place;
- Not being able to determine information quality, credibility and accuracy; and
- Not having sufficient training on how to conduct an effective literature search.

Wilson (2003) points out that the barriers listed above are within the ability of libraries to address. Libraries have to assist users in becoming more effective in their literature searching. The libraries can provide continuous training, as the trend is for libraries to provide such training at the beginning of the term. It is possible that such information may be lost, as students have too many other things to deal with at the beginning of the term. Libraries can assist by acquiring products that are easier to use, where possible.

The third comprehensive study Wilson (2003) reports on is a study of the Pew Internet and American Life Project (2002), entitled "The Internet goes to college: how students are living in the future with today's technology". A survey of 2 000 students from 27 institutions was conducted. This report not only focuses on library use in the OCLC and Outsell surveys, but it provides important information about the students. The Pew study found that:

- College students are early adopters and heavy users of the Internet;
- Students say that the Internet has enhanced their education; and
- The Internet has changed college social life.

Wilson (2003) points out that those working with students may not find these findings new or insightful, but have to be seriously considered by service providers working in the academic environment.

These three studies reported by Wilson (2003) give a rich understanding of user preferences, readiness and behaviours that can be used to create changes in information provision. The studies also highlight the need to plan ahead for the next generation of academic library users. To remain relevant in the digital age, libraries have to adjust how they have always provided their services. Urquhart *et al.* (2005) found that search engines and organisational websites were a main source of information for users. Search engines were preferred, as users felt they needed basic search skills in order to exploit them.

While user studies provide libraries with a framework for decision-making, Wilson (2003: 23) warns of the need to understand local environments and user preferences. It is important, therefore, for libraries to conduct local studies which help inform them of the local conditions and of user preferences in their particular situation. A lesson that emerges is that users in the digital age conduct their own literature searches and users are becoming more self-reliant.

The survey of academic librarians conducted by Tenopir (1999), on their perceptions of database use by students in academic libraries, revealed that, from the dozens of online databases available, some were preferred over others, for a number of reasons. First, availability of full-text was seen as an overriding factor. Second, content was another factor, where some databases were seen as well organized. Third, uniqueness of content was a factor, which encompassed subject specific coverage. Fourth, convenience, which included availability of logins, where needed. Finally, Tenopir (1999) states that students tend to base their choice of database on peer influence, rather than the right database for their information need. Friends *do* influence choice, whether they are useful or not. Urquhart, *et al.* (2005) found that search skills were developed through peer education. Tenopir and Read (2000) state that instruction plays a very important role in educating students about available databases which they may use.

McDonald and Dunkelberger (2000) conducted a survey and they also found a great dependency by students on the availability of full-text databases. They used them, in some cases, to the exclusion of all other information sources. They found that the full-text information was sought either on the WWW or in online, subscription-based full-text databases.

A study by Chen and Hernon (1982) investigated information seeking patterns, which are paths pursued by individuals in an attempt to resolve an information need. They found that libraries were not the only source of information used. Other information providers were also used to satisfy information needs. Chen and Hernon (1982: 87) list five major factors affecting which information source was used: cost in money, cost in time, accuracy of the response, up-to-dateness of the information obtained and overall understandability.

The study Tenopir, Hitchcock and Pillow (2003) conducted for the Council of Library and Information Resources was an analysis of over 200 studies. It concentrated on the use of electronic library resources. The studies analysed were published over the period of 1995 to 2003. A variety of research methods were used for these studies. Some common conclusions reveal that both students and staff liked using electronic resources if the sources were seen as convenient, relevant and time-saving. They gained access to electronic resources through a variety of pathways, including bibliographic databases with full-text links, full-text databases, links from colleagues or from staff members and through use of a web search engine. They also found both staff and students preferred electronic resources and they often used the library from their desktop. Although both browsing and searching remain important information-seeking strategies, full-text database use was the most popular.

Two of the local studies conducted on use have concentrated on the use of library services and not on use of the electronic databases. From the literature it appears that there are a number of difficulties experienced by users accessing electronic resources. Nsanzya (2003) conducted a survey, using a questionnaire, of academic staff at the Edgewood campus of the University of Natal, that points to some of these difficulties. Lack of knowledge of what is available was seen as a major factor preventing use of the electronic information resources. Lack of training on how to use and gain access to electronic resources was another difficulty identified. Finally, lack of time to explore such resources was also a difficulty.

Darries (2004: 73) is of the opinion that the introduction of OPACs in libraries started the electronic revolution in the library world. The resources in libraries had, in the space of two decades, evolved from print to networked CD-ROMs and dial-up access to online information, to web-based OPACs and databases. Darries conducted a survey using a questionnaire to investigate the impact of the Internet on reference services in academic libraries in South Africa. The study found that the number of terminals available for students to use had an impact on the usage of resources. It was therefore important to have more computers available for use and the need for increased Internet bandwidth, in order to increase the connection speed. The need to train users of these resources was found to be important, with the majority of

respondents using one-on-one training at the point of need. Darries (2004) found that the preferred format was web-based and no longer the CD-ROM databases. Many libraries still had CD-ROM databases, but the trend was to replace these with online databases.

2.4.2 Usage statistics

Vendor statistics are another source of data and give an indication of the extent of use of online databases. A number of electronic databases provide statistics of usage of a particular database. The main concern about such statistics is how to interpret the data available and how to make comparisons. In order to standardize such information, an international code of practice called COUNTER (Counting Online Usage of Networked Electronic Resources) was developed. The intention of such a code is to provide a consistent and credible way of measuring usage of online products. Release 1 of the code of practice, which focuses on electronic journals and online databases, was launched in March 2002 (Shepherd 2003). The development of the standard was to produce vendor-generated usage statistics that are consistent, credible and compatible. For this study, usage statistics were not used, as it would not have been possible to identify usage made by the particular population of this study, postgraduate students in the Faculty of Science and Agriculture. The current usage statistics at the University of KwaZulu-Natal give the overall usage made on a particular Internet protocol (IP) address. It is possible to identify usage made between campuses, but it is very difficult within one campus to know who was using which database.

2.5 Summary

Chapter 2 provides a literature survey which explores more recent studies of information searching, search techniques and user attitudes. Surveys were undertaken with most studies to canvass opinions of various groups. Some findings pointed out the over-reliance on available full-text, problems related to shortcoming of infrastructure, lack of information literacy and non-availability of staff to assist at times. Where relevant, significant points identified in the literature review will be drawn on during the interpretation of the results of this study.

Chapter 3

Research methods used

In Chapter 3 the research methods chosen to investigate the use of electronic databases by postgraduate students in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg, are described.

3.1 Choice of method

This study sought to establish which particular electronic databases were used as sources of information for studies and the rationale for such choices made by postgraduate students registered in the Faculty of Science and Agriculture. It also sought to establish how often such electronic databases were used and the problems students encountered when using these databases.

The nature of this study was best served by use of the survey method. The choice of this method was guided by the size of the population, which was 500 students. Survey research is better suited to studying, exploring and analyzing relationships among a large number of cases (Powell 1985: 60). Leedy and Ormrod (2001: 196) give the following three common characteristics that the majority of survey researches possess. First, data is collected from a group of willing participants in order to describe some aspects or characteristics (such as attitudes, beliefs, and opinions) of the population of which that group is a part. Second, data is collected through asking questions. Third, data is collected from a sample rather than from every member of the population. Using a sample suited this study because of the large size of the population. Thereafter inferences were drawn from the responses of the representative sample about the population.

3.2 Population and sample

A key strength of survey research is that it allows for generalization from a smaller group to a larger group, from which the subgroup has been selected. The subgroup is referred to as the sample and the larger group is known as the population (Powell 1985: 59).

The population from which a sample was drawn were registered postgraduate students in the Faculty of Science and Agriculture at the UKZNP. The total population in September 2004 was 500. This information was made available on the University of KwaZulu-Natal website by the Division of Management Information. From this total of 500 postgraduate students registered it was not possible to find a breakdown of students who were registered for full-time and part-time studies. So the sample was drawn from the total population, regardless of full- or part-time status.

According to De Vos (1998: 191) the sample is studied in an effort to understand the population from which it was drawn. The main concern in sampling is representativeness. Terre Blanche and Durrheim (1999: 44) state that the main aim should be to select a sample that will be representative of the population about which the researcher aims to draw conclusions. The sample for this study will be 100 respondents out of a total population of 500. This sample works out to 20% of the total population. The composition of the 500 students was as follows: Honours 210, Masters 191, PhD 88 and Post-Doc 11.

A stratified sampling design was used. Each level of postgraduate study represented a stratum. In this situation the sample is chosen according to the proportions of each level of study. Quota sampling within each strata was used. With a stratified sampling design, a sample is selected from each level of study. For this study the questionnaire was distributed to 45 Honours students, 35 Masters students, 15 PhD students and five post-doctoral students. See below for details of the sample:

Level of study	Total population	Sample	% Sample
Honours	210 (42%)	45	45%
Masters	191 (38%)	35	35%
PhD	88 (18%)	15	15%
Post-Doc	11 (2%)	5	5%

Bias in research sampling is another concern. Bias is any influence, condition, or set of conditions that singly or together distort the data (Leedy and Ormrod 2001: 221). The researcher needs to guard against bias, in sampling techniques, questions asked, how the questions are asked and so forth. It is essential to guard against bias so that the research conducted is credible. Where bias occurs, the researcher has to acknowledge it. For this study the questionnaire was distributed to students belonging to the four categories of level of study. Different levels of strata were represented when distributing the questionnaire but it was only full time, campus-bound students who were represented in the sample. A quota of different strata were part of the sample and only students who used the library and post-graduate LANs received a copy of the questionnaire.

3.3 Instrumentation

The source of data for this study consisted of a questionnaire distributed to a sample of 100 postgraduate students registered in the Faculty of Science and Agriculture at the UKZNP.

The instrument selected for data collection for the study was a self-administered questionnaire because of the advantages it provides compared to other data collection instruments. Self-administered questionnaires encourage frank answers, give respondents a greater feeling of anonymity and facilitate the collection of large amounts of data in a relatively short period of time (Powell 1985: 90; Leedy and Ormrod 2001: 197).

There are limitations associated with the use of self-administered questionnaires, such as the students' willingness to participate. As the size of the total population was

large (500), it was important to have a large sample, so that unwillingness to participate by some would not adversely affect the study. The choice to use a questionnaire was influenced by other studies such as Tenopir, Hitchcock and Pillow (2003), Nsanzya (2003) and Darries (2004).

Questions asked had checklists, rating scales and spaces to express another opinion, or give a reason why. Leedy and Ormrod (2001) stress that checklists and rating scales facilitate both evaluation and quantification of data. This helped save the time of the respondent. The respondents were meant to spend ten minutes or less on answering the questionnaire.

3.3.1 The questionnaire

A short (six-page), self-administered questionnaire (see Appendix 1), consisting mainly of limited option questions, with some open questions, was designed to obtain information about the use of electronic databases by postgraduate students for information they needed for their studies.

3.3.2 Categories of information

The questionnaire, consisting of two sections, was designed to collect two categories of information. The first section asked the respondents for background information in order to know more about each respondent. It asked for the gender of the respondents and degree registered for. The second section asked the respondents about their behaviour. It included questions about which databases they had used, problems experienced using the databases, if any, and about other libraries or resources they had used.

3.3.3 Forms of question

There is a distinction between types of questions commonly used in questionnaires. Leedy and Ormrod (2001: 197-8) distinguish between closed and open questions. Both types were used in the study.

3.3.3.1 Closed questions

Closed questions are sometimes referred to as forced-choice or limited option questions. These questions allow the respondent to choose from a list of predetermined options. An advantage of such questions is that they are easier to code and analyse. The disadvantage is that they force respondents to choose from a list of answers provided. It is also of benefit to provide respondents with another category, in case there is no appropriate response from the choices provided.

Most of the questions from the questionnaire used for the study were closed, i.e. 16 out of 19 questions. This meant that the respondents had to make a selection from a list of options provided. In 11 of these closed questions respondents had a choice to select an 'other' category and they were asked to specify or give an answer in their own words.

3.3.3.2 Open questions

Open questions allow the respondents to give their own response to the question. A total of three open questions were used in the study. The one open question asked respondents to state the degree they were registered for. Rather than provide a selection, it was easier to design this as an open question. A disadvantage of open questions is that the researcher may find them difficult to code and analyse. Another disadvantage may be the difficulty in categorizing the responses.

3.4 Pre-testing of instrument

The instrument used was pre-tested to ascertain whether the questions were clear, understandable and relevant. This pre-test was conducted to ascertain if the questions asked would yield the appropriate data sought.

A questionnaire was distributed to a sample population of 12 postgraduate students registered in the Faculty of Human and Social Sciences. The reason for using this group of students in the pre-test was because all of them were postgraduate students on campus with similar characteristics to those postgraduates registered in the Faculty of Science and Agriculture. This ensured that the group testing the questionnaire could relate to the questions from their own experiences and they could adequately consider the issues raised in the questionnaire.

The questionnaire, together with a cover letter (see Appendix 2) was distributed to the group, asking them to comment. Feedback was requested from the group who pre-tested the instrument. An explanation of what the study was about was provided. Feedback was sought on the clarity of the questions, the logical ordering of the questions and the relevance of the questions. Feedback was also sought on the length of time it took to complete the questionnaire.

All 12 respondents returned the questionnaire with some comments. One of the concerns expressed by some of the respondents was the lack of clarity of the questions. In question 5.2 the suggestion was to change the 'Other libraries' option to 'Visit other libraries'. This helped to make a distinction between requesting via ILL from other libraries and actually visiting the libraries.

In question 12 the suggestion was to quantify how often the databases were used and to use daily, weekly, and so forth. However, it was decided that often, seldom and never be used. This choice seemed appropriate, as students do not necessarily search for information on a daily basis, but instead the search is driven by an assignment or research project being undertaken.

Another comment made by one of the respondents was that there needs to be clarity on whether one uses the Sabinet Online database for articles or for books. A decision was made not to itemise the individual Sabinet Online databases, but to indicate whether a student used it for books or journal literature.

Based on the comments received from respondents in the pre-test, and with the assistance of staff from the Information Studies Programme, the final instrument was developed.

3.5 Data collection

Data for this study was collected by the researcher with the help of colleagues in the Life Sciences Library. The 100 questionnaires were distributed to postgraduate students registered in the Faculty of Science and Agriculture over a period of two months, from October 2004. The questionnaires were handed to respondents, who were encouraged to complete them and leave them, rather than take them away. The questionnaire was distributed at the Life Sciences Library and at postgraduate rooms and these were to be returned voluntarily and placed in a box made available at the entrance of the library. A total of 45 were given to Honours students, 35 were given to Masters students, 15 were given to PhD students and five were given to post-doctoral students.

3.6 Response rate

A total of 100 questionnaires was distributed and the total response rate was 65 (65%). The 65 respondents were made up of postgraduate students at the following levels of study: 26 (40%) Honours, 23 (35%) Masters, 13 (20%) PhD and three (5%) post-doctoral.

3.7 Data analysis

The data collected from returned questionnaires were sorted and coded. Coding helps make the analysis systematic. The reseacher drew up a coding key that identified each question by labelling whether it needed content analysis or whether it could be coded using a statistical package such as SPSS. All questions were coded and assigned an item number and the individual items were allocated an alphabetical letter. From this the researcher formulated a coding sheet. Each question was identified and checked off the letter, which corresponded with the answer that each respondent had given. The data was entered on a data matrix, using SPSS. The data was then processed in terms of frequency counts and percentages and cross tabulations.

Open-ended questions were analysed using content analysis techniques. The results of the analysis are presented in Chapter 4, in both quantitative form, using descriptive statistics, and qualitative form.

3.8 Evaluation of the method used

Leedy and Ormrod (2001: 103) point out that no matter what research methodology has been chosen for a study, the researcher needs to consider the validity and reliability of the approach. The bias acknowledged by the researcher in this study is that the questionnaire was distributed to students who came to the Life Sciences Library and each was given according to the total number who had to respond from each level. The questionnaire was also distributed at postgraduate rooms. Students who were away at the time were therefore excluded and unlikely to have a chance of participating.

3.9 Summary

In this chapter, the research methods used for the study were described and the population and limitations were discussed. The instrument was described and details of the pre-test were given as was an overview of the data analysis.

Chapter 4

Results of the survey

Chapter 4 reports on the results of the survey of the population of students. The survey was conducted by means of a self-administered questionnaire. The purpose behind each question is explained and the results are given.

4.1 Response rate

One hundred (100) questionnaires were distributed and 65 were returned. This was a response rate of 65%. This rate of return is acceptable and is explained by the fact that students were asked to complete the questionnaire at the Life Sciences Library. Some preferred to take it away and return it later. Another factor which contributed to a high number of responses is that the students were approached by library staff who requested students to complete the questionnaire.

4.2 Questionnaire results

In line with the intentions of the research, the results are reported under broad headings, the first of which looks at the background information of the population (4.2.1 below) and the second (4.2.2 below) at information relating to the use of electronic databases. This section also has questions that relate to problems experienced by the respondents.

4.2.1 Background information

Information in this section was obtained from the responses given. Background information provides more details about who the respondents are, their level of study and their gender.

4.2.1.1 Degree registered for

Question 1

Figure 1 illustrates the distribution of responses according to year of study. All 65 students who responded were registered in 2004. Of the 65 students, 26 (40%) were registered for a Honours degree, 23 (35%) for a Masters, 13 (20%) for a PhD and three (5%) were post-doctoral students.

Figure 1: Degree registered for

N=65

PostDoc
3 / 5%

PhD
13 / 20%

Hons
26 / 40%

Masters
23 / 35%
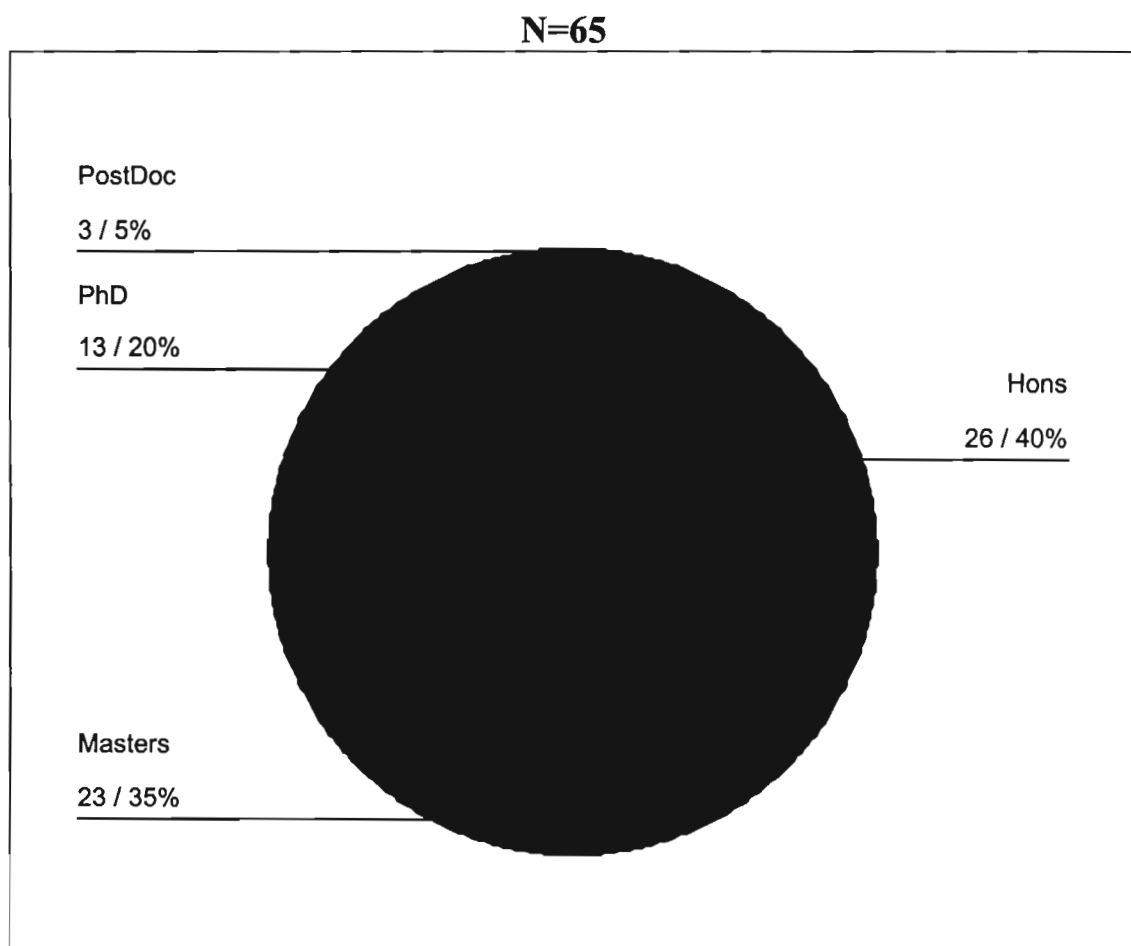
4.2.1.2 Gender

Question 2

This question was asked to ascertain the number of respondents who were male or female. This information provides a better understanding of the population of the study.

Figure 2 shows that, from a total of 65 students who completed the questionnaire, the majority were females. Of the 65 students, 42 (65%) were female and 23 (35%) were male.

Figure 2: Gender

N=65

Male
23 / 35%

Female
42 / 65%
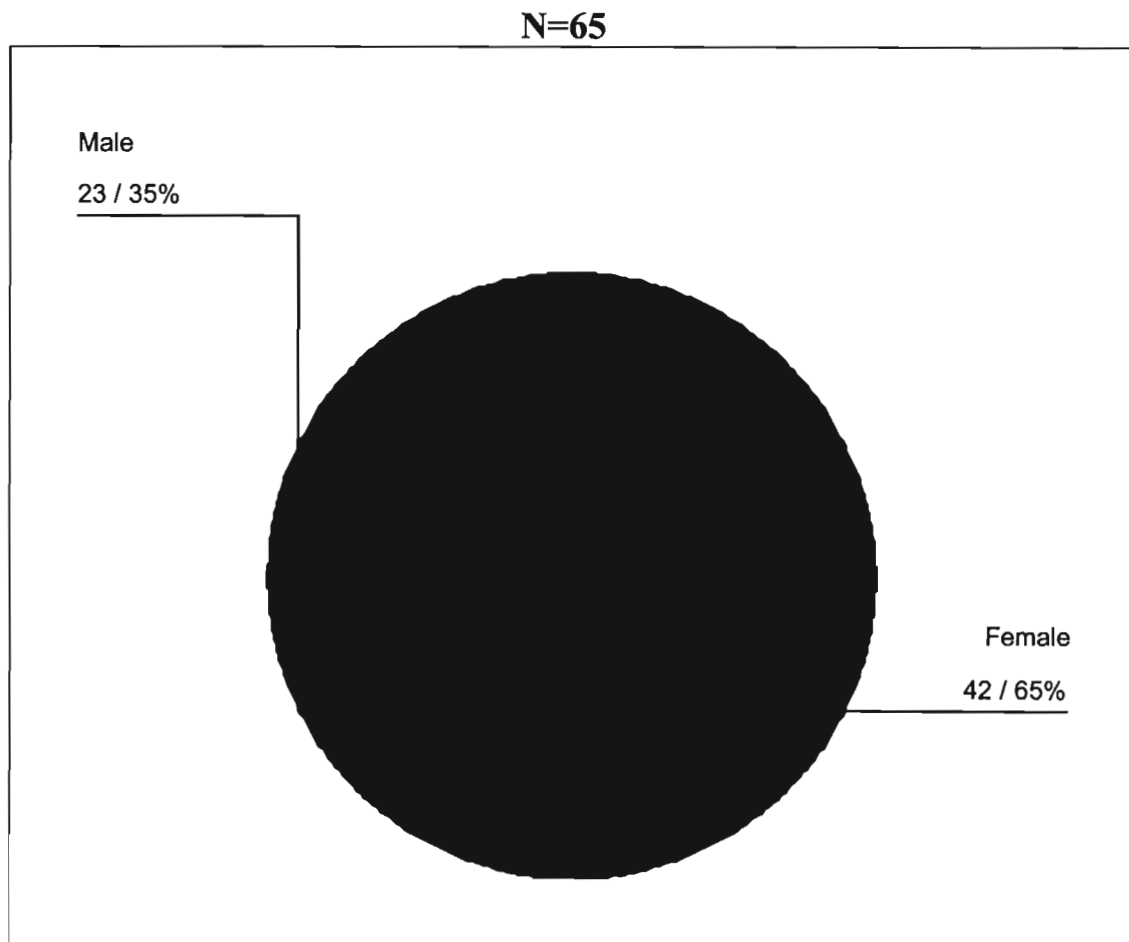
4.2.2 Information relating to electronic databases

This section discusses the responses received relating to electronic databases, such as use of the databases and problems encountered.

4.2.2.1 Use of library OPAC to find books
Question 3

This question sought to establish if students made use of the OPAC to find books from the Life Sciences Library and other campus libraries.

Figure 3: Use of library OPAC to find books

N=65

No

8 / 12%

Yes
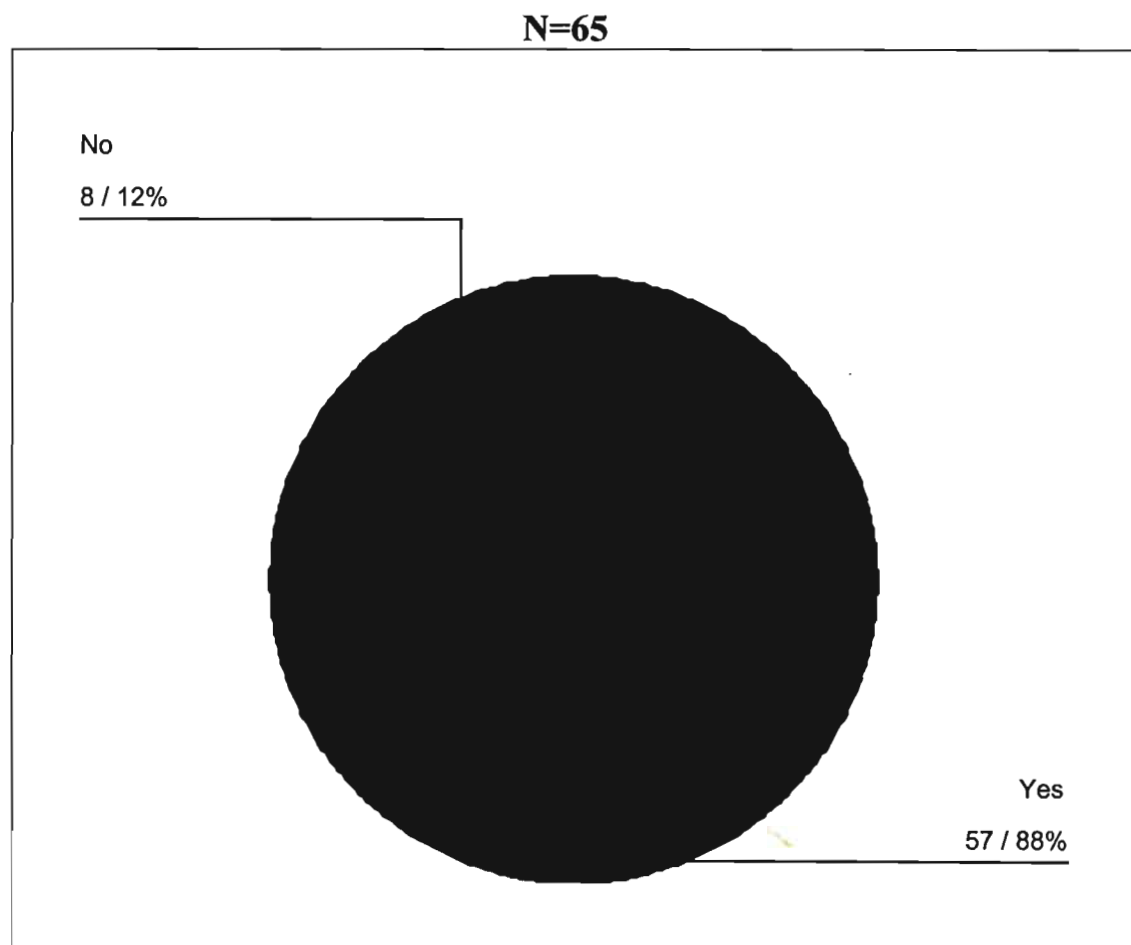
57 / 88%

Figure 3 shows that, from a total of 65 students who completed the questionnaire, 57 (88%) used the OPAC and only 8 (12%) indicated that they did not.

4.2.2.2 OPAC use and degree registered for cross tabulation

A cross tabulation between use of the OPAC and degree registered for was done to evaluate which levels of postgraduate students used the OPAC. Table 1 below shows the results of the cross tabulation. Of the 26 (40%) Honours students who responded to the questionnaire, 25 (38.5%) used the OPAC and one (1.5%) did not. Of the 23 (35.4%) Masters students who responded to the questionnaire, 19 (29.2%) used the OPAC and four (6.2%) did not. Of the 13 (20%) PhD students who responded to the questionnaire, 12 (18.5%) used the OPAC and one (1.5%) did not. Of the three (4.6%) post-doctoral students who responded to the questionnaire, one (1.5%) used the OPAC and two (3.1%) did not.

Table 1: OPAC use and degree registered for cross tabulation
N=65

Degree registered for		OPAC use		
		Yes	No	Total
Honours	Count	25	1	26
	%	38.5%	1.5%	40%
Masters	Count	19	4	23
	%	29.2%	6.2%	35.4%
PhD	Count	12	1	13
	%	18.5%	1.5%	20%
Post-doctoral studies	Count	1	2	3
	%	1.5%	3.1%	4.6%
Total	Count	57	8	65
	%	87.7%	12.3%	100%

4.2.2.3 Problems experienced using the OPAC

Question 4

This question sought to identify problems postgraduate students encountered when using the OPAC.

Table 2: Problems experienced using the OPAC

N=57

Problems	Yes		No		No response	
	Count	%	Count	%	Count	%
Limited off-campus access	18	31.6%	38	66.7%	1	1.8%
Searching difficulty	15	26.3%	41	71.9%	1	1.8%
Logging-on	13	22.8%	43	75.4%	1	1.8%
Slow connection	13	22.8%	43	75.4%	1	1.8%
No problems	10	17.5%	2	3.5%	45	78.9%
Printing	9	15.8%	47	82.5%	1	1.8%
No staff	4	7%	52	91.2%	1	1.8%

A total of 57 respondents answered this question. Table 2 shows that, with regards to limited access to OPAC from off-campus students, 18 (31.6%) considered this to be a problem, while 38 (66.7%) did not and one (1.8%) did not respond. With regards to difficulty in searching the OPAC, 15 (26.3%) considered this to be a problem, while 41 (71.9%) did not and one (1.8%) did not respond. With regards to logging-onto the OPAC, 13 (22.8%) considered this to be a problem, while 43 (75.4%) did not have a problem and one (1.8%) did not respond. Slow access when using the OPAC was considered by 13 (22.8%) to be a problem, while 43 (75.4%) did not have a problem and one (1.8%) did not respond. A total of 10 (17.5%) respondents indicated they did not experience any problems when using the OPAC. With regards to problems with printing when using the OPAC, nine (15.8%) considered this to be a problem, while 47 (82.5%) did not have a problem and one (1.8%) did not respond. Staff not always available to help with using the OPAC was considered by four (7%) respondents to be

a problem, while 52 (91.2%) did not have a problem with this and one (1.8%) did not respond.

4.2.2.4 Other sources for finding book literature, other than using the OPAC

Question 5

This question sought to identify different routes the respondents took to find book literature, other that using the OPAC.

Table 3: Other sources used to find books

Sources	Yes		No		No response	
	Count	%	Count	%	Count	%
ILL	29	44.6%	30	46.2%	6	9.2%
Sabinet Online	24	36.9%	35	53.8%	6	9.2%
Visit other libraries	21	32.3%	38	58.5%	6	9.2%
Online sources	10	15.4%	1	1.5%	54	83.1%
No need	3	4.6%	2	3.1%	60	92.3%
Browse shelves	3	4.6%	1	1.5%	61	93.8%
Bibliographies	2	3.1%	1	1.5%	62	95.4%

N=65

Table 3 shows the responses from sources used by most respondents. Use of ILL to find book literature was used by 29 (44.6%) respondents, while 30 (46.2%) did not use ILL and six (9.2%) did not respond. The Sabinet Online database was the second most-used source for finding book literature, with 24 (36.9%) respondents having used it, while 35 (53.8%) did not use it and six (9.2%) did not respond. With regards to visiting other libraries to find book literature 21 (32.2%) did visit other libraries, 38 (58.5%) did not and six (9.2%) did not respond. Other online databases were used by 10 (15.4%) to find book literature. There were three (4.6%) respondents who did not feel a need to find book literature from elsewhere. Another three (4.6%) indicated that

they found book literature by browsing the shelves in the library. A minority of two (3.1%) indicated that they found book literature from bibliographies or reference lists.

4.2.2.5 CD-ROM databases used

Question 6

This question sought to establish if students used the CD-ROM databases provided by the library to find journal literature.

Figure 4: Use of CD-ROM databases

N=65

No
17 / 26%

Yes
48 / 74%
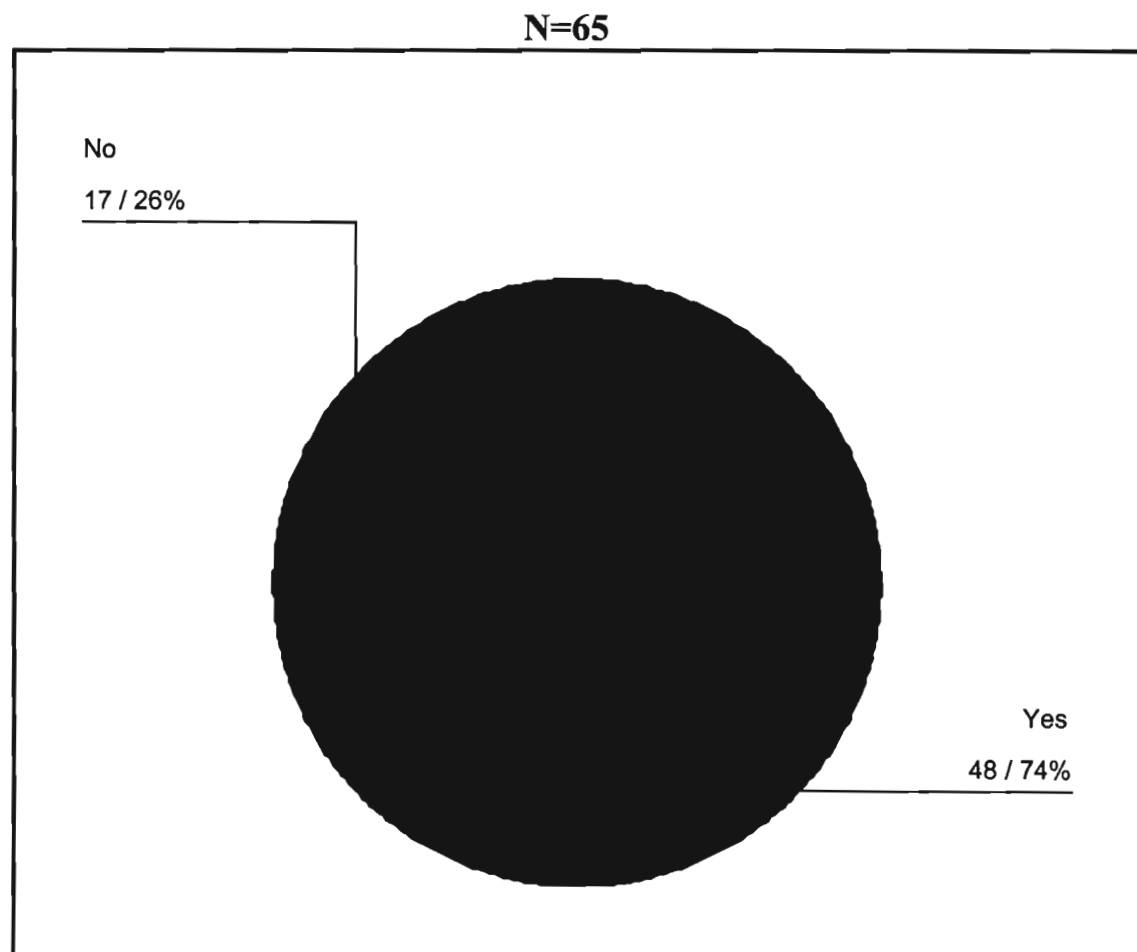
Figure 4 shows that, of the 65 students who responded, 48 (74%) used CD-ROM databases, while 17 (26%) indicated that they did not.

4.2.2.6 CD-ROM use and degree registered for cross tabulation

A cross tabulation between use of CD-ROM databases and degree registered for was done to evaluate which levels of postgraduate students used the CD-ROM databases. Table 4 reflects the results of the cross tabulation. Of the 26 (40%) Honours students who responded to the questionnaire, 19 (29.2%) used the CD-ROM databases and seven (10.8%) did not. Of the 23 (35.4%) Masters students who responded to the questionnaire, 17 (26.2%) used the CD-ROM databases and six (9.2%) did not. Of the 13 (20%) PhD students who responded to the questionnaire, 10 (15.4%) used CD-ROM databases and three (4.6%) did not. Of the three (4.6%) post-doctoral students who responded to the questionnaire, two (3.1%) used CD-ROM databases and one (1.5%) did not.

Table 4: CD-ROM use and degree registered for cross tabulation
N=65

Degree registered for		CD-ROM use		
		Yes	No	Total
Honours	Count	19	7	26
	%	29.2%	10.8%	40%
Masters	Count	17	6	23
	%	26.2%	9.2%	35.4%
PhD	Count	10	3	13
	%	15.4%	4.6%	20%
Post-doctoral	Count	2	1	3
	%	3.1%	1.5%	4.6%
Total	Count	48	17	65
	%	73.8%	26.2%	100%

4.2.2.7 Identifying CD-ROM databases used

Question 7

This question sought to identify the CD-ROM databases used by those respondents who had made use of this facility.

Table 5: CD-ROM databases used

N=48

CD-ROM	Yes		No		No response	
	Count	%	Count	%	Count	%
CAB	35	72.9%	12	25%	1	2.1%
Life Sciences	30	62.5%	17	35.4%	1	2.1%
ISI Citation Indexes	22	45.8%	25	52.1%	1	2.1%

Table 5 shows that the CAB database was used by 35 (72.9%) of the 48 (74%) respondents who used CD-ROM databases, 12 (25%) did not use it and only one (2.1%) did not respond. The Life Sciences database was used by 30 (62.5%) of the respondents, while 17 (35.4%) did not use it and only one (2.1%) did not respond. The ISI Citation Indexes were used by 22 (45.8%) of the respondents, while 25 (52.1%) did not use it and only one (2.1%) did not respond.

4.2.2.8 Problems experienced using CD-ROM databases

Question 8

This question sought to identify problems postgraduate students encountered when using the CD-ROM databases.

Table 6: Problems experienced using CD-ROM databases

N=48

Problems	Yes		No		No response	
	Count	%	Count	%	Count	%
INFRASTRUCTURE PROBLEMS						
Slow connection	19	39.6%	25	52.1%	4	8.3%
Printing	11	22.9%	33	68.8%	4	8.3%
No off-campus access	11	22.9%	33	68.8%	4	8.3%
Logging-on	6	12.5%	38	79.2%	4	8.3%
Network down	1	2.1%	0	0	47	97.9%
LACK OF INFORMATION LITERACY						
Not sure which CD to choose	14	29.2%	30	62.5%	4	8.3%
Difficulty in searching	14	29.2%	30	62.5%	4	8.3%
STAFFING PROBLEMS						
No staff to help	5	10.4%	39	81.3%	4	8.3%
OTHER						
No problems	2	4.3%	0	0	45	95.7%

Table 6 shows that the first category of problems deals with infrastructure issues. Of the 48 respondents who used the CD-ROM databases, slow connection was considered by 19 (39.6%) of the respondents to be a problem. In terms of printing, 11 (22.9%) had a problem and having no off-campus access was regarded as a problem by 11 (22.9%) of the respondents. Of the 48 respondents, six (12.5%) experienced problems with logging-onto the CD-ROM databases. Concerning the network being down, only one (2.1%) of the respondents regarded this to be a problem. Secondly, a lack of information literacy skills was shown by 14 (29.2%) respondents who were not sure which CD-ROM to choose for their searching, 30 (62.5%) knew which one to search and four (8.3%) did not respond. With regard to difficulty in searching the database, 14 (29.2%) experienced such a problem, while 30 (62.5%) did not experience searching difficulty and four (8.3%) did not respond. Thirdly, staffing problems revealed that five (10.4%) respondents needed staff assistance when staff

were not available to help, while 39 (81.3%) did not regard this as a problem and four (8.3%) did not respond. Two (4.3%) respondents indicated having no problems.

4.2.2.9 Online databases used

Question 9

This question sought to establish if students used the online databases provided by the library to find journal literature.

Figure 5: Use of online databases

N=65
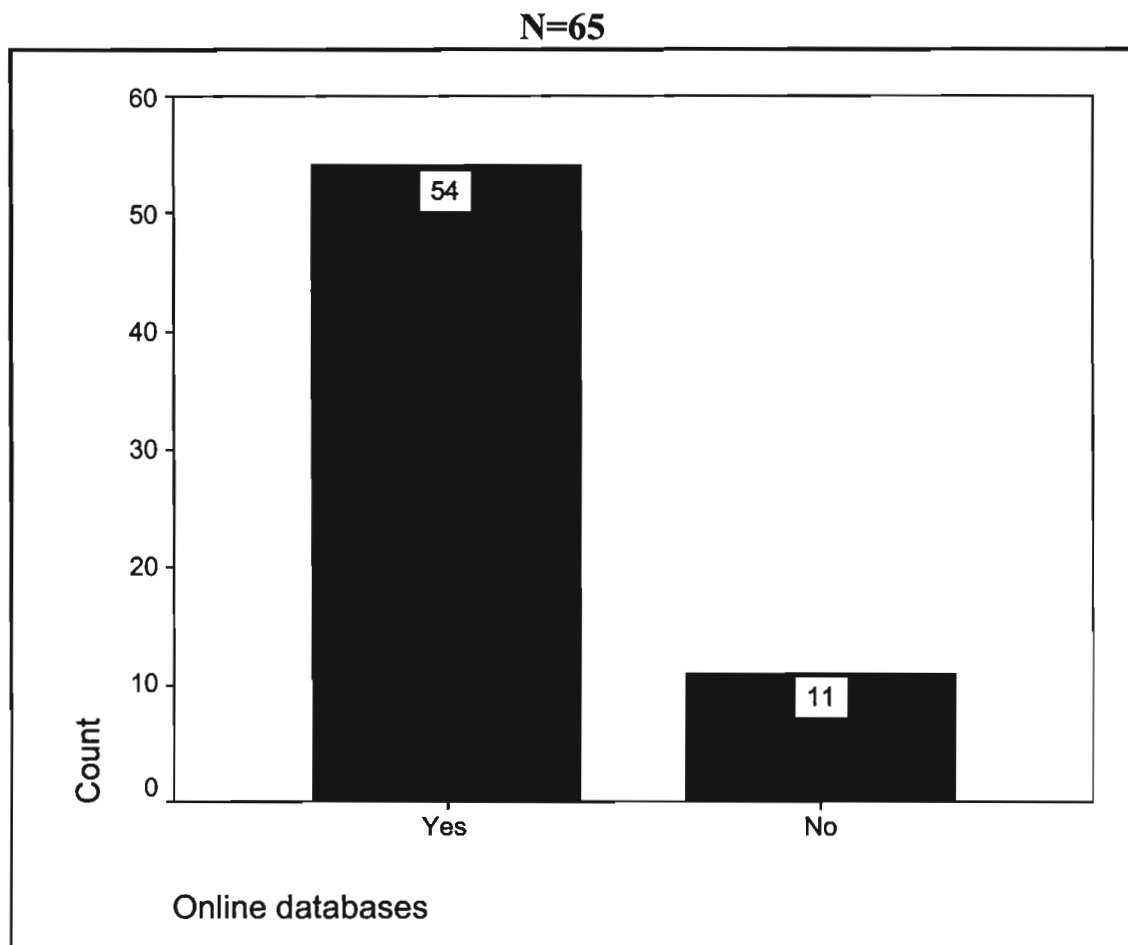
Figure 5 shows that, of the 65 students who responded, 54 (83%) used the online databases, while 11 (17%) indicated that they did not.

4.2.2.10 Online database use and degree registered for cross tabulation

A cross tabulation between use of online databases and degree registered for was done to evaluate which levels of postgraduate students used the online databases. Table 7 reflects the results of the cross tabulation. Of the 26 (40%) Honours students who responded to the questionnaire, 24 (36.9%) used the online databases and two (3.1%) did not. Of the 23 (35.4%) Masters students who responded to the questionnaire, 17 (26.2%) used the online databases and six (9.2%) did not. Of the 13 (20%) PhD students who responded to the questionnaire, 11 (16.9%) used online databases and two (3.1%) did not. Of the three (4.6%) post-doctoral students who responded to the questionnaire, two (3.1%) used online databases and one (1.5%) did not.

Table 7: Online database use and degree registered for cross tabulation

N=65

Degree registered for		Databases use		
		Yes	No	Total
Honours	Count	24	2	26
	%	36.9%	3.1%	40%
Masters	Count	17	6	23
	%	26.2%	9.2%	35.4%
PhD	Count	11	2	13
	%	16.9%	3.1%	20%
Post-doctoral	Count	2	1	3
	%	3.1%	1.5%	4.6%
Total	Count	54	11	65
	%	83.1%	16.9%	100%

4.2.2.11 Identifying online databases used

Question 10

This question sought to identify which online databases students used. A list of databases was provided from which respondents made their selection. This list consisted of databases which specifically had content coverage for the science and agriculture disciplines.

Table 8: Online databases used

N=54

Online Databases	Yes		No		No response	
	Count	%	Count	%	Count	%
CabDirect	33	61.1%	21	38.9%	0	0
EbscoHost	30	55.6%	24	44.4%	0	0
Sabinet Online	25	46.3%	29	53.7%	0	0
Web of Knowledge	10	18.5%	44	81.5%	0	0
JSTOR	6	11.1%	48	88.9%	0	0
Ecology Abstracts	4	7.4%	50	92.6%	0	0
SwetsWise	3	5.6%	51	94.4%	0	0
Wildlife and Ecology Studies Worldwide	2	3.7%	52	96.3%	0	0
PubMed	2	3.7%	0	0	52	96.3%
BioOne	2	3.7%	52	96.3%	0	
Scirus	1	1.9%	0	0	53	98.1%
Water Resources Worldwide	0	0	54	100%	0	0

Table 8 shows a list of online databases from those mostly used to those least used. Most respondents only marked the databases they had used. Of the 54 respondents who answered this question, 33 (61.1%) used CabDirect. EbscoHost was used by 30 (55.6%), followed by Sabinet Online, which was used by 25 (46.3%) of the respondents. Web of Knowledge was used by 10 (18.5%) of the respondents and

JSTOR was used by six (11.1%). Ecology Abstracts were used by four (7.4%) and SwetsWise was used by three (5.6%) respondents. Wildlife and Ecology Studies Worldwide, PubMed and BioOne were each used by two (3.7%) respondents. Scirus, a search engine, was used by one (1.9%) respondent who referred to it as a database. Water Resources WorldWide was not used by any of the respondents. A total of 11 respondents did not respond to this question, as they stated they had not used online databases.

4.2.2.12 Problems experienced using online databases
Question 11

This question sought to identify problems postgraduate students encountered when using the online databases.

Table 9: Problems experienced using online databases

N=54

Problems	Yes		No		No response	
	Count	%	Count	%	Count	%
INFRASTRUCTURE PROBLEMS						
Password needed	30	55.6%	19	35.2%	5	9.3%
Slow connection	24	44.4%	25	46.3%	5	9.3%
Printing	11	20.4%	38	70.4%	5	9.3%
Limited off-campus access	8	14.8%	41	75.9%	5	9.3%
Network down	0	0	4	7.4%	50	92.6%
LACK OF INFORMATION LITERACY						
Searching difficulty	12	22.2%	37	68.5%	5	9.3%
STAFFING PROBLEMS						
No staff to help	7	13%	42	77.8%	5	9.3%

Table 9 shows that the first category of problems experienced when using online databases deal with infrastructure issues. Of the 54 respondents who answered this question password requirements for some online databases was considered by 30

(56.6%) to be a problem, 19 (35.2%) did not consider this a problem and five (9.3%) did not respond. Slow connection was considered by 24 (44.4%) of the respondents to be a problem, while 25 (46.3%) did not regard slow connection as a problem and five (9.3%) did not respond. With regards to printing 11 (20.4%) respondents experienced problems, while 38 (70.4%) did not experience any problems and five (9.3%) did not respond. Of the 54 students, eight (14.8%) experienced problems of access from off-campus, while 41 (75.9%) did not have a problem and five (9.3%) did not respond. None of the respondents expressed that they experienced a problem when the network was down. The second category of problems related to a lack of information literacy skills. Difficulty in searching was experienced by 12 (22.2%) respondents as a problem, while 37 (68.5%) did not experience any difficulty searching and five (9.3%) did not respond. The third category dealt with concerns about non-availability of library staff when needed. Concerning problems experienced when subject librarians were not available to assist, seven (13%) of the respondents experienced problems, while 42 (77.8%) did not have problems and five (9.3%) did not respond. Therefore a total of 11 did not respond to this question, as they had indicated they had not used the online databases.

4.2.2.13 Frequency of use of library databases
Question 12

This question sought a better understanding of the frequency of use of all the UKZNP Library's electronic databases.

Table 10: Frequency of use of all library databases

N=54

Database	Often		Seldom		Never		No response
	Count	%	Count	%	Count	%	Count(%)
OPAC	35	53.8	9	20	3	4.6	7 (13%)
CABDirect	26	40	12	46.2	9	13.8	7 (13%)
EbscoHost	17	26.2	12	18.5	14	21.5	11(20.4%)
ISI Citation Indexes (CD-ROM)	12	18.5	11	16.9	16	24.6	15 (27.8%)
Sabinet Online (Articles)	12	18.5	13	20	14	21.5	15 (27.8%)
Life Sciences	11	16.9	10	15.4	18	27.7	15(27.8%)
Sabinet Online (Books)	9	13.8	17	40	13	20	15 (27.8%)
Web of Knowledge	7	10.8	5	7.7	23	35.4	19(35.2%)
Ecology Abstracts	5	7.7	5	7.7	23	35.4	21(38.9%)
JSTOR	4	6.2	2	3.1	26	40	21(38.9%)
Library Literature	3	4.6	3	4.6	23	35.4	25(46.3%)
Digital Dissertations	2	3.1	8	33.8	26	40	18(33.3%)
BioOne	2	3.1	6	13.8	26	40	20 (37%)
Wildlife and Ecology Studies	2	3.1	2	3.1	26	40	24 (44.4%)
African Healthline	1	1.5	31	33.8	22	33.8	22(40.7%)
African Studies	1	1.5	31	33.8	22	33.8	22(40.7%)
AIDSearch	1	1.5	31	49.2	22	33.8	22(40.7%)
Computer Literature Index	1	1.5	0	0	29	44.6	24 (44.4%)
LISA	1	1.5	2	3.1	25	38.5	26(48.1%)
SwetsWise	1	1.5	3	4.6	27	41.5	23(42.6%)
ATLASerials	0	0	0	40	32	49.2	22(40.7%)
ERIC	0	0	0	0	29	44.6	25(46.3%)
LexisNexis	0	0	0	0	30	46.2	24(44.4%)
NEXUS	0	0	1	1.5	29	44.6	24(44.4%)
Philosopher's Index	0	0	0	0	31	47.7	23(42.6%)
South African Studies	0	0	1	1.5	29	44.6	24(44.4%)
Water Resources Worldwide	0	0	2	3.1	29	44.6	23 (42.6%)
Westlaw	0	0	0	0	29	44.6	25(46.3%)
Child Abuse, Child Welfare and Adoption		0	0	44.6	30	46.2	24 (44.4%)

Table 10 shows that, of the 54 respondents who answered this question, the OPAC was often used by 35 (53.8%) of the respondents that used electronic databases. CabDirect received the second highest ranking, with 26 (40%) of the respondents. EbscoHost received the third highest ranking, with 17 (26.2%) of respondents using it often.

The next category of usage was those databases used often by between 10 and 20 of the respondents. ISI Citation Indexes (CD-ROM) were used by 12 (18.5%), Sabinet Online for articles was used by 12 (18.5%) and Life Sciences was used by 11 (16.9%) of the respondents. The next category of usage were those databases used often by between nine and one of the respondents. These databases included Sabinet Online, for finding books, which was used by nine (13.8%) respondents. Web of Knowledge was used by seven (10.8%) respondents, followed by Ecology Abstracts, which was used often by five (7.7%) and JSTOR was used by four (6.2%). Library Literature was used by three (4.6%) and Digital Dissertations, BioOne and Wildlife and Ecology Studies were each used by two (3.1%) respondents. Six databases were each used by one (1.5%) respondent. These were African Healthline, African Studies, AIDSearch, Computer Literature Index, LISA and SwetsWise.

The last category included those databases that were seldom used, never used or received no response. These nine databases included ATLASerials, ERIC, LexisNexis, NEXUS, Philosopher's Index, South African Studies, Water Resources Worldwide, Westlaw and, lastly, Child Abuse, Child Welfare and Adoption.

4.2.2.14 Preferred online databases

Question 13

This question sought to establish a better understanding of the usefulness of the online databases considered important by students. The ranking helped to gain a better understanding of students' preferences.

Table 11: Preferences concerning online databases

N=54

Database	Yes		No		No response	
	Count	%	Count	%	Count	%
CabDirect	33	61.1%	4	7.4%	17	31.5%
EbscoHost	25	46.3%	10	18.5%	19	35.2%
Sabinet Online	20	37%	7	13%	27	50%
OPAC	12	22.2%	7	13%	35	64.8%
ISI Citation Indexes	12	22.2%	5	9.3%	37	68.5%
Web of Knowledge	11	20.4%	4	7.4%	39	72.2%
Life Sciences	9	16.7%	7	13%	38	70.4%
JSTOR	5	9.3%	9	16.7%	40	74.1%
Ecological Abstracts	5	9.3%	8	14.8%	41	75.9%
Library Literature	3	5.6%	7	13%	44	81.5%
Swetswise	2	3.7%	9	16.7%	43	79.6%
BioOne	1	1.9%	9	16.7%	44	81.5%

The ranking of the databases is presented in Table 11. The respondents were asked to give a top five ranking of databases. Table 11 shows that CabDirect received the highest ranking, followed by EbscoHost, Sabinet Online, the OPAC and ISI Citation Indexes.

4.2.2.15 Location for accessing databases

Question 14

This question sought a better understanding about the locations students preferred to use in order to access information, whether in the library or somewhere outside the library.

Table 12: Where databases are used

N=54

Location	Yes		No	
	Count	%	Count	%
Library	40	74.1%	14	25.9%
LAN	36	66.7%	18	33.3%
Postgraduate rooms	24	44.4%	30	55.6%
Remote	3	5.6%	51	94.4%

Table 12 shows that, of the 54 respondents who used online databases, the majority 40 (74.1%) still accessed the databases from the library. The next category were 36 (66.7%) who accessed the online databases from the LAN. The next grouping of 24 (44.4%) accessed the online databases from postgraduate rooms. The last category was made up of three (5.6%) respondents, who accessed the databases from off-campus.

4.2.2.16 Other types of information sought from databases

Question 15

This question sought a better understanding about what categories or types of sources of information, other than books and journals, students required from databases. These could range from conference papers to annual reports.

Table 13: Other types of information sought

N=54

Types	Yes		No		No response	
	Count	%	Count	%	Count	%
Theses/Dissertations	24	44.4%	13	24.1%	17	31.5%
Conference papers	17	31.5%	21	38.9%	16	29.6%
Annual reports	9	16.7%	29	53.7%	16	29.6%
No other	7	13%	0	0	47	87%
Newspaper articles	3	5.6%	35	64.8%	16	29.6%

Table 13 shows other categories of information sought by students, other than books and articles. Theses or dissertations were sought by 24 (44.4%) respondents, out of a total of 54 who responded to this question. Seventeen (31.5%) sought conference papers, while nine (16.7%) sought annual reports and three (5.6%) sought newspaper articles. A total of seven (13%) of the respondents did not require any other information sources besides books and journals.

4.2.2.17 Advantages of online databases

Question 16

This question aimed at a better understanding of the advantages of the features of the online databases. This helped to discover what features of these databases students found useful.

Table 14: Advantages of online databases

N=54

Advantages	Yes		No		No response	
	Count	%	Count	%	Count	%
Easy to use	36	66.7%	17	31.5%	1	1.9%
Full-text availability	36	66.7%	17	31.5%	1	1.9%
e-mail, save, print	35	64.8%	18	33.3%	1	1.9%
Access anytime	32	59.3%	21	38.9%	1	1.9%
Up-to-date	1	1.9%	1	1.9%	52	96.3%
Research tool	1	1.9%	0	0	53	98.1%
Convenience	1	1.9%	0	0	53	98.1%

Table 14 shows the varied responses of the 54 respondents who answered this question; 36 (66.7%) found ease of use of these databases to be a good feature. With regards to availability of full-text, 36 (66.7%) found this feature to be an advantage. E-mailing, saving and printing were found to be useful by 35 (64.8%) of the respondents. The ability to access the databases anytime was found to be useful by 32 (59.3%) of the respondents. Other features thought to be useful by at least one (1.9%) respondent each were availability of up-to-date information, indispensable research tools and convenience.

4.2.2.18 Source of awareness of library databases

Question 17

This question sought to establish how students became aware of the library databases. This could assist the library in advertising their services to the students.

Table 15: Source of awareness of library databases

N=54

Source of awareness	Yes		No	
	Count	%	Count	%
Friends	30	55.6%	24	44.4%
Orientation	29	53.7%	25	46.3%
Agri220	27	50%	27	50%
Lecturers	21	38.9%	33	61.1%
Library website	17	32.1%	36	67.9%
Library guides	13	24.1%	41	75.9%
Library staff	3	5.6%	51	99.4

Table 15 shows that, of the 54 respondents who answered this question, friends were a source of awareness for 30 (55.6%) of the respondents. Orientation programmes were the second source of awareness, according to 29 (53.7%) of the respondents. The Agri220 course run for second-year students in the Faculty was mentioned as a source by 27 (50%) of the respondents. Lecturers were mentioned as a source by 21 (38.9%) of the respondents. The Library website was mentioned by 17 (32.1%) of the respondents and Library guides were a source of awareness for 13 (24%) of the respondents. Library staff were also a source of awareness for only three (5.6%) of the respondents.

4.2.2.19 Other resources used

Question 18

This question aimed at establishing which other sources of information were used by students. This would also assist the library in establishing which other types of databases were preferred by students. It could also provide a better understanding of student searching behaviours.

Table 16: Other resources used

N=65

Other Databases	Yes		No response	
	Count	%	Count	%
Search engines	63	96.9%	2	3.1%
PubMed	12	18.5%	53	81.5%
Journal sites	6	9.2%	59	90.8%
Scirus	1	1.5%	64	98.5%

Table 16 shows that of the 65 respondents who answered this question, 63 (96.9%) of the respondents used search engines. Pubmed was another database used by 12 (18.5%) of the respondents, while six (9.2%) of the respondents used other publisher journal sites. Scirus was used by one (1.5%) respondent.

4.2.2.20 Library orientation

Question 19

This question sought to establish whether students had received training to use the electronic databases.

Table 17: Training on use of databases

N=65

Training	Yes		No		No response	
	Count	%	Count	%	Count	%
OPAC	44	67.7%	9	13.8%	12	18.5%
CD-ROM	25	38.5%	28	43.1%	12	18.5%
Online databases	23	35.4%	30	46.2%	12	18.5%

Table 17 shows that, of the 65 respondents who answered this question, 44 (67.7%) had previously attended OPAC training sessions. With regards to training in using the CD-ROM databases, 25 (38.5%) had obtained training. In terms of online database training, only 23 (35.4%) had attended a library orientation session.

4.3 Summary

Postgraduate students registered in the Faculty of Science and Agriculture who responded to this questionnaire showed that they were using the databases made available by the UKZNP Library. Other sources of information were also used. The type of material that students used for their studies varied and was not confined to books and journals. These postgraduate students identified a range of problems, which hindered the use of library databases. Not many of the students had received training in using the electronic databases.

Chapter 5

Interpretation of the results

In chapter 5 the findings will be considered in the light of the research objectives and the literature reviewed. Although there were few studies that were specific to South Africa, most of the studies referred to were conducted in the United States of America or other developed countries. Most of the issues discussed are relevant and applicable to the South African situation.

The purpose of this study was to investigate the use of electronic databases by postgraduate students in the Faculty of Science and Agriculture. The objectives, outlined in Chapter 1, were as follows:

- To establish if postgraduate students use electronic databases;
- To find out which electronic databases the students use and why;
- To identify problems students encounter using electronic databases;
- To find out how often students use the available databases;
- To explore how students become aware of the available electronic databases; and
- To make recommendations based on the findings.

The order of the discussion in this chapter follows the order of the objectives of the study. The results for each of the two sections of the questionnaire are discussed in the light of the objectives of the study. The findings that are interpreted in Chapter 5 relate only to the students who responded to the questionnaire.

5.1 Use of electronic databases by students

Three questions in the questionnaire dealt with the use of electronic databases by students. Question 3 dealt with the use of the OPAC. Question 6 dealt with the use of CD-ROM databases and Question 9 dealt with the use of online databases. The use of the OPAC focussed on locating books, while the use of CD-ROMs and online databases focussed on locating journal articles. It is important to note that students

revealed that they also located other types of literature from CD-ROMs and online sources. In addition, they obtained references for theses or dissertations, conference papers, annual reports and newspaper articles. An analysis of several studies conducted by Tenopir, Hitchcock and Pillow (2003: 36-8) explained that the advantages of using electronic resources outweigh the perceived problems or concerns. There seemed to be a trend of users wanting more online material made available to them. Print seems to be considered an archival format.

5.1.1 Use of the OPAC

The majority of students used the library catalogue, also known as the OPAC. From a total of 65 students who responded, 57 (88%) used the OPAC. This high percentage shows that students, even at postgraduate level, considered this resource as very important. The OPAC is particularly important in providing users with information about books that are available in the UKZNP Libraries on campus and also in libraries around the Pietermaritzburg region.

It is important to note that the UKZNP Library makes available two other print sources as back-up to help users find books. The first source is a printout of the catalogue, arranged by author, title and by subject. The printout available is to assist users in the event of a system or power failure. This printout is not up-to-date, as it is printed once a year. The second source is a subject specific guide to the classification numbers. This guide is for users who prefer to browse the shelves rather than use the OPAC. Members of the university community who are reluctant to learn to use a computerised catalogue also use these sources.

The use of the OPAC by 88% of the respondents could have been reinforced by the fact that the Library makes available dedicated computers for accessing the OPAC. It is also possible to access the OPAC from a remote location, so users do not have to be in the Library to make use of this resource; they could also be off-campus.

The postgraduate students knew that they needed to read more widely than just the books already put aside for them on short loan or reserved for them by lecturers. The

longitudinal study conducted at Glasgow Caledonian University by Crawford, de Vicente and Clink (2004: 117) provided a warning that the traditional role of the library catalogue as "the key to the library" is threatened. As students have access to more resources online, use of the library catalogue declined. Urquhart *et al.* (2005: 7) found that the use of OPACs was comparatively low, compared to the use of CD-ROMs. The present study did establish that the library catalogue remains popular to more than two-thirds of the students surveyed.

5.1.2 Use of CD-ROM databases

The findings revealed a high usage of CD-ROM databases, with 74% of the students who responded to the questionnaire using CD-ROM databases, while 26% did not use them. The percentage of usage is very high, considering that users had to access two of the key databases, CAB and Life Sciences, from the Life Sciences Library, due to licensing restrictions. Users were expected to make a booking to use a particular CD-ROM database in the library. The booking of a session makes it easier for the user to find a free terminal at the allotted time. The rest of the CD-ROMs could be accessed from anywhere on the LAN. The study conducted in Ethiopia by Tefera, Wood and Ford (1999), showed that academic library users made the most use of the CD-ROMs. The reasons given for the higher usage of CD-ROMs in academic libraries was related to the accessible workstations.

The UKZNP Library continued to make print abstracts and indexes available, to help locate journal literature in a particular subject. The 26% who did not use CD-ROM databases could have used these print copies to find journal literature, as had been done previously by all library users. Those who did not use CD-ROM databases could have used online sources.

5.1.3 Use of online databases

Of the 65 respondents in the survey, 54 (83%) used the online databases, while 11 (17%) did not. All the online databases could be accessed from the Life Sciences Library, where dedicated multimedia machines are available. They could also be accessed from a remote location, which could be on campus or away from the university. One of the main factors discouraging use of online databases is the password requirement for accessing some of the databases, for example Sabinet Online. For students using this database in the Library it is easier to obtain the necessary password, but for those working away from the Library this would prove to be a problem, if they did not already have the password.

Similar to the CD-ROM databases the online databases give access to journal literature. Like the CD-ROM databases one is able to find references to journal literature and abstracts of those references. An added feature with online databases is that one is able to find the full-text for many of the articles online. Most of the online databases can be accessed anywhere on campus. Connections to these databases are such that the link is made to an IP address of the terminal. Only computers within the university IP range can be recognised by the remote server. A few online databases allow remote access with the use of a password.

5.2 Electronic databases used by students and reasons for use

Postgraduate students used a variety of electronic databases. The UKZNP Library made most of these databases available, but others were resources that were available freely on the Internet. The type of sources sought were books, journal articles, dissertations, conference papers, annual reports and newspaper articles. These sources were either accessed from the library, from the LAN or from off-campus. A number of advantages were found that made these databases useful.

5.2.1 Other sources for finding book literature, other than using the OPAC

Besides making use of the OPAC, students found books by using other resources. The ILL route was the most popular, with 29 (44.6%) of respondents using it. Aitchison (1998: 132) pointed out that there was an expectation that postgraduate level students would need more resources than the ones available at their local library. In spite of the efficiency of the service, ILL materials may take several weeks to arrive, as books are posted by the lending library. Users would need to make their requests in good time, or they might receive the material only after the due date of the assignment or seminar paper.

Sabinet Online was selected by 24 (36.9%) of respondents as the second source for finding books, other than OPAC. Once references were selected from Sabinet Online, the student would have to check locally on the OPAC to ascertain if the item was available locally. The next route would be to obtain the book from other libraries via inter-library loans or by visiting those libraries.

Visiting other libraries was considered by 21 (32.3%) of the respondents. Since the UKZNP OPAC is part of the Cataloguing Network in Pietermaritzburg (CATNIP), a significant number of records seen on the OPAC belong to libraries in the region. One of these libraries, the Natal Society Library (now known as Msunduzi Public Library), is a legal deposit library, so it is essential for users to visit in person as legal deposit material cannot be removed from the library. The legal deposit collection is invaluable, as everything published in the country is likely to be available at this library.

Some of the respondents revealed that they found further book references from online databases they had used. Although the online databases give more references for journal literature, they also provide information such as chapters in books and conference proceedings. It was quite surprising that three (4.6%) of the respondents felt they had sufficient book references and did not need to find more from other sources. Three (4.6%) of the respondents preferred to browse the shelves in order to

find books. Browsing is quite useful especially where the books are arranged using the Dewey Classification System. Books on the same or similar subjects are found together on the shelf. The use of bibliographies was found to be useful by only two (3.1%) of the respondents.

5.2.2 Identifying CD-ROM databases used

The three key CD-ROM databases for the science and agriculture disciples that the UKZNP Library subscribed to were CAB, Life Sciences and ISI Citation Indexes. Munoo (2000: 57) stressed that users are more likely to use CD-ROMs if there are enough workstations and do not have to wait in line or sign-up. CAB and Life Sciences were the two CD-ROM databases that had to be accessed from the Life Sciences Library, due to licensing restrictions and users had to sign-up to use the computer workstation. Better usage of these databases may have occurred had these obstacles not existed. CAB remained the best-used of these databases, with 72.9% of the respondents using it. Life Sciences was used by 62.5% of the respondents. It is interesting to note that the ISI Citation Indexes, which could have been accessed from anywhere on the LAN, was used by only 45.8% of the respondents. This might mean that users were not aware of such a service. Less than half of the students used the ISI Citation Indexes.

5.2.3 Identifying online databases used

The online databases that the UKZNP Library subscribes to are made available via the Library website. CabDirect, which is the online version of the CD-ROM CAB, was the database used by 61.1% of the respondents. It is important to note that CabDirect gives only references with abstracts and no full-text is available to users. The literature warns that sometimes quality is sacrificed for the availability of full-text. Tenopir (1999) cautions against full-text mania, where availability of full-text overrules other, more important, considerations.

EbscoHost was used by 55.6% of the respondents. This database provides citations, abstracts and full-text articles. This database is considered useful primarily because it

is multi-disciplinary and because of the full-text it provides. The one drawback with this database is the embargo period for full-text, which can extend to 12 months for some titles. Sabinet Online, which is a South African product, was used by 46.3% of the respondents. This revealed that local products remain popular if they provide important information. The availability of a legal deposit library in Pietermaritzburg may assist in making Sabinet Online a valuable resource for students. Less than 10 respondents used five of the relatively newly acquired databases. These were JSTOR, Ecology Abstracts, SwetsWise, Wildlife and Ecology Studies Worldwide and BioOne. No respondents made use of Water Resources Worldwide. This is surprising, as there are a number of disciples such as Hydrology and Geography that would find this resource very useful. However, in terms of access this database does not permit unlimited simultaneous users, but allows access to just five simultaneous users.

5.2.4 Other databases used

There are other resources which are freely available on the Internet which students made use of. Of the 65 respondents, 63 (96.9%) made use of search engines. It is interesting that such a high percentage of students felt comfortable using search engines, when they are used predominantly without any prior training. Search engines were used by trial and error or by way of peer education. Pubmed, Journal sites and Scirus were other Internet resources used by students, to a lesser extent. The study conducted by Urquhart *et al.* (2005) on student use of electronic information services found that students acquired information skills through a variety of routes, such as peer instruction, surfing, instruction by tutors and training by library staff. Urquhart *et al.* (2005) also found that search engines and organisational websites were a major source of electronic information. Search engines were preferred search tools as students needed only basic search strategies to use them.

5.2.5 Where databases are used

The reason why these electronic databases are used may be the location, where students are able to access them. Historically the library has been the only place where it was possible to access electronic databases. There have been some

improvements to accessibility. Now it is possible to access UKZNP Library databases anywhere on the LAN. The Life Sciences Library remains the location at which 74% of the respondents accessed electronic resources. This could be because the library has dedicated computers for accessing the available databases. It is also convenient for users who need to borrow items from the Life Sciences Library. The LAN was another location used for accessing databases. The Information Technology Department oversees student LANs, where students are able to access these library resources for their studies. Postgraduate rooms were used by a substantial number of students. Only three students made use of the databases from off-campus. This may be because most students do not have Internet access at home, or because the majority of students stay on campus. Alternatively, they may conduct their literature searching during the day, while they are on campus.

5.2.6 Other types of information sought from databases

Another reason for students to use electronic databases is that they wanted to find types of literature other than books and journal articles. Other types of information they were able to find from the electronic databases were theses or dissertations, conference papers, annual reports and newspapers. At postgraduate level it is important to look widely for these sources of information. It was important for students who were in the process of writing their own theses or dissertations to scan the literature to discover what other people had written. The results revealed that 44% of the respondents sought theses from these databases.

5.2.7 Advantages of online database use

Tenopir, Hitchcock and Pillow (2003: 35-37) stressed that the use of online resources has many advantages and preferences. Graduate students surveyed in a questionnaire by these authors felt that using online databases enabled them to link to further information sources, current information and to search a number of titles and years simultaneously. Users in many of the studies reviewed by Tenopir, Hitchcock and Pillow (2003) felt that the convenience of accessing articles at any time from their own desktop was an advantage. In the present study there were a number of

advantages found in using online databases. These databases were found to be easy to use and the availability of full-text was given as an advantage by 66.7% of the respondents. The facilities to e-mail, save and print were found to be an advantage by 64.8% of the students. The freedom to access the databases at any time was thought to be an advantage by 59.3% of the respondents.

5.3 Problems students encountered when using electronic databases

Problems emphasize the need for corrective action to be taken by the UKZNP Library. The problems identified by respondents were experienced when using all three types of electronic databases, the OPAC, CD-ROM and online databases. The Tenopir, Hitchcock and Pillow (2003) study acknowledges that a number of problems are encountered when electronic databases are used, but these are less important compared with having no access.

5.3.1 Problems experienced using the OPAC

Less than a third of the respondents indicated that they experienced problems when using the OPAC. Table 17 showed that 67.7% of respondents revealed that they had attended OPAC training. The second-year students in the Faculty of Science and Agriculture all attended a compulsory library course, AGRI220, which included practical training on the use of library databases. At postgraduate level the students who had attended that course should have retained the necessary skills they had learnt earlier. However Gash (2000) found that if library skills obtained earlier are not used, then students lose them.

In terms of the OPAC, respondents revealed having problems with limited off-campus access. This affected 18 (31.6%) students. The UKZNP Library has a limited number of sessions and does not allow access once the maximum has been reached. This can be a source of frustration for a student trying to gain access to the OPAC. Another problem experienced by 15 (26.3%) of the respondents was difficulty with searching

for books on the OPAC. This problem may be linked to a difficulty in navigation and moving from one screen to the next. It may also be linked to the complexity that comes with a shared catalogue, which shows that one title is available from more than one location. The system can be clumsy, as campus copies do not necessarily appear on the first screen. A study conducted by Blazek and Bilal (1988) found that there were problems linked to subject searching which required the knowledge and use of controlled vocabulary.

Another problem experienced by 13 (22.8%) of the respondents was logging-on. The Life Sciences Library provides dedicated computers for accessing the OPAC which are already logged on. A minority of the students found it difficulty to log on independently. Network connectivity was another problem students experienced and 13 (22.8%) of the respondents felt that the network was too slow. This could be a source of frustration for students. The inability to print from the OPAC was also considered to be a problem. This could be because the Life Sciences Library did not provide a printer for use by students. Only four (7%) of the respondents felt that the lack of availability of staff to render assistance was a problem.

Bilal (2002) points out that the Web has not solved many of the underlying problems users have experienced using second generation OPACs. The OPAC system currently used on campus is a second generation OPAC. Bilal (2002) states that users experience problems mainly with regards to formulating search strategies, selecting appropriate terminology, using boolean logic correctly and managing information overload. The recommendations by Bilal (2002) are that the OPAC of the future should be user-centred. This means that the OPAC should allow searching in natural language, provide online help and give relevance-ranking of results. As the University of KwaZulu-Natal Libraries plan for a Web-based OPAC to be implemented in 2006, it would be important to take such concerns into account.

5.3.2 Problems experienced using CD-ROM databases

The main problem experienced with using the CD-ROM databases was the slowness of the connection. All the CD-ROMs were loaded in a tower at the Information Technology Department and accessing these depended on the network working efficiently. The frustration of slow connection was revealed by 19 (39.6%) of the respondents.

The study by Munoo (2000: 14-15) points out the disadvantages of CD-ROM technology. He discussed lack of standardization for retrieval software, which then necessitates training users on the different CD-ROM databases. The speed of the technology is a concern, as it needs faster disc drives and the number of users on the network could reduce the speed of access.

Other problems experienced by 14 (29.2%) of the respondents were not being sure which CD-ROM to choose, as they were not aware of the coverage of each package. The study by Wilson (2003) points to lack of knowledge of coverage of databases, as users do not have time to explore the resources. The difficulty of searching the CD-ROM databases was another concern. Printing from, and having no off-campus access to the CD-ROM databases, was a problem for 11 (22.9) of the respondents.

5.3.3 Problems experienced using online databases

The problems experienced by students in using online databases were similar to the ones experienced when using the OPAC and CD-ROM. The longitudinal study conducted by Crawford, de Vicente and Clink (2004) found a decline in usage for databases that were password protected. The present study found that over half of the respondents, 30 (55.6%) who used the online databases, had difficulty with the password requirement for accessing some of the online databases. Slow connection was found to be problem by 24 (44.4%) of the respondents. This could be a local problem with insufficient bandwidth or the slow network.

5.4 How often the electronic databases provided were used

The frequency of use of the 29 library databases provided was determined from the responses concerning the frequency of use of each database.

5.4.1 Frequency of use of library databases

The study by Nsanzya (2003) points out that some databases were not used because of the users' lack of time to explore such resources. This study showed that, from a list of 29 databases available for use, there were three broad categories of usage. The first category was those databases that were used often: the OPAC, CabDirect and EbscoHost. The next category was of those databases seldom used: Sabinet Online, ISI Citation Indexes, Life Sciences, Web of Knowledge and Ecology Abstracts, ATLASerials, NEXUS, Philosopher's Index. The last category was of databases that were never used: Water Resources Worldwide, which caters for science and agriculture disciplines. It is surprising that Water Resources Worldwide was not used at all.

5.4.2 Preference concerning online databases

The top five databases that received the highest rankings as the preferred ones were CabDirect, EbscoHost, Sabinet Online, OPAC and ISI Citation Indexes. Databases were preferred for a number of reasons, including recommendation by lecture staff, friends and library staff.

5.5 Exploring how students became aware of the databases

Exploring how students became aware of the databases is of interest, as it gives a better understanding of the students' needs. To serve a group of users effectively, it is important for the library to understand its users' needs. The study by Dewald (2005) points out that students are encouraged by staff to use particular databases that the staff themselves are aware of. The study also highlights the problem of part-time staff

who are largely not aware of databases that the library subscribes to and instead promote free Web resources to their student.

5.5.1 Awareness of library databases

More than half of the students who responded to the questionnaire (55.6%) had found out about the databases from friends. Library orientation programmes were a source of information about the databases for 53.7% of the respondents. The information retrieval course, AGRI220, run for the students in the Faculty, was a source of information for 50% of the respondents. Lecturers, the UKZNP Library website and UKZNP Library guides were a source of information for 38.9%, 32.1% and 24.1% of the respondents, respectively. Library staff were considered to be a source of information by only 5.6% of the respondents.

5.5.2 Library orientation

The impact of library orientation programmes on the use of electronic resources, particularly the OPAC, is important. More than two-thirds or 67.7% of the students had attended the OPAC training. However, only 38.5% of the students attended CD-ROM training and 35.4% of the students attended online database training. The studies by Urquhart, *et al.* (2005) and Gash (2000) found that students generally had a vague recollection of the content of library induction sessions as these were conducted much earlier than when the students would need to use such skills. Gash (2000) warns that the timing of such programmes is important, as students may not attend if the relevance and usefulness is not apparent. Urquhart, *et al.* (2005) stated that another problem was of students lacking IT skills, but never having the time to attend training. This lack of basic IT skills would have an adverse effect on students' ability to use the library electronic databases.

5.6 Summary

In Chapter 5 the results of the present study were discussed and elaborated upon. The general observation was that postgraduate students were aware of, and were using, the electronic databases made available by the library. Most of the databases provided by the UKZNP Library were used, with the exception of one, which was not used at all. A variety of problems experienced by students when using the databases was discussed. The problems belonged mainly in three categories, problems related to infrastructure, secondly lack of information literacy, and thirdly staffing problems.

Chapter 6

Conclusion and recommendations

The purpose of the present study was to investigate the use of electronic databases by postgraduate students in the Faculty of Science and Agriculture. In this chapter, conclusions and recommendations are made after the objectives of the study are reiterated.

6.1 Revisiting the objectives of the study

The objectives of the research were to establish if postgraduate students used electronic databases; to find out which electronic databases the students used and the reasons for use; to identify problems students encountered using electronic databases; to find out how often students used the available databases; to explore how students became aware of the available databases and to make recommendations based on the findings.

6.2 Conclusions

The survey of 100 postgraduate students registered in the Faculty of Science and Agriculture in 2004 resulted in significant findings. The survey revealed that postgraduate students *did* use the electronic databases. More than two-thirds of the students used the OPAC, CD-ROM and online databases to locate books and journal literature. Other sources of information were also found, such as annual reports, theses or dissertations, conference papers and newspaper articles. Ranking the three sources in terms of usage, the OPAC was the most heavily used (88%), followed by the online databases (83%) and then the CD-ROM databases (74%).

Other than using the OPAC, Sabinet Online, visiting other libraries and online databases were other sources for book literature. Students submitted ILL requests for

items which were not held by the UKZNP campus libraries, so that those items could be borrowed on their behalf from lending libraries.

Three key CD-ROM databases that were used were CAB, Life Sciences and ISI Citation Indexes. In spite of the licensing restrictions imposed on accessing CAB and Life Sciences, these were the most heavily used CD-ROM databases. These restrictions meant that these CD-ROM databases could only be accessed from workstations available in the Life Sciences Library. Only one ISI database could be accessed from anywhere on the LAN. The top three online databases used were CabDirect, EbscoHost and Sabinet Online. At the time of the study CabDirect and Sabinet Online did not make available any full-text articles. EbscoHost was the only database with full-text, but it also had full-text restrictions on some titles due to embargoes. All of these online databases could be accessed from anywhere on the LAN.

Search engines were another category that were often used by postgraduate students. Search engines were very popular with 96.9% of the respondents, due to a number of factors, such as perceived ease of use. Users have to be cautious about the quality of information available on the Internet. This ease of use is linked to the student's ability to access such resources from anywhere on the LAN with limited restrictions. The present study found that most students still access the electronic databases mainly from the Life Science Library, even though they can be accessed from anywhere on the LAN.

Students encountered a number of problems when using all three electronic databases, the OPAC, CD-ROM and online databases. Students had problems with limited off-campus access. Limited off-campus access affected a third of the respondents, but access should be available as and when required. The finding of this study is that searching the databases was another problem students experienced. The literature supported the difficulty in subject searching due to the need to use controlled vocabulary. Searching problems could also be due to a lack of knowledge about coverage of a particular database and could be procedural or technical in nature. For the online databases, logging-onto the databases, slow connectivity and password

requirements were problems students experienced. These problems point to the need for training library users.

The frequency of use for the databases was found to vary from one database to another. The databases that were found to be used most frequently were the OPAC, CabDirect and EbscoHost. The most surprising finding of the study was that one database which is relevant for the science and agriculture disciplines, Water Resources Worldwide, was not used by any of the respondents. This is unfortunate, because the UKZNP Library spends thousands of rands annually to subscribe to such a database. Students revealed that they became aware of the library databases from a variety of sources. Friends were found to be the most important source of information about the library databases. The second source of awareness came from library orientation programmes followed by lecturers. Other sources of awareness about the library databases were the library website, library guides and library staff.

Students had attended training that was provided by the UKZNP Library. This stimulated greater access to the resources. More than two-thirds (67.7%) of the students had attended an OPAC training session. Only a third of the respondents had attended a CD-ROM or online training session. The CD-ROM and online training sessions were thus not well attended.

6.3 Recommendations

Recommendations are made for action and further research, based on the conclusions of the study.

6.3.1 Use of the OPAC

In order to improve the use of the OPAC, the UKZNP Library would have to improve access for users who would like to use the OPAC on or off-campus. Improving access includes finding solutions to the problem of limited sessions. At present there is a problem with the limited number of available sessions and users cannot login if the

limit on the number of sessions available has been reached. This is a hindrance for users. Another problem is the difficulty of using a character-based, second generation OPAC system, which can be difficult and clumsy to use. With the introduction of a Web-based OPAC (UNICORN) in 2006, the restrictive problems with limited sessions and the difficulty of searching a character-based OPAC should be resolved. Introduction of a web-based OPAC will assist with the problems which are procedural or technical in nature, such as the locking or jamming of some keys and logging-on.

6.3.2 Use of CD-ROM databases

The CD-ROM databases are being phased out at the UKZNP libraries. At present none of the science and agriculture databases remains in this format. No recommendations will be made in this regard, since the UKZNP Library has migrated the CD-ROM versions of such databases to an online version that requires Internet access.

6.3.3 Use of online databases

To improve the use of online databases there is a need for more training of staff and students. There is also a need to allow better access to students by limiting the need for password access to particular databases. This is coupled with the need to improve off-campus access for staff and students. The UKZNP Library will have to collaborate with IT departments at the university in order to achieve this. The UKZNP Library should ensure that full access to all resources is available for all users, whether they are on or off-campus. To improve access to online databases there is a need to increase the number of computer facilities available to users within the UKZNP Libraries university-wide and to increase the Internet bandwidth to improve connection speed.

6.3.4 Awareness of databases

To improve the awareness of available databases the UKZNP Library has to continue to improve its liaison with academic departments and lecturers. Ongoing awareness campaigns for students must be carried out at the beginning of the year and also at intervals during the year. It is becoming evident that targeting students only at the beginning of a semester may not be very effective; training must be ongoing to meet all the various user needs.

6.3.5 Training

The library will have to develop a more systematic approach to training its users. Training programmes need to be developed. A combination of approaches when training users is necessary, involving talks, demonstrations, teaching sessions, workshops with small groups and one-on-one when needed. The UKZNP Library may have to lobby for more resources to make this a reality. Library users have become more independent, so their training needs also change. There is a need for online tutorials that assist the user with a step-by-step guide that they can use during their time of need.

6.4 Suggestions for further research

The following suggestions concern other research studies that should be conducted at the University of KwaZulu-Natal, Pietermaritzburg:

- A similar study on the use of electronic databases, focussing on students in other faculties on campus;
- A similar study on the use of electronic databases, focussing on staff members in the Faculty of Science and Agriculture; and
- A longitudinal study should be conducted on the use of electronic databases by postgraduate students in the same faculty. This will enable the UKZNP Library to establish if there are any new developments and changes in the trends of usage.

6.5 Summary

The study fulfilled its original intention to investigate the use of electronic databases by postgraduate students in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg. Conclusions are outlined and recommendations and suggestions for further research were made.

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Appendices

Questionnaire on the use of electronic databases by postgraduate students in the Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg.

Please complete the following questionnaire by clearly ticking or crossing the relevant boxes or by filling in the information requested.

Section 1: Background information

1. Degree/Diploma registered for _____

2. Sex

2.1 Female ☐
2.2 Male ☐

Section 2: Information relating to electronic databases

3. Do you use the library catalogue (OPAC) to find books?

3.1 Yes ☐
3.2 No ☐

   If No go to Question 5

4. If Yes, what problems do you experience when using the OPAC? (*Please tick all those that apply*)

4.1 Login on ☐
4.2 Difficulty in searching ☐
4.3 Staff not always available to help ☐
4.4 Printing ☐
4.5 Limited access off-campus ☐
4.6 Slow connection ☐
4.7 Other (Please specify) _____

5. How else do you find books? (*Please tick all those that apply*)

5.1 Sabinet Online ☐
5.2 Visit other libraries ☐
5.3 Inter-library loans (ILL) ☐
5.4 Other (Please specify) _____

6. Have you used any of the CD-ROM databases provided by the library to find journal articles?

6.1 Yes ☐
6.2 No ☐

If **No** *go to Question 9*

7. If Yes, which CD-ROM databases have you used?

7.1 Life Sciences   ☐
7.2 CAB
7.3 ISI Citation Indexes ☐
7.4 Other (Please specify)_____

_____

8. What problems do you experience when using CD-ROM databases? (*Please tick all those that apply*)

8.1 Login on   ☐
8.2 Not sure which one to choose   ☐
8.3 Difficulty in searching
8.4 Staff not always available to help ☐
8.5 Printing   ☐
8.6 No access off-campus
8.7 Slow connection   ☐
8.8 Other (Please specify) _____

_____

9. Have you used any of the online databases provided by the library to find journal articles?

9.1 Yes ☐
9.2 No ☐

If No go to Question 18

10. If Yes, which online databases have you used?

Database	Please tick
BioOne	
CabDirect	
EbscoHost	
Ecology Abstracts	
JSTOR	
Sabinet Online	
SwetsWise	
Water Resources Worldwide	
Web of Science	
Wildlife & Ecology Studies Worldwide	
Other (Please specify)	

11. What problems do you experience when using the online library databases?
    (Please tick all those that apply)

11.1 Password requirements ☐
11.2 Difficulty in searching ☐
11.3 Staff not always available to help ☐
11.4 Printing ☐
11.5 Limited access off-campus ☐
11.6 Slow connection ☐
11.7 Other (Please specify) _____

12. How often do you use the following library databases?

	Often	Seldom	Never
BOOK DATABASES			
Library catalogue			
Sabinet Online (e.g. SACat)			
Digital Dissertations			
ARTICLE DATABASES			
African Healthline			
African Studies			
AIDSearch			
ATLASerials			
BioOne			
CABDirect			
Child Abuse, Child Welfare and Adoption			
Computer Literature Index			
EbscoHost			
Ecology Abstracts			
ERIC			
ISI Citation Indexes (CD-ROM)			
JSTOR			
LexisNexis			
Library and Information Science Abstracts (LISA)			
Library Literature (CD-ROM)			
Life Sciences (CD-ROM)			
NEXUS: Current and Completed Research			
Philosopher's Index			
Sabinet Online (e.g. ISAP)			
South African Studies			
SwetsWise			
Water Resources Worldwide			
Web of Science			
Westlaw			
Wildlife and Ecology Studies Worldwide			

13. From the above list of databases, which do you use most frequently? *(Rank in order, 13.1 as most frequently used to 13.5 as least used)*

13.1 _____

13.2 _____

13.3 _____

13.4 _____

13.5 _____

14. Where do you access these databases from? ***(Please tick all those that apply)***

14.1 Library ☐
14.2 Postgrad rooms
14.3 LAN ☐
14.4 Remote (off-campus) ☐
14.5 Other (Please specify) _____

15. Do you use these databases to find anything other than books and journal articles? ***(Please tick all those that apply)***

15.1 Theses ☐
15.2 Conference papers ☐
15.3 Annual reports ☐
15.4 Newspaper articles ☐
15.5 Other (Please specify) _____

16. What are the benefits of using these databases? ***(Please tick all those that apply)***

16.1 Easy to use ☐
16.2 Can e-mail, save, print results
16.3 Availability of full-text ☐
16.4 Access anytime of day
16.5 Other (Please specify) _____

17. How did you find out about these library databases? *(Please tick all those that apply)*

17.1 Lecturers ☐
17.2 Library orientation ☐
17.3 Agri220 course ☐
17.4 Library guides ☐
17.5 Friends ☐
17.6 Library webpage ☐
17.7 Other (Please specify)_____

_____

18. Apart from the CD-ROM and online databases provided by the university library, what other databases do you use? *(Please tick all those that apply)*

18.1 Web search engines, e.g. Google ☐
18.2 Other databases on the Web (Please specify) _____

_____

_____

_____

18.3 Other (Please specify) _____

_____

19. Have you attended any library orientation or library instruction on the use of databases? *(Please tick all those that apply)*

19.1 OPAC ☐
19.2 CD-ROM databases ☐
19.3 Online databases ☐

Thank you for completing this questionnaire

12 September 2004

Dear Student

USE OF ELECTRONIC DATABASES BY POSTGRADUATE STUDENTS IN THE FACULTY OF SCIENCE AND AGRICULTURE AT THE UNIVERSITY OF KWAZULU-NATAL, PIETERMARITZBURG

The purpose of this study is to evaluate use of electronic databases by postgraduate students registered in the Faculty of Science and Agriculture. With the increase in the number of electronic sources available to students, it is important to find out which sources are used for their studies. It is also important to find out if students experience any problems while using electronic sources.

I am a Masters student in Information Studies on campus. This study is being conducted in partial fulfilment of my Masters course. I hope the findings of this study will assist the University Library, and Life Sciences Library in particular, to establish which electronic databases are being used by students. I hope this will enable the library to plan how best to meet the information needs of postgraduate students.

The attached questionnaire is designed to be completed by postgraduate students registered in the Faculty of Science and Agriculture. Please complete the attached questionnaire and place it in the box provided at the Life Sciences Library issue desk. All responses to the questionnaire will be kept confidential.

Your co-operation will be greatly appreciated.

Yours sincerely

Lindiwe Soyizwapi
Subject Librarian
Life Sciences Library
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