EVALUATION OF STUDENTS' USE OF PRINT AND ELECTRONIC RESOURCES AT THE UNIVERSITY OF MALAWI COLLEGE OF MEDICINE

by

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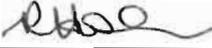
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Declaration

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.

Diana Mphatso Mawindo

As the candidate's supervisor I have/~~have not~~ approved this thesis for submission.

Signed: _____

Name: __Ruth Hoskins__

Date: __12.12.2005__

Dedication

This thesis is dedicated to my parents, Mr and Mrs B. B. Mawindo.

Abstract

The proliferation of information available in electronic format has been perpetuated by rapid technological advances. Users have a choice between print and electronic resources. At the same time, the use of these resources is determined by what is available to the users and what the users prefer. Problems that users encounter when accessing these resources determine the use of print and electronic resources.

The current study evaluated the use of, and preference for, print and electronic resources by students at the University of Malawi College of Medicine. The study population comprised 179 undergraduate students. A self-administered questionnaire was used to establish the students' use of, and preference for, print and electronic resources, reasons for their preferences and the problems they encountered in accessing print and electronic resources. An interview schedule was used to elicit background information from the College Librarian on issues of budgeting, technological infrastructure, licensing and copyright agreements, archiving and library staff and training. Questionnaire results were quantitatively analysed and presented in terms of frequency tables and graphs. Interview results were analysed qualitatively.

The study findings show that the students used both print and electronic resources. However, print resources were more heavily used than electronic ones. The students also preferred print resources to electronic. A lack of sufficient computers and low levels of computer and information literacy contributed to the underutilisation of electronic resources. Recommendations in terms of technological infrastructure, user training, staff training, user support and archiving were made based on the findings of the study.

Acknowledgements

Contents

List of tables

List of figures

List of acronyms and abbreviations

ARL   Association of Research Libraries

AV   Audio-visual

CD-ROM   Compact Disc-Read Only Memory

CL   College Librarian

CLS   Central Library Services

CLIR   Council on Library and Information Resources

COM   College of Medicine

DLF   Digital Library Federation

HINARI   Health InterNetwork Access to Research Initiative

HKU   University of Hong Kong

HTML   Hyper Text Mark-up Language

ICOLC   International Coalition of Library Consortia

ICT   Information and Communication Technology

IMPEL   Impact on People of Electronic Libraries

INASP   International Network for the Availability of Scientific Publications

IP	Internet Protocol
IT	Information Technology
LAN	Local Area Network
LJMU	Liverpool John Moores University
MALA	Malawi Library Association
MALICO	Malawi Library and Information Consortium
MBBS	Bachelor of Medicine and Bachelor of Surgery
MIS	Master of Information Studies
MK	Malawi Kwacha
OPAC	Online Public Access Catalogue
PDF	Portable Document Format
PERI	Programme for the Enhancement of Research Information
UKZNP	University of KwaZulu-Natal Pietermaritzburg
UNC	University of North Carolina
UNC-CH	University of North Carolina-Chapel Hill
UND	University of Natal Durban
URL	Universal Resource Locator

VSAT   Very Small Aperture Terminal

WHO   World Health Organization

Chapter 1

Setting the scene

1. Introduction

Rapid technological growth has perpetuated the increased rate at which information is produced. Users are faced with vast amounts of information in different formats, from which they are expected to choose, to meet their information needs. However, the use of information and communication technologies to access information depends on the skills and capabilities of the user to access the required information.

Subramanian (1998: 127) argues that the appearance of computerised (electronic) resources has shifted the emphasis in the minds of users from information need to means of access. Users tend to concentrate on the format of the access tool, that is print compared with electronic. He feels that users have pre-conceived opinions concerning the best format, based on previous experience and what they found to be the easiest type of material to use. This implies that if users find that print resources meet their information needs, the probability of them consulting the same print format is high. The same applies to electronic resources. Hence user perceptions will determine the choice of either print or electronic resources.

Though users' perceptions have a bearing on the use of print and electronic resources, users may be bound to use what is available in a particular library. As more information resources are being made available electronically (Brennan, Hersey and Harper 2002), librarians have to decide what will satisfy their users' needs. The cost of print and electronic resources, space and staffing has to be taken into account to ensure that these needs are met.

Pather (2004: 142) found that the price of a print journal increased substantially each year, compared to that of an electronic journal. In this situation libraries have to make choices that will satisfy both the user and the information provider. On the other hand, electronic resources are becoming costly in terms of subscriptions and the accompanying mediums that enable users to access them (Lee 2002: 8).

Subscription to electronic resources may be taken as a move to save the space which print resources occupy. However, electronic resources require a computer for them to be accessed. Computer hardware and software require continuous investment because of changes in technology (Gallimore 1997: 14). In addition to this, users need adequate points for them to access electronic resources. Therefore networks, computer hardware and software and system staff are needed for electronic resources to be utilised (Pather 2004: 171).

Gorran-Farkas (2000: 2) states that publishers feel that copyright laws are inadequate to protect their economic investment in electronic resources. They are now creating their own restrictions on the use of products that they license to libraries. Licensing and copyright agreements restrict how users utilise electronic resources. Licensing agreements include the number of simultaneous networks that are licensed. This limits simultaneous access to electronic resources by users. In some instances there are multi-year agreements and the library needs to renew subscriptions after the agreed period of time (Pather 2004: 173). In other instances, libraries are made to purchase electronic resources as a "bundle" of many titles, some of which may not be relevant to their users. The price of individual titles of electronic resources may be exorbitantly high when removed from the "bundle" (Himmelfarb Health Sciences Library 2004).

Both print and electronic resources provide problems in terms of archiving (Fecko 1997: 70). The long-term storage of electronic journals has implications for the maintenance of back issues and provision of access to these sources. Users want to access multiple years of back issues. Electronic resources are moving from being mere additions to print resources to becoming an area of focus in their own right (Himmelfarb Health Sciences Library 2004). Libraries need to decide on what stances to take. For instance, the library may acquire

network-based journals from publishers as offline products such as Compact Disc-Read Only Memory (CD-ROMs), provide access to back issues maintained by publishers on their Web sites, or the library itself might provide access to back issues through its Web page (Fecko 1997: 71).

Issues of training are important if students do not possess sufficient skills to access electronic resources. Lack of computer and information retrieval skills lead to their underutilisation. Users have the notion that information seeking in the electronic age is a simple process. This has been enhanced by the availability of more electronic resources, coupled with attractive Web-based interfaces (Feather and Sturges 2003: 173). The same applies to library staff. Professional or highly skilled staff are required to provide and maintain access to electronic journals. Gallimore (1997: 15) states that library staff need information technology (IT) skills in order to support users. However, few library staff keep abreast of the broad issues and rapid developments in the electronic environment (Haigh 2000: 28).

User-oriented studies are mainly concerned with subjective values of information that are perceived by the user (Palmquist and Kim 1998: 9). Libraries need to be aware of the usage of both print and electronic media. This is due to the fact that libraries are forced to make difficult decisions regarding budgets that are allocated to them. The budgets do not allow them to meet escalating prices of both print and electronic resources (Himmelfarb Health Sciences Library 2004). According to Tenopir (2003a: 32), users use and like electronic resources and most readily adopt them if the sources are seen as convenient. However, she also mentions that users still use print resources. Libraries are therefore faced with the challenge of balancing print and electronic resources to best meet the information needs of their users.

1.1 Background to the University of Malawi College of Medicine (COM)

The University of Malawi consists of five colleges: Bunda College of Agriculture, College of Medicine, Chancellor College, Kamuzu College of Nursing and the Polytechnic of Malawi. The College of Medicine (COM) is the smallest, in terms of size and population. It is also the newest college and was opened in 1991. It is situated in the commercial city of Blantyre in the Southern Region of Malawi. The student population is over 200. The college offers a Bachelor of Medicine and Bachelor of Surgery (MBBS) programme, which takes five years to complete. Plans are under way to open schools of pharmacy, physiotherapy and dentistry (University of Malawi College of Medicine 2003b).

The COM Library is currently housed in a temporary building. Before this building was erected, the library was housed in the Polytechnic of Malawi Library, which is roughly a quarter of a mile away from the COM. After eleven years in the Polytechnic Library, the COM Library finally moved into the temporary building in October 2002. The building is restricted in size due to the limited money that was available at the time (Masanjika 2003: 2; University of Malawi College of Medicine 2003a).

The COM Library collection consists of the following sections: Malawiana, Reference, General Circulation, Short Loan, an Information and Communication Technology (ICT) suite and an Audiovisual (AV) materials room. The Malawiana section, which is a closed access system, includes print resources that have been written on Malawi or by Malawians. These are mainly used for reference purposes. Students may only borrow books from General Circulation for a semester, while materials on Short Loan are borrowed for an hour. Print resources include books, journals or periodicals, pamphlets, indexes and abstracts. Audiovisual (AV) materials include films, video-tapes, slides and posters.

Apart from using these resources, COM students are entitled to use what is called a Book Bank. The Book Bank is a collection of core texts recommended by lecturers which students

are able to borrow for use for the whole academic year. The Library is thus responsible for the acquisition and distribution of these books. The number of books that students receive range from five to 18, on average, depending on their year of study.

Electronic resources are listed on a different Webpage of the College of Medicine Website (University of Malawi College of Medicine 2003c). Electronic resources are categorized into journals, electronic pre-print publishing, library resources, databases, training materials, general medical resources and general Internet resources. The library does not control access to all electronic resources. Some electronic resources, such as the Cochrane database and Health InterNetwork Access to Research Initiative (HINARI), can be accessed through the Department of Community Health Web page.

The ICT suite is used to access the following: library databases (Web-based and CD-ROM), the Online Public Access Catalogue (OPAC), general software packages such as Microsoft Word, e-mail and the Internet. The ICT centre has eight computers which are on a Local Area Network (LAN). Students use these computers to search electronic resources such as electronic journals, abstracts and indexes and other resources. Electronic resources are available to the COM Library through partners such as the International Network for the Availability of Scientific Publications (INASP), the Malawi Library and Information Consortium (MALICO) and the World Health Organization (WHO) (University of Malawi College of Medicine Library 2005).

The Central Library Services (CLS), which cater for all the colleges under the University of Malawi, used to manage the access to some electronic journals through the PERI (Programme for the Enhancement of Research Information) Project. The Project is an initiative of INASP. Since the establishment of MALICO in 2003, the provision of access to electronic resources shifted from the CLS to MALICO. INASP subsidizes and funds electronic services through MALICO (MALICO 2004). The COM Library subscribes to electronic resources through its contribution to MALICO as a member institution. Some of the electronic resources available in the COM Library include (University of Malawi College of Medicine Library 2005):

- African Journals Online
- Blackwell Synergy
- BioOne (open access journals)
- Cambridge University Press Journals
- Directory of Open Access Journals
- EBSCOHost
- Emerald
- HINARI
- Oxford Reference Online
- Wiley Interscience

There is no particular library staff responsible for the use of electronic resources who can assist users with their information searches. Despite the fact that there is a Library Assistant responsible for print journals, their work does not include responsibility for electronic journals and electronic resources in general. The College Librarian is solely responsible for electronic journals and electronic resources, in general.

Library orientation or user instruction is normally conducted for pre-medical, first-year and post-graduate students when they first come to the College. Library orientation includes general introduction to the Library and its sections, rules and regulations. Students do not have formal practical instructions for electronic resources in terms of information searching and retrieval. Recently, the COM Library started offering information literacy lessons. The sessions are offered randomly upon the request of students or lecturers (Kadzamira 2005). The information literacy skills cover the following areas (University of Malawi College of Medicine Library 2005):

- Introduction to the Internet and the World Wide Web
- Web browsers
- The Universal Resource Locator (URL) and its anatomy
- Search Engines and Metasearchers
- Subject Directories and Information Gateways

- Search Strategies and Boolean searching
- Evaluation of Internet information
- Online Information Resources, e.g. the HINARI database

1.2   Description of the problem

Users are faced with a choice between print and electronic resources, depending on what a particular library subscribes to. In instances where an information resource is provided in both formats, users are able to choose the type of format they want to consult. Users have different perceptions and satisfaction with the use of these formats. Tight budgets force the library to create a balance between the two formats, to satisfy the user.

The COM Library needs to ascertain the extent of use of print and electronic formats. With a limited budget, provision of the right information resources, that best meet the needs of users, is important. Peters 2000 (in Wallis 2002) points out that there is a gap between what libraries collect and what users use. The present study aimed at establishing if a particular resource was being underutilised. It also aimed to establish the reasons why students do not utilise these resources. Electronic resources are costly in terms of subscription costs, which have to be renewed after a particular period. Price fluctuations are also unpredictable (Lee 2002: 8). Issues of user education in information literacy, staff training, technological infrastructure, licensing and copyright agreements and archiving of resources also have to be examined, in order to establish user needs.

1.3   The purpose of the study

The purpose of the study was to evaluate student use of print and electronic resources at the University of Malawi College of Medicine.

7

1.3.1 Objectives of the study

The objectives of the study were:

a.   To establish to what extent students used print and electronic resources.

b.   To establish which resources, between print and electronic, students preferred when looking for information to meet their needs.

c.   To establish the reasons why students preferred these resources.

d.   To establish what problems students encountered when consulting these resources.

e.   To make recommendations to the library, based on the findings of the study.

1.3.2 Research questions

The study aimed at answering the following questions:

a.   To what extent did students use print and electronic resources?

b.   Which resources did students prefer when looking for information to meet their needs?

c.   Why did students prefer these resources?

d.   What problems, if any, did students encounter when consulting these resources?

e.   What recommendations could be made, based on the findings of the study?

1.3.3 Justification of the study

The COM Library users have a wide range of resources which they use to meet their information needs. However, usage statistics are kept only for books which are borrowed from the Library. Usage statistics for books that are used inside the Library and other print resources are not recorded. The fact that electronic resources are licensed, rather than owned,

means that the Library depends on the provider or producer of these electronic resources for usage statistics.

These statistics for electronic resources are available from publishers, but are not clear to librarians (Luther 2001: 1). According to Luther (2001: v), the meaning of the term "use" varies among publishers. For instance, what is counted, e.g. searches, abstracts displayed, Hyper Text Mark-up Language (HTML) pages viewed, Portable Document Format (PDF) documents downloaded, varies according to the software being used by a particular publisher (Luther 2001: 5). The same article can also be counted in different formats. The Stanford University and High Wire Press did a Web log analysis and found that individuals first downloaded an article in HTML, only to download it again in PDF (Institute of the Future 2002 in Pester 2004: 369).

Lack of complete and comparable usage statistics for print and electronic resources makes it difficult for librarians to ascertain the extent to which these resources are used. The present study was done to establish the extent to which students use both resources at the COM Library to meet their information needs. Their preferences for print and electronic resources were also investigated, as this would determine usage of the resources available in the Library.

The COM Library needs to maintain a balanced collection, in spite of tight budgets. Rising costs for print resources, as well as accompanying costs for access to electronic resources, call for wise decisions to cut costs and to simultaneously satisfy user needs. The user study was important to assist the Library in justifying the use of print and electronic resources. In addition to this, few studies have been done in Africa that relate to the use of print and electronic sources. This study would therefore contribute to the sparse literature in this area.

1.3.4 Limitations of the study

The major limitation of the study was that pre-medical and postgraduate students were omitted from the study. Pre-medical students are not considered part of the University of Malawi until after they have successfully completed the one year. Postgraduate students study on a part-time basis, which made access to the students difficult. They attend seminars at the College campus for a few weeks and then return to their workplaces.

The other limitation of the study was that AV materials (films, video-tapes, slides and posters) were not included, because they were not the focus of the study.

1.3.5 Definitions of terms used in the study

a.   Access: This means the "right of entry to a library or its collections" (Reitz 2004). In this study, it implies the right that the COM students have to the Library's collections in order for them to meet their information needs. Access may also imply the method that a user uses to meet an information need (Prytherch 2000: 4).

b.   Archiving: This refers to the process of organising electronic resources to preserve them for future use, either permanently or for an indefinite period of time (Reitz 2004). The continual availability of a particular electronic resource is unpredictable. Therefore archiving is an important aspect that poses a challenge for the COM Library to ensure continued access to electronic resources.

c.   e-book: This study will focus on hypermedia books, which are referred to as electronic representation of print books which are integrated with other related sources, e.g. video, sound and pictures, and provide the user with alternative reading or browsing paths (Prytherch 2000: 170; Lee 2002: 37). These e-books are those that are Web-based.

d. e-journal: This is "a journal that is available in an electronic format through an online host" (Prytherch 2000: 176) or, in other words, "an electronic representation of a [print] journal" (Lee 2002: 36). The study focused on scholarly e-journals which students access for their academic undertakings, namely assignments and research.

e. Electronic resources: These refer to information sources available in the library in electronic format, namely journals, books, databases and CD-ROMS.

f. Evaluation: Prytherch (2000: 4) defines evaluation as "a process of measuring the effectiveness of an organisation in meeting its aims and objectives." It usually involves making judgments on the overall success of the organisation. In this study, evaluation will imply the process of measuring the effectiveness of print and electronic resources in meeting user needs through their use of, perceptions of, and preference for, these resources.

g. Copyright: This refers to the legal right accorded to a copyright owner to prevent others from copying, preparing derivative works, distributing, performing or displaying original works of authorship of the author (Shuman 2001: 118). This study focused on copyright with regards to access to electronic resources.

h. Information use: This refers to "a behaviour that leads an individual to meet his or her information needs" (Meho and Haas 2001: 6). In this study, information use implies access and consultation of print and electronic resources that students feel best meet their information needs.

i. Licensing agreement: In this study, this means a formal written contract between a library and an information provider for the lease of one or more copyrighted electronic resources. The agreement is usually made in "a fixed period of time in exchange for payment of an annual subscription fee or per-search charge" (Reitz 2004).

j. Print resources: these refer to information resources available in print format, namely books, periodicals and bound journals.

1.4 Summary of the chapter

Chapter 1 looked into the problems and challenges that have been brought about by the surge in the availability of electronic resources. Users have a choice between print and electronic resources. The need for balance between print and electronic resources is a challenge to librarians, taking into account the costs that go with it. Background information concerning the University of Malawi College of Medicine has been described, with particular focus on the Library and its resources. The problem statement, purpose, objectives and definitions of terms used in the study were also discussed in this chapter.

Chapter 2

Literature review

2.   Introduction

This chapter covers a review of the literature that is related to the research study. It intends to indicate where the present study fits into the broader debates, thereby justifying the significance of the study (Pather 2004: 72). According to the University of North Carolina-Chapel Hill (UNC-CH) Writing Center (2002), a literature review "discusses published information in a particular subject area, and sometimes information in a particular subject area within a certain time period."

The present study was relevant in determining user information needs, preferences and perceptions which would assist librarians to provide information resources that will meet the users' needs. Feather and Sturges (2003: 173) state that:

> ... the availability of electronic information, coupled with the attractiveness of Web-based interfaces, has further enhanced the notion that information seeking in the electronic age is a simple process. The reality, of course, is that the plethora of information sources means that effective retrieval of the best available information has become even more complex."

A number of studies have been done on the use of, and the perceptions and preferences with relation to print and electronic resources. Some of them focused entirely on print and electronic journals (Pullinger 1999; Sathe, Grady and Giuse 2002; Bonthron *et al.*, 2003; Pather 2004), while others focused on information resources in general (Ray and Day 1998; Morse and Clintworth 2000; Friedlander 2002; Bodomo, Lam and Lee 2003; Evalued 2004; Liu 2005). The latter covered Web-based electronic sources comprising electronic journals and databases and CD-ROMs.

Not all studies covered all aspects of use, perceptions or attitudes and preferences. The studies reviewed here were conducted on academic staff and students (Pullinger 1999; Morse and Clintworth 2000; Friedlander 2002; Bonthron *et al.*, 2003) and those that focused on students only (Ray and Day 1998; Bodomo, Lam and Lee 2003; Evalued 2004; Liu 2005). Sathe, Grady and Giuse (2002) studied fellows, students, residents and faculty at a library and university medical centre.

2.1   Use of print and electronic resources

The use of print and electronic resources depends on what is available to users at a particular library. In other instances, their use would depend on users' preferences for print and electronic resources, as will be discussed later. Pullinger (1999: 165) felt that the local information environment that surrounds the user affected his or her use of electronic journals. Thus the use of electronic resources, for example journals, would be perpetuated by the absence of particular resources in print. The library's opening hours may also drive the user to utilise electronic journals.

Pullinger (1999) studied 70 scientific users in four universities. The users were asked to complete questionnaires. He found a number of local factors that affect the use of electronic journals. One of them was accessibility to the library as a 'place' under which opening hours, distance to the library, where holdings are held (centralised compared with decentralised libraries) limit user access to print resources. The findings illustrated the changing patterns of use towards electronic resources (Pullinger 1999: 165). The promotion of availability of journals signalled the availability of electronic journals at the point of need that is, from the Online Public Access Catalogue (OPAC). When print resources were not on the shelf, competing electronic services were required. The findings also included the need for technical infrastructure, user authentication, training and support for information retrieval (Pullinger 1999: 165).

Sathe, Grady and Giuse (2002) touched on the use of print and electronic journals in their study on the effect of journal format on research processes. The study was done at the Eskind Biomedical Library and Vanderbilt University Medical Center. Fifteen high-use print journals which were also available in electronic format were retrieved from the shelves and placed behind the circulation desk. Users who asked for these journals were asked to fill in a questionnaire. Respondents who were also using library computers were surveyed simultaneously.

Results showed that use of print and electronic resources depended on the reasons for use. For instance, respondents used print resources to browse (72%), photocopy articles (36%), read tables of contents (32%) and to check references (22%). Respondents also used electronic resources to print (58%), check references (41%) and to browse (39%). In addition, respondents' preferences for print and electronic resources depended on the reasons for use. Few users (17%) indicated that they preferred print resources.

The study found that academic staff preferred print journals to electronic journals. It was found that age had an influence on the usage of print and electronic resources. These findings answered the researchers' speculation that academic staff, who were probably older than most students, might have been later adopters of technologies such as electronic journals. However, Pather (2004: 104) found that both academic and postgraduate students accepted and used personal computers frequently. For instance, 94.7% and 90% of the academic staff and postgraduate students, respectively, indicated that they used personal computers on a daily basis.

In a similar study to Sathe, Grady and Giuse's (2002), Morse and Clintworth (2000) studied the usage of biomedical literature that was available in both print and electronic format at Norris Medical Library, University of Southern California. The results showed high levels of electronic usage, compared with print. There were 28 000 electronic viewings, while the corresponding print literatures accounted for 1 800 viewings. There was almost equal concentration of usage of the most popular titles.

The study by Morse and Clintworth (2000) assumed that the magnitude of electronic usage represented satisfaction of needs that were previously not met in using the print format. However, the number of viewings does not suffice as a measure of user satisfaction with electronic literature. It cannot be ascertained in this case whether users were actually satisfied with what they accessed.

The Morse and Clintworth (2000) study was based on two separate projects: the Impact on People of Electronic Libraries (IMPEL2) Project at the University of Northumbia and a Masters in Information and Library Management dissertation on attitudes of students towards electronic information. The data from these projects was validated by a study of 162 students using the same methodology as the student IMPEL2 study. Questionnaires were used to collect data.

Findings showed that, though students indicated usage of electronic resources, only a few were being used. Most students used CD-ROMs and the Internet. The students had the opportunity to use these resources in schools and the College of Further Education, which invests in the Internet and CD-ROMs, hence their popularity compared with electronic journals (Morse and Clintworth 2000). This shows that students used resources that they were accustomed to. Students indicated that limited time and lack of effective information retrieval skills were major barriers to the use of electronic resources which may have deterred them from adopting the use of electronic journals and other resources. Hence the majority used print resources to complement electronic resources (Ray and Day 1998).

Bonthron *et al.*, (2003) examined the views of academic staff and students on the advantages and disadvantages of electronic journals. Their research used data from two research projects. One project studied the use of electronic journals by academic staff in the Faculty of Science at the University of Edinburgh, while the other studied student uptake and use of a wide range of electronic information services in higher and further education in the United Kingdom. The aim of the study was to determine the level of use of electronic journals, how students felt about various issues surrounding electronic reference and whether attitude change depended on the subject that was being studied.

The findings of this study tend to agree with Pullinger's (1999) findings on the use of electronic journals. For instance, it was found that the convenience (accessibility) of electronic journals meant that academic staff would not access less important articles which were only available in print format. Limited time and lack of information retrieval skills were the main barriers to the access of electronic journals. It was found that students needed to be taught how to access electronic journals through databases.

The study concluded that the working environment of users would provide clues to reasons why electronic journals will be used or not. These factors would thus determine the type of training required for staff and students, depending on their varied differences (Bonthron *et al.* 2003).

Friedlander (2002) carried out a study for the Digital Library Federation (DLF) in collaboration with the Council on Library and Information Resources (CLIR) and Outsell, Inc., at three types of institutions of higher education: public (state-funded universities); private (doctoral research institutions); and liberal arts colleges. A survey of students and faculty was conducted to determine the relevance of existing and possible future services; student perceptions of the library value in the context of the scholarly environment; what resources were used to support research, teaching and learning and how these resources were located.

Findings indicated that users (faculty and students) employed both print and electronic resources. However, there was a difference between graduate and undergraduate students. Graduate students relied strongly on print resources, while the latter relied on electronic resources. Overall, most of the respondents used print journals more, followed by books, online abstracts and indexes, papers given at conferences, data and online databases.

There was a difference between Liu's (2005) study findings and Friedlander's (2002). In his study, Liu investigated the extent to which graduate students at San Jose University used print and electronic resources. He found that online resources were consulted first when completing assignments and essays. Of the respondents, 84.2% used electronic resources

17

more frequently than 54.2%, who used print resources. Eighty-five per cent felt that print resources need to be supplemented with electronic resources.

This study implied that graduate students used electronic resources, compared to Friedlander's (2002) findings that showed that graduates used print resources more than electronic resources. However, one needs to take into account the period when these studies were conducted, as well as the respondents' background and skills to use computers and retrieve information. Liu's study is more recent that Friedlander's, so there might be changing patterns in the use of print and electronic resources with the increasing availability of technology. Pather (2004) found that the majority of academic staff and students used print resources. Interestingly, more than half of the respondents indicated that they preferred electronic resources. The underlying factors on the use and preference of print and electronic resources therefore need to be established.

A study by Pather (2004) compared the science print and electronic journal collections at the University of Natal Durban (UND) Libraries. She examined costs and benefits, to provide a useful indicator of what could be done at the Library and possibly other academic libraries (Pather 2004: 5).

She found changing patterns in the use of print and electronic journals. Most of the respondents used print journals (94.7% of the academic staff and 95% of the postgraduate students). However, 93% of the students thought that electronic journals would replace print journals, while only 10% of the academic staff thought so. More than half of the academic staff (55%) thought that print journals would co-exist with electronic journals. Respondents' likes for print journals included: easy to read, easy to browse, portability and quality of presentation.

Academic staff and postgraduate students differed on their preferences for electronic journals. Academic staff indicated the following likes, in order of highest response: search facility, browsability, full-text searching and availability. Postgraduate students liked the following about electronic journals: full-text searching, browsability, search facility and

availability. Both groups disliked user authentication and accessing electronic journals by Internet Protocol (IP) address. On the future of electronic journals, the responses were varied. Both groups thought electronic journals would co-exist with print journals, followed by the response that electronic journals would mostly replace print journals. Lastly, respondents indicated that electronic journals would supplement print journals.

In light of Pullinger's (1999) study, it could be said that factors indicated in the respondents' dislikes of electronic journals contributed to the use of print journals in one way or another. The main reason was access to electronic journals, which was controlled by the use of user authentication and IP address. This implied lack of remote access outside the library or university campuses. In addition to this, Bodomo, Lam and Lee (2003) found that users were not familiar with copyright issues concerning electronic resources.

2.2   Preference for print compared with electronic resources

Being aware of usage of, and preference for, print and electronic resources by users could assist librarians to choose between the two formats. There are certain advantages and disadvantages for each format. It is important for librarians not to think in terms of 'either or' terms, but rather to look at models that incorporate them both (Rosenblum 2000 in Pather 2004: 51). According to the Association of Research Libraries (ARL) Bimonthly Report (2002), library users depend on both print and electronic resources and prefer a hybrid information environment, where electronic resources supplement print.

Preference for electronic resources over print resources depending on perceived advantages and disadvantages of electronic and print formats was shown in the studies conducted by Ray and Day (1998), Sathe, Grady and Giuse (2002) and Morse and Clintworth (2000). In these studies, respondents used and preferred a particular resource because of the advantages that they attached to them.

Another study of preferences was done by Bodomo, Lam and Lee (2003). They conducted a survey on preferences of students for print and electronic resources at the University of Hong Kong (HKU). A questionnaire survey was carried out among 35 students. Eight respondents involved in the questionnaire survey were also interviewed. Two staff members of the HKU library were interviewed.

The study had interesting results. More than half of the students who were not confident about their levels of computer competency preferred to use print resources, rather than electronic ones. Reasons for their preferences included their habit or familiarity with print resources, as indicated in other studies, portability of books and health reasons. Some indicated that reading print resources was better for their eyes (Bodomo, Lam and Lee 2003: 42).

Students who were interviewed expressed fears about the preservation of electronic resources, computer viruses that would hinder access to electronic resources if the digital library system, Internet server or their computers were attacked (Bodomo, Lam and Lee 2003: 43). They were not familiar with copyright issues concerning electronic resources and access was another factor that hindered use of electronic resources. Some respondents did not have a computer and others did not have any knowledge of computer usage at all.

From December 2003 to February 2004, a survey was conducted among students by the University of North Carolina (UNC) Library Services (Evalued 2004). The aim was to investigate the students' opinions regarding access to the UNC Library's electronic information sources. The survey was marketed by sending e-mail to students with active e-mail addresses and a link to the survey on the UNC Library's home page. Questionnaires were sent through e-mail to those students who offered their e-mail addresses. The total number of respondents was 599.

On the issue of preference for print versus electronic resources, it was found that the majority of the respondents (63%) preferred electronic resources, compared to 36% of the respondents who indicated that they preferred print resources (Evalued 2004). The main reasons given

for preference for electronic resources included speed of access to information, convenience, i.e. students could access information from home, and currency of information. Some students indicated that electronic resources contained up-to-date information. On the other hand, those who preferred print resources indicated so for the following reasons: lack of a computer, password problems and lack of knowledge and skills to use a computer and retrieve electronic information.

Pather (2004) found that, although the majority of academic staff and students used print resources, more than half of the respondents indicated that they preferred electronic resources. Given a choice between print and electronic journals, the majority preferred electronic journals (55% and 56% of the academic staff and postgraduate students, respectively). Thirteen per cent of the academic staff and 6% of the postgraduate students preferred print journals, while the rest were uncertain. The study showed that though most of the respondents used print journals, they preferred electronic journals.

The studies show that users who are comfortable with using electronic resources prefer them over print resources. Those that are comfortable with using print resources prefer them over electronic resources. For instance, Bodomo, Lam and Lee (2003: 36) question the acceptability of the use of electronic resources for [people] who have been trained with print books. Previous orientation in the use of information resources has a bearing on one's preconceptions of the best format and use. Tenopir (2003b), in her assessment of user studies, concluded that in an academic environment, both faculty and students use and like electronic resources and they adopt them if the sources are seen to be convenient.

In relation to this, the question of age having an influence was touched on in some of the studies (Friedlander 2002). Users' willingness to use electronic information may be inhibited by their lack of information retrieval skills to access these resources. This may result in users' preference for print resources. Lack of basic computer and information retrieval skills determine the usage of technological facilities and satisfaction that the user gets from them. Older people would not have had the opportunity to gain these skills and thus prefer to use print resources.

2.3　User training, computer and information literacy

Computer literacy is the ability to use a computer and its software, to accomplish practical tasks (National Forum of Information Literacy 2005). Information literacy, sometimes referred to as information competency, is the ability to access, evaluate, organise and use information from a variety of sources (Humes 1999; Feather and Sturges 2003: 261).

In an electronic environment, computer literacy is seen as the basis for information literacy. According to Feather and Sturges (2003: 261):

> The provision of ICTs and associated training in the use of hardware and software - the
> focus of many government corporate and educational programmes - is only a starting point
> in achieving desired reforms.

Being computer literate does not guarantee being information literate. The use of electronic resources depends on the user's capability to use the computer to access and retrieve information that meets his or her need. The user needs to be aware of the way information systems work and the dynamic link between a particular need and the sources and channels that are required to satisfy that need (Darch *et al.*, 1997b in Humes 1999).

The studies discussed above show that use and preference for either print or electronic resources depends, to some extent, on the individual's capability to use computers and retrieve information electronically (Ray and Day 1998; Morse and Clintworth 2000; Bodomo, Lam and Lee 2003; Evalued 2004; Pather 2004). For instance, in Bodomo, Lam and Lee's (2003: 42) study, students who were not comfortable with using computers preferred to use print resources.

Lack of information retrieval skills may apply across all ages, depending on their backgrounds. Users who have basic computer skills are more likely to use electronic information resources than those that do not have the skills. In some studies, respondents reported that lack of information retrieval skills were a barrier to using electronic resources.

Others indicated lack of computer literacy to access electronic resources (Ray and Day 1998; Bodomo, Lam and Lee 2003; Bonthron *et al.*, 2003). Dutton (1990 in Ray and Day 1998) suggested that "the skills required to maximize the potential of electronic resources are much greater than those required for searching printed sources."

Lombardo and Miree (2003: 6) cited Barbara Valentine as stating that students seek information sources that are easy to use and they favour convenience of access over quality of information. Valentine's study revealed that students "tend to avoid resources that they are unfamiliar with, or believe are difficult to use, returning to tools they have successfully used in the past" (Lombardo and Miree 2003: 6). Mutula (2004: 6) stated that several studies indicated that lack of information literacy was partly because of underutilisation of ICTs and information resources. He cited Lwehabura 1999, who stated that user education in African universities is not comprehensive enough for the required skills. If students are not confident to use computers, they will turn to print resources which they are familiar with, even if the library spends its budget on subscribing to and acquiring electronic resources and information technologies.

The level of training that users need to access electronic resources may vary according to their backgrounds and experience. Students who feel that they are competent to access electronic resources will find thorough training unnecessary. On the other hand, users who are computer and information illiterate may need thorough training. In this light, Fecko (1997: 9) poses the following questions, which the library needs to consider when planning for training:

- How basic or detailed should training be?
- In what areas should training be provided?
- Should training include traditional print as well as electronic resources, particularly for those electronic resources with print counterparts in the library?
- Should basic training courses be mandatory for new students, or should it be provided only on request for specific courses?

Thus preference for print and electronic resources may depend on the user's familiarity with that particular format. As technology continues to evolve rapidly, there is a need for higher educational institutions to ensure that users have some basic level of technological competency (McDonald 2004). Students tend to be over-reliant on electronic information, at the expense of traditional forms of information (Ray and Day 1998). Librarians need to know how students use print and electronic resources and be aware of the barriers that they meet in accessing them. If more information is available in electronic format, users need to be computer literate and have the necessary information searching and retrieval skills so that their needs are met. The same applies to print resources.

2.4   Issues facing academic and research libraries

The increasingly availability of information sources in electronic format has required libraries to make difficult decisions regarding services and collections (Fecko 1997: 5). It is vital to understand user needs and how users utilise information (Palmquist and Kim 1998: 3). This would help librarians to plan and acquire information that best meet user needs in a more efficient and effective manner.

Libraries are faced with the task of providing these electronic resources and, at the same time, trying to balance between the purchase of print and electronic resources, with tight budgets. As Lee (2002: 7) states:

> With the exception of freely accessible Internet sites, the problems faced by collection developers when it comes to establishing a budget for electronic resources and traditional (print) resources are very similar.

Though this may be the case, the provision of access to electronic resources has its own accompanying costs, as will be discussed later in this chapter.

The decision to purchase or subscribe to a particular resource needs to be in line with what best meets the information needs of the user, otherwise it would be a waste of resources. Therefore the views of users in terms of their use of resources, perceptions and preferences need to be taken into account when making these decisions. Issues like tight budgets, expenses that go with the provision of electronic resources, for example copyright and licensing agreements, networking infrastructures, as well as staffing and training, make it difficult for librarians to meet these needs. Electronic support is more expensive than print in these cases (King 2004: 262).

Academic and research libraries in Africa are faced with more complex problems than their counterparts in developed countries. Most libraries in Africa depend, to a large extent, on grants from international governments for most of their recurrent and capital budgets (Mutula 2004: 3). Rosenberg (1997: 24) states that the minimal budgets allocated to libraries by most universities "can only reflect a lack of support for these libraries and an unwillingness to recognize and tackle the information problem."

Assibley 2000 (in Mutula 2004: 3) reported on a study done by the African Association of Universities in 1996. The Association found that libraries within university environments in Africa were neglected. In addition to this, university libraries witnessed a changing economic climate and changing government policies. Academic and research libraries are hard hit when their budgets are cut. To alleviate this problem, libraries depend on donations, gifts and exchange materials (Mutula 2004: 3). The escalating availability of information in electronic format makes it even harder for academic and research libraries in Africa to keep up with the current trend.

2.4.1 Budgeting in academic and research libraries

It is imperative that librarians make decisions based on the little money that is allocated to the library to balance the purchase of print and electronic resources. Lee (2002: 8) argues that the price of electronic resources is often considerably higher, even when the additional

advantages of using the resources in electronic form are taken into account. He states that price fluctuations in electronic resources are unpredictable. In this light, librarians would be faced with a challenge on how to maintain subscriptions to these electronic resources, as subscriptions are expensive.

Pather (2004: 142) analysed science print journals subscriptions from 2003 to 2004 at the University of Natal Durban (UND) Library. She found that the average price of print journals increased each year, for various reasons. Data indicated that the average cost of electronic journals was lower than that of print. This saw the UND Library subscribing to fewer print journals, whilst paying more each year for journals.

During her interview with the Acting University Librarian, Pather (2004) found that the UND Library had reduced the purchase of monographs to allow for the purchase of journals. Journal cancellations were also planned in favour of electronic journals. These were Elsevier print journal titles that were provided by Elsevier's ScienceDirect. The reason was that the UND Library was to receive a discount of (10%) on the electronic subscriptions (Pather 2004: 145).

According to Pather (2004: 154), despite the low cost of electronic journals, there are other factors that librarians need to take into account. Pather (2004: 154) found that there was lack of sufficient computer workstations and printing facilities in the UND Library. Other barriers to usage of electronic journals were the speed and reliability of the computers and the unavailability of remote access outside campus. There was also a need for library computer support and staff to be responsible for electronic services (Pather 2004: 179).

Budgeting is a serious issue where libraries are concerned. Most libraries operate on tight budgets when, at the same time, they are expected to meet user needs. According to Himmelfarb Health Science Library (2004):

> ... libraries are thus forced into making difficult decisions, because funding levels are not growing as fast as new pricing mechanisms are escalating and libraries have to make changes to meet these increases.

In Africa, where budgets from governments for most universities continue to decrease, the problem is even worse. In a study relating to the financing of university libraries in Africa, Raseroka and Rosenberg 2000 (in Mutula 2004: 3) found that most universities in sub-Saharan Africa received an average of 4% of the parent institution's budget, compared with the international figure of 6%.

In case studies of 18 African university libraries, Rosenberg established that government grants no longer provided a steady income for the purchase of library materials (Rosenberg 1997: 25). The studies were conducted between April and December, 1995. Rosenberg (1997) stated that most of the libraries' acquisitions included much donated material. In addition, library budgets were not high enough to purchase core collections (Rosenberg 1997: 1). This being the case, it was difficult for these universities to manage the provision of electronic resources. The cost of electronic services was beyond most libraries in many Southern Africa countries, until the International Network for the Availability of Scientific Publications (INASP) recognised that libraries were "negatively affected by prevailing global financial conditions" (Ngwira 2004). Among other things, INASP assists libraries with subsidised subscriptions to electronic resources.

Libraries depending on donations or subsidised electronic resources still need to put in place measures to sustain the provision of both print and electronic resources, should donors decide to withdraw. "Funding that is provided to libraries is not necessarily separate from the amount the library is often allocated by the parent organization" (Mutula 2004: 4). Decisions regarding the replacement of print with electronic resources have to be made economically, but with the satisfaction of the user in mind.

2.4.2 Technological infrastructure

The studies discussed in this chapter indicate that there seems to be changing patterns in the use of print and electronic resources. Ray and Day (1998) state that students are encouraged to use electronic resources whilst at university. As technology continues to dominate the

information society, users are encouraged to use electronic resources as more information becomes available online. The proliferation of the availability of information in electronic format may force libraries to cancel some print resources that also appear in electronic form, to cut costs.

The provision of electronic information comes with additional costs for information technologies. Users cannot access electronic information resources if there are no "workstations with the appropriate hardware and software such as Acrobat Reader, printers and access to the Internet and the university server" (Pather 2004: 149). In addition, this equipment would require space. This is another challenge for librarians, especially in an environment where users depend on the library to access electronic resources. Considering the space issue, some authors have argued that there will be no need for a [large] library building in future, as:

> Libraries will primarily be a series of small but powerful computers... A library could be only large enough to contain a bank of public terminals which will be used to retrieve and display information from remote databanks (Corbin in Drabenstott 1994: 14).

Cummings *et al.*, 1992 (in Drabenstott 1994: 14) felt that it would be impractical to build large, costly warehouse-type structures to shelve print materials, replicating collections that exist elsewhere, for instance in electronic format. Drabenstott (1994: 14) projected that physical library space would be of little concern, since electronic resources would be accessible through information technologies. These technologies would enable library staff and patrons to access the resources from their offices, homes or any convenient site. These arguments refer to digital libraries, where information exists only in digital electronic format rather than print (Barker 1997: 94). It would be assumed that library users have access to information technologies such as hardware and Internet connectivity outside the library.

Academic and research libraries in Africa are still far from realising this dream. For instance, even though universities are better equipped in relatively well-off South Africa, one thousand people can depend on just one terminal (Witten, Loots, Trujillo and Bainbridge

[n.d.]) Most academic and research libraries acquire print resources and provide access to electronic resources at the same time. Hence the issue of space cannot be ignored altogether.

Lack of access to personal computers among library users implies user dependence on computers available in the library to access electronic resources. In Morse and Clintworth's (2000) study, respondents indicated limited time and lack of skills to retrieve information electronically. It would be assumed, therefore, that these respondents relied to a greater extent on the library to access computers. They also needed assistance from library staff to retrieve information.

The requirement for suitable technology to use electronic resources is projected in Pullinger's (1999) study. Respondents did not use electronic resources because of lack of remote access, which was controlled by user authentication and password. This would require the library to provide sufficient computer terminals and related technologies to allow users to access electronic resources within the library or academic institution. Crawford and Gorman (1995) state that:

> There are other costs to the library that are associated with electronic reference works. Online resources require terminals or workstations. CD-ROM publications require computers and increasingly, networking. The user needs more than a table and a good light to use an electronic resource.

Though it is argued that subscriptions to electronic journals save space in the library, computer hardware and related technology need space where users can access them to consult electronic resources. If users use the library to access electronic resources, sufficient numbers of computers are required. Therefore, access to electronic resources cannot be separated from the mediums through which they are accessed. Fecko (1997: 11) states, "the acquisition of electronic resources is directly tied to the availability of, or willingness to purchase, suitable technology to use the resources." The issue of space can thus not be discarded completely, as in such situations libraries need to ensure enough terminals for users to access and utilise electronic resources.

In Rosenberg's (1997) study, the Librarian of the University of Zimbabwe Medical Library indicated that she had not realised how fast technology would change and how often computers would malfunction. On top of that, databases were costly to maintain and updating of hardware presented continual problems (Rosenberg 1997: 29). The Cheikh Anta Diop University Librarian indicated that the use of computers brought an additional cost burden in terms of updating equipment, maintenance and creating suitable space and facilities. The trend seems to be the same in most academic and research libraries in Africa, due to the limited budgets allocated to them.

Brophy (2000: 50) states that academic libraries have become more dependent on the use of computers for the delivery of many of their services. However, with the dwindling budgets allocated to libraries, the provision of access to electronic resources in African academic and research libraries is inhibited. As Westra 1993 (in Mutula 2004: 3) argued:

> ... the decreasing of funding to [African] libraries has had an effect of low development of digital library and information services. In addition, Internet access in libraries is restricted because of the high costs of [providing] the services and computer equipment.

Users are thus either denied access or have limited access to information available electronically. Libraries are forced to charge for services for users to access electronic resources or, in some instances, users have to book to access these resources, due to limited access points.

2.4.3 Licensing and copyright agreements

According to the International Coalition of Library Consortia (ICOLC), "the use of licensed electronic information resources will continue to expand and in some cases become the sole or dominant means of access to content" (Brooks 2001: 318). Licensing agreements restrict access to electronic resources in the library. Electronic resources are often leased, not purchased. This means that electronic resources have contracts that specify which users may

access the resource and how many simultaneous users are permitted at a given time (American Association of Law Libraries in Schottlaender 1998; Fecko 1997: 10).

Pather (2004: 173) found that "many packages and individual subscriptions to e-journal cost less because of these restrictions. If the access was open-ended, then the subscription would be more." Information providers offer licenses based on the size of the entire network that will carry the product or the number of simultaneous users (Pantry and Griffiths 2002: 93). Requirements like user authentication and passwords are also some of the issues that limit user access to electronic resources, as indicated in Pullinger's (1999) study.

Licensing agreements limit access to electronic resources and so does copyright, which governs their use. Some publishers or providers do not allow users to download and print out information. Users find this unsatisfactory. Some people still prefer to read from paper rather than computer screens (McNight 1997). In the study by Bodomo, Lam and Lee (2003: 46), respondents preferred print resources because reading physical material was better for their eyes. Respondents, as well as librarians themselves, were unaware of copyright laws applying to electronic resources.

Despite the use and preference for electronic resources, librarians need to understand licensing agreements and their implications, as well as copyright laws that govern their use by library users. Librarians need to review and negotiate for electronic resources in terms of licence, because they have the most knowledge of the user community and of the resource being acquired (American Association of Law Libraries in Schottlaender 1997). In addition to this, users need to be aware of the extent to which they can copy, share, disseminate and use the resources (Bodomo, Lam and Lee 2003: 46).

2.4.4 Archiving of electronic resources

Another challenge facing librarians today is that of archiving. Much information is moving from print to electronic form and is correspondingly more accessible (Barnes 1997). With

31

this in mind, there is need to ensure its continued availability and accessibility. Librarians have to decide on how to provide for continued availability of obsolescent materials (electronic resources) and how to handle problems of copyright, which are complex in electronic publishing (Gurnsey 1985: 57).

In an academic setting, continual availability of electronic resources, apart from print resources, is of utmost importance, as libraries are responsible for preserving and providing continuing access to "a society's accumulated stock of recorded knowledge" (Barnes 1997). The availability of electronic resources, without their print counterparts, poses a challenge to librarians in terms of archiving. Sometimes publishers or providers (aggregators) add journal titles, or drop them, without consulting the user or library and often without notification. Librarians need to ensure that these resources remain accessible and usable by their users as far into the future as possible (Neavill and Sheble 1995; Montgomery and King 2002: 134).

Though some publishers of electronic resources, electronic journal *per se*, maintain archives of backfiles at network sites, there is still little assurance that these resources will be available permanently. Neavill and Sheble (1995) and Ithaka Harbors (2004) stress that libraries are skeptical of publishers' ability to deliver long-term access to electronic resources. Publishers may discontinue individual titles or go out of business altogether. Adding to this, Janice M. Jaguszewski and Laura K. Probst (Brooks 2001: 317) state that:

> If a resource is leased but not owned, and an archive is not made available, then, on cancellation, not only is the collection lost, but so is the historical record of the (said) resource that was, at one time, important to the collection. In addition, if research were ever renewed in that subject, the archive would be difficult and costly to reconstruct.

In addition, it is costly for libraries to build the technological infrastructure necessary to ensure the long-term preservation of the numerous electronic resources on which scholars now rely (Ithaka Harbors 2004). Library staff would also need expertise in the archiving of electronic resources if long-term access is to be granted to users.

2.4.5 Library staff and training

Libraries cannot isolate themselves from the effects of technology in their provision of services to library users. They are being swept along with the currents of rapidly changing technology. Librarians are faced with the challenge of developing new skills and redefining their roles, to support technology-based services (Youngman 1999). Librarians need expertise to keep abreast of the broad issues and rapid developments in the electronic information field. In the African context, not many librarians are on the cutting edge of ICTs (Ngwira 2004).

In a technologically-driven environment, the importance of library staff trained in information technology (IT) was revealed in a study done by Katundu (1998). His study involved 18 academic and research libraries in Tanzania. Only seven libraries (38.89%) rated their staff members as having adequate IT skills, knowledge and computer competence. Eleven libraries (61.11%) indicated that, though some of their staff members performed IT functions, they lacked adequate IT skills, knowledge and computer competence (Katundu 1998: 133). This has a negative impact on meeting user needs.

Similar findings were established in a study of the ICT skills and knowledge of subject librarians at the university libraries of KwaZulu-Natal by Hoskins (2002). Lack of training, understanding, knowledge and skill in the use of, and application of, ICTs were highlighted in the problems faced by the subject librarians. It was found that lack of ICT knowledge and skills led to the underutilisation of these resources (Hoskins 2002: 129, 136). It was also argued that some of the subject librarians lacked ICT knowledge and skills because they "would have received their library education at a time when technological competencies were not as critical as they are now" (Hoskins 2002: 136).

The Impact on People of Electronic Libraries (IMPEL1) Project, carried out at the University of Northumbia, investigated the impact that the development of electronic libraries was having on library staff. Some of the factors that were established included shortage of funds, with no extra resources being provided despite the need to develop new

services while maintaining the old and deficiencies in staff training, usually ascribed to pressures of time, so that even peer to peer training is squeezed out by user demands (Brophy 2000: 95).

A research project based at Liverpool John Moores University (LJMU) investigated the provision of electronic information resources in Nigerian libraries. Most of the libraries that participated in the study indicated that there was a lack of ICT skills at all levels (Ashcroft and Watts 2005: 9). Other areas of concern included a shortage of technology literate staff in libraries, the lack of skilled human resources to install, manage and network technology, as well as poor funding to attract staff or to develop such skills in existing staff.

All the studies discussed in this section indicate the importance of ICT knowledge and skills by library staff in academic libraries. Staff training is an important aspect in the library, where staff are expected to assist users in using computers to access electronic resources. Staff who are not competent in the use of ICTs are not likely to assist a user who needs assistance in using a computer or accessing an electronic resource. Library staff need to be trained in the effective use of ICTs (Gallimore 1997: 15). As information becomes available in new formats, librarians need to know how to use the technology required to access the new technology. When the new technology is made available to users, librarians will need to assist them (Fecko 1997: 13).

2.5   Methodologies employed in the literature

Almost all the studies discussed earlier used the survey design and questionnaires to collect data (Ray and Day 1998; Friedlander 2002; Hoskins 2002; Sathe, Grady and Giuse 2002; Liu 2005). Some used a combination of questionnaires and interviews (Rosenberg 1997; Lam and Lee 2003; Pather 2004) and interviews only (Bonthron *et al.*, 2003). Pather (2004) used a literature review, review of documentary sources and an analysis of journal data. Ashcroft and Watts (2005) used secondary data sources and questionnaires.

Morse and Clintworth (2000) conducted a case study over a period of six months. Data was gathered from Ovid transaction logs that indicated every user transaction and scanning barcodes of journal volumes during the reshelving process. A list was later compiled for print and electronic titles in ranked order by the number of uses. Katundu's (1998) study was done over a period of five months. He carried out an exploratory survey in which interviews, questionnaires and observations were used to collect data.

2.6   Summary of the chapter

The literature review in Chapter 2 examined various themes that have been investigated in relation to the study. The chapter covered the use of print and electronic resources, preference for print over electronic resources, user training, computer and information literacy, issues facing academic libraries and methodologies that were employed in the various related studies.

From the studies reviewed above, some factors can be deduced to have an influence on the use of, preference for and perceptions of print and electronic resources. The trend in the use of print and electronic resources is changing as technology seems to dominate the information society. African studies highlight the fact that the trend is slower in Africa than in developed countries.

Chapter 3

Research methodology

3. Introduction

Chapter 3 discusses the methods used to investigate student use of print and electronic resources at the University of Malawi College of Medicine. The research adopted a quantitative approach. Quantitative research involves the collection of data in the form of numbers and the use of statistical data analysis (Blanche and Durrheim 1999: 42).

3.1 Research method

A descriptive survey was employed in this study. This type of survey describes the characteristics of the population that is under study, estimates proportions in the population, makes specific predictions and tests associated relationships (Powell 1997: 61). According to Weisberg, Krosnick and Bowen (1996: 15), survey research is used to address the following questions:

- The prevalence of attitudes, beliefs and behaviour;
- Changes in them over time;
- Differences between groups of people in their attitudes, beliefs and behaviour; and
- Causal propositions about these attitudes, beliefs and behaviour.

This study investigated the use of, preferences for and perceptions of print and electronic resources by students. Survey research was most appropriate to establish the students'

behaviour in the use of print and electronic resources and their attitudes or perceptions towards these resources. The students' preferences were investigated to determine what they believed to be the most useful resources that met their needs. Another reason why the survey method was chosen in the present study was that most of the studies discussed in the literature review (see Chapter 2) used the survey design to gather data.

Survey research is used to gather contemporary data (Powell 1997: 58). It was projected that the findings of the study would portray the current state of student use of print and electronic resources available in the COM Library.

3.2   Population

A study population is defined as the "aggregation of elements from which a sample is actually selected" (Babbie and Mouton 2001: 174). The population in this study was COM undergraduate students.

3.2.1 Size of population

The population of this study comprised 179 undergraduate students at the University of Malawi College of Medicine. One of the advantages of survey research is the ability of the researcher to "gather information about the target population without undertaking a complete enumeration" (Busha and Harter 1980: 54). Sampling in survey research allows the researcher to generalise findings across the population from which the sample was taken.

In the present study, the population was relatively small, which made sampling unnecessary. The entire population was studied. A study of a whole population is referred to as a census. A census is a survey of all the elements of a population and the determination of the distribution of their characteristics (Powell 1997: 67). A census approach eliminates

sampling errors and provides data on all probable respondents in the population (Ngulube 2005: 130).

3.2.2 Known characteristics of the population

In this section, known characteristics of the population are discussed. These include undergraduate students, gender and the College Librarian of the COM Library.

3.2.2.1 Undergraduate students

According to Brophy (2000: 58), undergraduate students form the largest user group of most university libraries. The COM Library is no exception. Undergraduate students form the largest part of COM's overall population. All undergraduate students are full-timers, who reside on campus and hence have access to the COM Library.

3.2.2.2 Gender

There were 119 male and 61 female undergraduate students at the COM. The number of students in the lower years of study (i.e. first to third year) shows the increase in the number of students enrolled at COM over the past few years. The population list was obtained from the COM Administration Office through the College Librarian (Kadzamira 2005). The population distribution of males and females according to the year of study was as follows:

- First year: 30 males and 12 females;
- Second year: 37 males and 20 females;
- Third year: 26 males and 16 females;
- Fourth year: 13 males and 11 females; and

- Fifth year: 13 males and one female.

3.2.2.3   The College Librarian

The College Librarian is responsible for the administration and services of the COM Library. She supervises the overall running of all sections of the Library. She is also responsible for the budgeting and acquisition of library materials, that is both print and electronic resources.

3.3   Instrumentation

Most surveys utilise a simple data collection technique. Nevertheless, combinations are sometimes used (Fowler 1993: 54). Two methods were used in collecting data in the present study. These were a self-administered questionnaire for undergraduate students and a structured interview schedule, which was used to collect data from the College Librarian.

A self-administered questionnaire allows respondents to complete the instrument themselves (Borque and Fielder 1995: 2). Access to the students was difficult because of their busy schedules and because most of their time is spent at a government hospital situated near the COM campus. The self-administered questionnaire was deemed appropriate, to allow the students to complete it at their own convenience. A self-administered questionnaire also guarantees anonymity. Due to the limited time at the disposal of the researcher, the self-administered questionnaire was chosen because it allows one to collect large amounts of data within a short period of time (Busha and Harter 1980: 62).

Apart from producing a better response rate, interviews provide a greater capacity for the correction of misunderstandings by respondents (Powell 1997: 112). They also allow the interviewer to probe further for elaboration or clearance on respondents' answers. Busha and Harter (1980: 78) point out that verbal responses often provide valuable original data. The

interview with the College Librarian provided some background information that could not have been elicited from the undergraduate students.

3.3.1 The questionnaire

The questionnaire was 12 pages long and consisted of 24 questions or items. The questionnaire was semi-structured, that is both open-ended and close-ended questions were included in the questionnaire. The questionnaire was designed to elicit views about the use of print and electronic resources by undergraduate students at the University of Malawi College of Medicine.

3.3.1.1   Categories of information

The questionnaire was divided into three sections. These were:

- Section A: Background information
- Section B: Use of print and electronic resources
- Section C: User education

Questions one to three solicited background information in which respondents were asked about their gender, year of study and age. The use of print and electronic resources included a general section and three sub-sections on print resources, electronic resources and preferences for print and electronic resources (questions four to 22). Respondents were asked to rate the importance of library resources at COM and their use of the resources. Respondents who indicated that they used print resources were directed to respond to questions under Print Resources (Section B1), while those that indicated that they used electronic resources only were directed to complete the section on Electronic Resources (Section B2). Those that indicated that they used both resources were required to complete

both sections (B1 and B2). Section B3 set out to establish the respondents' preferences for print or electronic resources, the reasons for the preferences and what they viewed the future of print and electronic resources to be.

Section C comprised questions on user education (questions 23 to 28). These questions were asked to establish the respondents' level of computer literacy. The respondents were asked whether they had received any form of training from the COM Library and their level of satisfaction with the training they had received. The last two questions were open-ended and asked for the views of respondents on what improvements they thought could be made in terms of user training.

3.3.2 The interview schedule

The interview schedule was nine pages long. There were 30 questions in total. The schedule intended to establish the current situation of print and electronic resources available at the COM Library, with regards to budget, infrastructure, staff, licensing and copyright agreements, archiving of electronic resources, awareness and usage of both the print and electronic resources. Most of the questions required the respondent to answer "Yes" or "No" and then to provide explanations for his or her answers.

3.3.2.1   Categories of information

The interview schedule comprised seven sections:

- Section A: Budgeting
- Section B: Infrastructure
- Section C: Staffing
- Section D: Licensing and copyright agreements

- Section E: Archiving of electronic resources
- Section F: Awareness of print and electronic resources
- Section G: Usage

The first section asked the respondent what proportion of the budget was allocated to the COM Library and what proportions were allocated to print and electronic resources. The researcher also wanted to ascertain if electronic resources had affected the acquisition of print resources and if comparisons were made between the costs of the two resources. In Section B questions were asked on the challenges or problems that the COM Library experienced in terms of technological infrastructure, as well as spacing. The next section elicited information about staff, their responsibilities over print and electronic resources, their qualifications and the on-going training they received. Section D asked the respondent about issues concerning licensing and copyright agreements in accessing electronic resources and how these restrict user access. Section E aimed to establish if there were any mechanisms in place regarding the archiving of electronic resources and problems that the Library encountered in this area.

The interview schedule wanted to determine how users were made aware of the available resources in the Library (Section F). The respondent's views on the use of print and electronic resources were elicited in Section G. The last two questions asked the respondent if usage statistics were kept for print and electronic resources.

3.3.3 Forms of questions

Close-ended and open-ended questions were included in the questionnaire. Busha and Harter (1980: 70) and Powell (1997: 94) refer to close-ended and open-ended questions as structured and unstructured questions, respectively.

3.3.3.1   Close-ended (structured) questions

In close-ended or structured questions, respondents are provided with fixed responses from which they are supposed to choose. A series of alternative responses are given, from which respondents are allowed to choose (Busha and Harter 1980: 70; Weisberg, Krosnick and Bowen 1996: 78; Babbie and Mouton 2001: 233). These types of questions are less demanding for the respondent and much easier to code and analyse, as opposed to open-ended questions.

Powell (1997: 94) states that close-ended questions are "standardisable", easy to administer and more easily understood by respondents, in terms of the dimensions along which the answers are sought. For example, the questionnaire used in this study included questions that forced respondents to choose between fixed responses like "yes" and "no". The shortcoming of such kind of responses is that they sometimes force a statement of opinion on an issue about which the respondent has no opinion. Respondents may also be forced to choose inaccurate answers (Powell 1997: 95). Attitudinal questions were included in the questionnaire to obtain data of a subjective nature (Pather 2004: 85). These questions ask respondents to rate their attitude on what is called a Likert scale. For example, respondents are asked to rate their attitude on a scale with the following statements: Strongly agree, Agree, Neutral, Disagree and Strongly disagree (Trochim 2002).

Sometimes the responses provided in a close-ended question may not be exhaustive and force the respondent to choose a response that does not apply to him or her. To overcome this problem, partially close-ended questions were included in the questionnaire. These questions provide "a compromise between the open- and close-ended questions" (Salant and Dillman 1994: 84). Thus, although fixed responses are provided, respondents are given the option to provide their own response if different from the series of responses suggested. This is ensured by adding a category labelled something like, Other (Please specify: _____) (Babbie and Mouton 2001: 234).

However, the nature of some close-ended questions in the questionnaire, though partially closed, allowed respondents to choose more than one response. For instance, in the study, respondents were asked to indicate what problems they encounter when accessing print resources. It could not be assumed that respondents encountered one problem only and it was thus appropriate to allow them to choose all that applied to them. The disadvantage of this kind of question is that it creates difficulties in data processing and analysis (Babbie and Mouton 2001: 234).

3.3.3.2   Open-ended (unstructured) questions

Open-ended questions allow respondents to answer in their own words. Respondents are not forced to choose from a fixed series of answers. They are free to express their thoughts and feelings in their own words. This allows the researcher to elicit the respondents' views on the topic under study (Busha and Harter 1980: 70; Weisberg, Krosnick and Bowen 1996: 78).

Open-ended questions have their own disadvantages. Respondents tend to approach the same questions from different perspectives, which makes it difficult for the researcher to compare responses (Weisberg, Krosnick and Bowen 1996: 78; Salant and Dillman 1994: 81). Responses to open-ended questions are also difficult to analyse compared to close-ended questions (Busha and Harter 1980: 70). The researcher is required to code the respondents' answers to open-ended questions into categories before analysing them. Responses that are similar are first grouped into categories before they are coded. This process is called content analysis.

The questionnaire in the present study included open-ended questions. These questions asked the respondents to provide explanations for their response in the previous questions. Two questions asked the respondents' thoughts on what could be done to improve library user education. This was important in light of Salant and Dillman's (1994: 81) statement:

44

> Open-ended questions are sometimes helpful when they immediately follow a close-ended question and ask respondents to explain why they selected a particular answer. Their explanation may give researchers more insight regarding certain survey results.

Bourque and Fielder (1995: 17) argue that self-administered questionnaires must be closed-ended ones. Respondents of self-administered questionnaire dominated by open-ended questions are not always highly motivated to answer the questions. As a result the researcher finds out that returned questionnaires "will frequently have substantial amounts of missing or irrelevant data" (Bourque and Fielder 1995: 17). To minimise this problem, the self-administered questionnaire used in the present study included more close-ended questions and fewer open-ended questions.

3.4 Pre-testing the questionnaire

A pre-test allows the researcher to "learn how well their questions or instructions are understood and how comprehensive the response categories are" (Bourque and Fielder 1995: 89). A pre-test also allows the researcher to identify questionnaire items that tend to be misunderstood by the respondents and hence do not obtain the information that is needed (Powell 1997: 105).

3.4.1 Population for the pre-test

The population for the pre-test were eight Master of Information Studies (MIS) students at the University of KwaZulu-Natal. The respondents were asked to fill in the questionnaire and comment on the structure, wording, clarity and relevance of the questions. Babbie and Mouton (2001: 245) mention that it is proper to pre-test the questionnaire on people to whom it is at least relevant. In the present study, the undergraduate students at the University of KwaZulu-Natal, Pietermaritzburg (UKZNP), were on holiday when the questionnaire was ready for pre-testing. It was thus almost impossible to access the students during this time.

MIS students were chosen because they were accessible through e-mail and had consented beforehand to participate in the pre-test.

3.4.2 Administering the pre-test

Bourque and Fielder (1995: 89) state that the pre-test should always be conducted prior to the actual data collection and the results should be carefully evaluated and used in making changes to the questionnaire. The questionnaire was sent on 20 June 2005 through e-mail to seven of the students, because they were part-time students. The eighth questionnaire was presented by hand to a full-time student.

The respondents were given one week to complete the questionnaire and e-mail or send it back to the researcher, together with their comments. A reminder was sent on 23 June 2005. Of the eight questionnaires sent, four were returned.

3.4.3 Changes resulting from the pre-test

Very few changes were made to the questionnaire. Some spelling mistakes in the questionnaire were corrected.

3.5   Administering the research instruments

In this section, the procedures that were followed in administering the research instruments are discussed. The research instruments used in this study were the questionnaire and the interview schedule.

3.5.1 Administering the questionnaire

The questionnaire was finalised and sent out, together with a covering letter, to undergraduate students of the University of Malawi College of Medicine. A list of the names of the students was obtained from the COM Library. The list was verified with the COM Assistant Registrar (Administration) by the College Librarian. The questionnaires were sent on 15 July 2005 to the students through class representatives for each particular year of study. The covering letter explained the aim of the study and assured the respondents of confidentiality and anonymity. The first page of the questionnaire included instructions on how to complete the questionnaire.

Respondents were asked to return the questionnaire to the COM Library on or before 19 August 2005. A reminder was given for students to return the questionnaires. A further reminder was sent on 20 August 2005 to the respondents. With the assistance of the COM Library staff, students who visited the library were reminded to return completed questionnaires. The response rate was so low that it necessitated the extension of the deadline for completing the questionnaire. Fifteen questionnaires were collected during this period. This signified a response rate of 8.4%. Due to the fact that the students had a two-week vacation a fortnight after the questionnaire was administered, data collection was postponed and resumed on 9 August 2005, when the students returned. Reminders were sent during this time and a note was placed on the COM Library notice-board. The number of questionnaires eventually received totalled 67, a response rate of 37.4%.

3.5.2 Administering the interview schedule

An appointment was booked with the College Librarian for the COM Library a few weeks prior to the interview. The interview took place in the College Librarian's office on 19 July 2005.

3.6 Data analysis

Once data is collected it should be checked for completeness, comprehensibility, consistency and reliability. This process is referred to as data cleaning. It involves "everything from simply reading the results, looking for surprising responses and unexpected patterns, to verifying or checking the coding of the data" (Powell 1997: 63). Data cleaning is done both after data collection and data entry into the computer. According to Ngulube (2005: 138), "data analysis may aid a researcher to arrive at a better understanding of the operation of the social processes". Data analysis involves categorizing, ordering, manipulating and summarizing data to find answers to the research questions (Kerlinger 1986 in Ngulube 2005: 138).

Since the questionnaire included both open- and close-ended questions, coding was done after the data was collected. Coding is "the conversion of raw data or responses to numerical codes so that they can be tabulated or tallied" (Powell 1997: 182). Responses to open-ended questions were first content-analysed before they were coded. Busha and Harter (1980: 171) define content analysis as:

> ... the procedure designed to facilitate the objective analysis of the appearance of words, phrases, concepts, themes, characters, or even sentences and paragraphs contained in printed or audiovisual materials.

Numerical values were allocated to answer categories in the questionnaire, known as variables.

Data was entered into a computer and analysed using SPSS[1] software. Presentation of data included the use of frequency tables and graphs. The results are presented in Chapter 4. Data analysis of the interview with the College Librarian was done qualitatively, because the

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[1] SPPS used to be called the Statistical Package for the Social Sciences. However, the name of the product in no longer viewed as an acronym, and is now simply `SPSS` (London 2002 in Hoskins 2002: 72).

data could not be quantified and comparisons made with other respondents in the population under study.

3.7   Evaluation of the research method

Evaluation of a research method is necessary to find out if it measured what it intended to. Evaluation requires assessing the reliability and validity of the research method, as well as the instrumentation. Reliability is defined as the degree to which a test consistently measures what it sets out to measure, while at the same time yielding the same results (Ngulube 2005: 136). Validity refers to "the degree to which a test measures what it is supposed to measure" (Gay 1996 in Ngulube 2005: 132). In other words, a valid research method measures the concepts it is intended to measure (Weisberg, Krosnick and Bowen 1996: 93). All surveys have certain methodological limitations in common. Additional limitations are imposed by constraints in time and money and by other factors unique to a particular object (Doyle 2001). It is not good for researchers to give readers the impression that their research was perfect. Errors and limitations need to be acknowledged.

The major limitation in the present study was non-response. The response rate in the study was so low that generalisation of results across the whole population was difficult. In addition to probable respondents not returning the questionnaire, there were also non-responses to some of the questions.   According to Ngulube (2005: 136), item non-response "results from the respondents failing to answer all the survey questions." This was more prevalent with open-ended questions than with close-ended questions. The latter could be attributed to the fact that the respondents did not fully understand the questionnaire items. For example, one of the respondents indicated that the researcher should have used "layman's" language in asking the questions.

A high response rate diminishes the chance of non-respondent bias. Thus a researcher should be aware of the possible sources of bias due to the different characteristics among

49

respondents and non-respondents, that is differences that result from those that respond to the questionnaire and those that do not (Weisberg, Krosnick and Bowen 1996: 338; Babbie and Mouton 2001: 261). Lower response rates increase the likelihood of biased results. According to Salant and Dillman (1994: 20), non-response bias occurs when:

> ... a significant number of people in the survey sample do not respond to the questionnaire and are different from those who do in a way that is important to the study.

In the present study, few respondents from the higher years of study returned the questionnaire. This contributed to bias in the results.

The duration or time period that the respondents were given to complete and return the questionnaire could have contributed to the low response rate. Respondents were required to complete and return the questionnaire within five days. The researcher found out that the respondents were writing their end of semester exams when the questionnaires were distributed. However, after data collection resumed at the beginning of the following semester, the responses were still low. The researcher undertook every effort to get the questionnaires returned.

The reliability of the study could not be ascertained due to the low response rate and the non-response bias. Nonetheless, the results of the study established what the researcher set out to investigate.

3.8 Summary of the chapter

The research method used to gather data in the study was discussed in this chapter. Descriptions of the population under study, instruments, their form and categories of questions have been provided. Data collection procedures and the evaluation of the research method have also been discussed.

Chapter 4

Results of the study

4. Introduction

Chapter 4 presents the results of the study. The study set out to investigate the students' use of print and electronic resources at the University of Malawi College of Medicine. Respondents' perceptions of, and preference for, print and electronic resources were also investigated. Data was collected using a self-administered questionnaire to undergraduate students and an interview schedule for the College Librarian of the COM Library. Results for each question in the questionnaire and interview schedule are presented. An explanation for the purpose of each question is discussed. Questionnaire data were analysed quantitatively using SPSS, while data collected using the interview schedule were analysed qualitatively.

4.1 Response rate

One hundred and seventy-nine questionnaires were sent to COM undergraduate students. Sixty-seven questionnaires were returned, giving a response rate of 37.4%. Pather (2004: 96, 97) cited Saunders (2000: 158), who stated that response rates can be as low as 40% and that a response rate of 30% is reasonable. Arguing differently, Babbie and Mouton (2001: 261) state that a response rate of 50% is fairly good, while those of 60% and 70% are good and very good, respectively. They stress, however, that these arguments have no statistical basis and are hence used as rough guides for researchers (Babbie and Mouton 2001: 261).

Despite the low response rate, the results of the present study were affected by a non-response bias. As Babbie and Mouton (2001: 261) emphasize, "lack of response bias is far more important than a high response rate." Therefore the results of the study could not be used to make generalisations about the total population.

4.2   Questionnaire results

The questionnaire was outlined under three main broad headings. These are: Background information, Use of print and electronic resources and User education. The section on the use of print and electronic resources was categorised into four subdivisions: General, Print resources, Electronic resources and Preference for print and electronic resources.

Note:

- Percentages were rounded off to one decimal place.
- Questions 5, 13, 16, 18, 20, 21 and 22 allowed respondents to indicate more than one response and hence the percentages exceed 100%.
- N means number of respondents that completed a particular question.

4.2.1 Background information

Background information included the gender of the respondents, their age category and year of study.

4.2.1.1   Gender of respondents

This question was asked to establish the gender of the respondents. Sixty-seven undergraduate students responded to the questionnaire. Forty-two (62.7%) respondents were

male, while 25 (37.3%) of the respondents were female. The population included more male (119) than female (60) respondents. Proportionally, more females (41.7%) responded to the questionnaire than males (35.3%). Table 1 shows the frequency distribution of the respondents, according to gender.

Table 1: Gender of respondents

Gender	Frequency (N=67)	Percentage (%)
Male	42	62.7
Female	25	37.3
Total	67	100

4.2.1.1   Age category of respondents

Question 2 of the questionnaire asked the respondents which age category they belonged to. The study intended to establish the age of respondents which, according to some studies discussed in the literature review, may have a bearing on the use of print and electronic resources. The results in Table 2 show that the majority of the respondents 39 (58.2%) were within the 20-25 year category, followed by 21 (31.3%) respondents who indicated that they were less than 20 years old. Five respondents (7.5%) fell within the 26-30 years category and only two respondents (3%) were over 30 years old.

Table 2: Age category of respondents

Age category	Frequency (N=67)	Percentage (%)
Less than 20 years	21	31.3
20-25 years	39	58.2
26-30 years	5	7.5
Over 30 years	2	3
Total	67	100

4.2.1.2   Year of study of respondents

In question 3, respondents were asked to indicate their year of study. Responses to this question were to enable the researcher to compare results across the years of study and to ascertain if this had any bearing on the use of print and electronic resources. Table 3 shows the frequencies and percentages of the responses to the question.

Table 3: Respondents' year of study

Year of study	Frequency (N=67)	Percentage (%)
First year	20	29.9
Second year	20	29.9
Third year	17	25.4
Fourth year	5	7.5
Fifth year	5	7.5
Total	67	100

Equal numbers of respondents (20) indicated that they were in first and second year, indicating a response rate of 29.9% for each year. Seventeen respondents (25.4%) were in third year. Fourth and fifth years showed the lowest number of respondents (five each),

comprising 7.5% of the respondents. It should, however, be noted that the number of undergraduate students in the higher years of study (fourth and fifth year) were relatively few, compared to those in the lower years (first to third year).

4.2.2 Use of print and electronic resources

This section presents the results on the use of print and electronic resources. Questions 4 to 10 were general. They related to both print and electronic resources. Respondents who indicated that they used print resources, only, were asked to complete questions 11 through to 13 and continue with question 19. Those that indicated that they used electronic resources, only, were asked to complete questions 14 through to 18 and continue with question 19. Respondents who indicated that they used both resources were asked to complete all the questions that followed.

4.2.2.1 Respondents' perceptions of the importance of the COM Library resources

Respondents were asked to indicate the level of importance of the COM Library resources. This question wanted to establish how important the COM Library resources were for the students' academic studies. The assumption was that all the respondents used the resources available in the COM Library.

More than half of the respondents 36 (53.7%) indicated that the COM Library resources were essential for their academic studies, followed by 22 (32.8%) of the respondents who indicated that the resources were very important. None of the respondents indicated that the resources were important. However, six (9%) and three (4.5%) indicated that the resources were somewhat important and not important, respectively. Overall, the majority of the respondents 58 (86.6%) perceived that the COM Library resources were important for their

55

academic studies. Figure 1 shows the number of respondents and the level of perceived importance of the COM Library resources.

Figure 1: Respondents' perceptions of the importance of the COM Library resources (N=67)
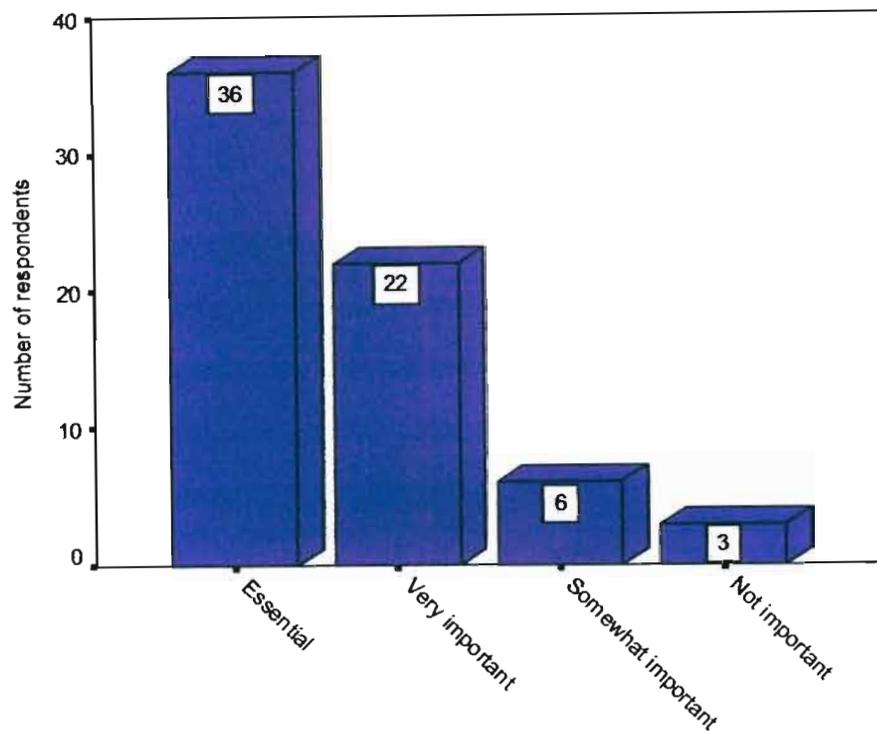
4.2.1.1 Reasons for perceived importance of the COM Library resources

Question 5 was a follow-up to question 4 (4.2.2.1). Respondents were asked to give reason(s) for their answer in question 4. Out of the 67 respondents, 56 responded to this question. Various reasons were provided for respondents' answers to the previous question. Respondents could give more than one reason. Most of the reasons were in line with the respondents' perception of the level of importance of the COM Library resources.

Of the 56 respondents, 46 (82.1%) indicated that they had access to essential information, while seven (12.5%) indicated that they had access to the Internet. Four respondents (7.1%) indicated that they used the resources to supplement information and were made aware of current research in medicine through these resources. Other reasons included: lack of personal computers, resources were outdated and there were fewer computers, frequent failures of computers and one (1.8%) said that lecturers provided notes.

Table 4 presents the reasons for the respondents' perceived importance of the COM Library resources.

Table 4: Reasons for respondents' perceived importance of the COM Library resources

Reason	Frequency (N=56)	Percentage (%)
Have access to essential information	46	82.1
Have access to the Internet	7	12.5
Supplement information and are aware of current research in medicine	4	7.1
Lack of personal computers	1	1.8
Outdated books, fewer computers, etc.	1	1.8
Frequent failure of computers	1	1.8
Lecturers provide notes	1	1.8
Total	**61**	**108.9**

4.2.2.3 Use of the COM Library resources over the past few years

The next question (question 6) asked the respondents to indicate how their use of the COM Library resources had changed in the past few years. It was assumed that with the availability of electronic resources, besides print resources, user behaviour might have changed over the years.

Sixty-four respondents completed this question, while three did not respond. Of the 64 respondents, 35 (54.7%) indicated that they used the COM Library resources more. Only seven (10.9%) of the respondents indicated that they used the resources less, while 22 (32.4%) indicated that their use of the resources had not changed. Figure 2 shows the respondents' answers to the question.

Figure 2: Use of the COM Library resources in the past few years (N=64)
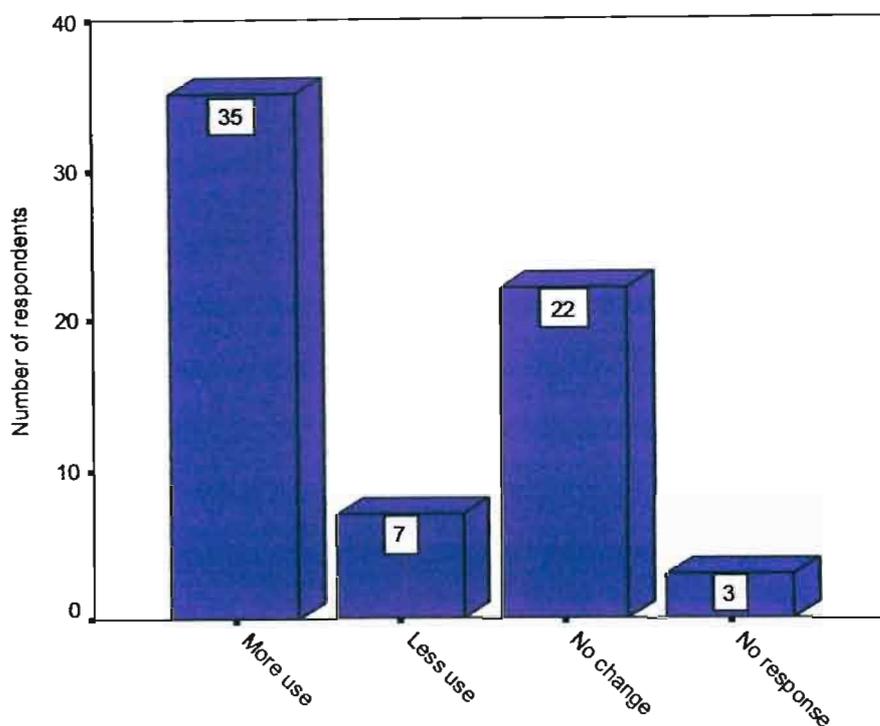
4.2.2.4 Respondents' use of print resources

Question 7 wanted to determine how many respondents used print resources. Sixty-five (97%) of the respondents indicated that they used print resources, whilst only two respondents (3%) said no. Print resources were thus used by the majority of the respondents.

4.2.2.5 Reasons for non-use of print resources

In question 8, the two respondents who did not use print resources were asked to give reasons for their non-use. One respondent indicated that they almost always had problems with print resources. They did not elaborate what kind of problems they had experienced. The other

respondents said that materials were outdated and newly acquired book materials were not helpful, either.

4.2.2.6 Respondents' use of electronic resources

Sixty-six students responded to question 9 on the use of electronic resources. Out of these, 65 (97%) indicated that they used electronic resources, while the rest (two or 3%) indicated that they did not use them.

4.2.2.7 Reasons for non-use of electronic resources

Reasons were given for non-use of electronic resources. This question aimed at establishing why the two (3%) respondents did not use electronic resources. Each of the respondents gave their own reason. One indicated that he/she did not use electronic resources because he/she did not like reading from a computer screen. The other indicated that limited access to computers in the COM Library prohibited them from using electronic resources.

4.2.3 Use of print resources

This section of the questionnaire was intended for those respondents that indicated that they used print resources. The areas covered in this section were the level of importance of print resources, how often respondents used print resources and the problems they encountered when accessing print resources.

4.2.3.1 Respondents' perceptions of the importance of print resources

Question 11 in the questionnaire asked respondents to rate the level of importance of various print resources for their academic studies. The researcher wanted to establish how respondents perceived these resources, in terms of importance. This question was completed by the 65 respondents who indicated that they used print resources.

Books were ranked the highest, as being essential to the respondents' academic studies. Most respondents (40 or 61.5%) indicated that books were essential, followed by short loan materials, by 37 (56.9%) of the respondents. Short loan materials are mostly textbooks and a few reference books; the results showed that respondents perceived books as essential to their academic studies, compared to other print sources.

Abstracts and indexes, Malawiana materials and journals were perceived as less important. Nineteen (29.2%) of the respondents indicated that abstracts and indexes were not important, while 15 (23.1%) and 14 (21.5%) of the respondents indicated that Malawiana materials and journals were not important, respectively. Perceptions about the importance of newspapers were rather skewed. Twenty (30.8%) of the respondents perceived newspapers as somewhat important and a few (six or 9.2%) indicated that they were not important. Fourteen (21.5%) and 16 (24.6%) of the respondents indicated that newspapers were essential and important, respectively. It should be noted that newspapers subscribed to by the COM Library are local and are therefore part of the Malawiana collection. Results are shown in Table 5.

Table 5: Respondents' perceptions of the importance of print resources (N=65)

Print resource	Essential	Very important	Important	Somewhat important	Not important	No response
Books	40 (61.5%)	21 (32.3%)	4 (6.2%)	0	0	0
Short Loan materials	37 (56.9%)	22 (33.8%)	5 (7.7%)	1 (1.5%)	0	0
Newspapers	14 (21.5%)	8 (12.3%)	16 (24.6%)	20 (30.8%)	6 (9.2%)	1 (1.5%)
Reference materials	7 (10.8%)	17 (26.2%)	19 (29.2%)	16 (24.6%)	5 (7.7%)	1 (1.5%)
Journals	3 (4.6%)	8 (12.3%)	13 (20%)	25 (38.5%)	14 (21.5%)	2 (3.1%)
Malawiana materials	3 (4.6%)	8 (12.3%)	16 (24.6%)	21 (32.3%)	15 (23.1%)	2 (3.1%)
Abstracts and indexes	3 (4.6%)	8 (12.3%)	9 (13.8%)	24 (36.9%)	19 (29.2%)	2 (3.1%)

4.2.3.2   Respondents' use of print resources for their academic studies

Respondents were asked to indicate how often they used print resources (question 12). This question was asked to establish to what extent print resources were being utilised. Sixty-five respondents completed this question. Results showed that books were used most often, that is daily. The majority of the 65 respondents 59 (90.8%) indicated that they used books daily. Thirty-six (55.4%) of the respondents also used newspapers daily, followed by 23 (35.4%) of those who used short loan materials on a daily basis.

Short loan materials were mostly used two to three times a week by 33 (50.8%) of the respondents. Journals, abstracts and indexes were the least-used print resources. One respondent used journals daily and another used abstracts and indexes daily. Most of the respondents (24 or 37%) used journals once a month and 26 (40%) of the respondents

indicated that they never used journals. Similarly, the majority of the respondents (38 or 58.5%) never used abstracts and indexes, while 11 (17.5%) used them once a month. Results are shown in Table 6.

Table 6: Respondents' use of print resources for their academic studies (N=65)

Print resource	Daily	2-4 times a week	Once a week	Every two weeks	Once a month	Never	No response
Books	59 (90.8%)	3 (4.6%)	1 (1.5%)	0	2 (3.1%)	0	0
Newspapers	36 (55.4%)	10 (15.4%)	4 (6.2%)	5 (7.7%)	4 (6.2%)	6 (9.2%)	0
Short loan materials	23 (35.4%)	33 (50.8%)	6 (9.2%)	1 (1.5%)	2 (3.1%)	0	0
Reference materials	4 (6.2%)	13 (20%)	7 (10.8%)	9 (13.8%)	16 (24.6%)	16 (24.6%)	0
Malawiana materials	3 (4.6%)	3 (4.6%)	4 (6.2%)	6 (9.2%)	18 (27.7%)	30 (46.2%)	1 (1.5%)
Journals	1 (1.5%)	3 (4.6%)	5 (7.7%)	6 (9.2%)	24 (37%)	26 (40%)	0
Abstracts and indexes	1 (1.5%)	4 (6.2%)	4 (6.2%)	5 (7.7%)	11 (16.9%)	38 (58.5%)	2 (3.1%)

4.2.3.3 Problems encountered by respondents in accessing print resources

Question 13 asked the respondents to indicate the problems they encountered when accessing print resources. The study wanted to establish what problems the respondents encountered. The respondents were allowed to indicate more than one problem. Forty-five respondents completed this question. Ranging from the most encountered problem, respondents indicated the following: Materials were outdated, materials did not meet the respondents' needs,

materials were few, materials were missing from the Library, it was difficult to locate materials and staff were not always available to help.

Table 7 shows the results of these responses. Twenty-six (57.8%) of the respondents indicated that materials were outdated, followed by (18 or 40%) who felt that materials did not meet their needs. Only six (13.3%) of the respondents indicated that staff were not always available to help.

Table 7: Problems encountered by respondents when accessing print resources

Problems encountered	Frequency (N=45)	Percentage (%)
Materials are outdated	26	57.8
Materials do not meet my needs	18	40
Materials are few	16	35.6
Materials are missing from Library	15	33.3
Difficult to locate materials	11	24.4
Staff not always available to help	6	13.3
Total	92	204.4

4.2.4 Use of electronic resources

Questions 14 to 18 covered the use of electronic resources. Respondents were asked to answer questions on the level of importance of electronic resources, the electronic databases that they use, how often they used sources such as the COM Library Webpage to access electronic databases and the problems they encountered when accessing electronic resources.

4.2.4.1 Respondents' perceptions of the importance of electronic resources

Respondents who indicated that they used electronic resources (65) were asked to rate the level of importance of various electronic databases (question 14). This question wanted to establish the level of importance that respondents attached to different electronic resources available in the COM Library. Results are shown in Table 8.

Table 8: Respondents' perceptions of the importance of electronic resources (N=65)

Electronic resource	Essential	Very important	Important	Somewhat important	Not important	No response
Websites	35 (53.8%)	21 (32.3%)	7 (10.8%)	1 (1.5%)	1 (1.5%)	0
CD-ROM databases	8 (12.3%)	6 (9.2%)	21 (32.3%)	17 (26.2%)	11 (16.9%)	2 (3.1%)
E-books	8 (12.3%)	14 (21.5%)	13 (20%)	14 (21.5%)	14 (21.5%)	2 (3.1%)
Electronic databases	6 (9.2%)	11 (16.9%)	17 (26.2%)	12 (18.5%)	14 (21.5%)	5 (7.7%)
E-journals	6 (9.2%)	8 (12.3%)	13 (20%)	19 (29.2%)	16 (24.6%)	3 (4.6%)
Online Public Access Catalogue	6 (9.2%)	6 (9.2%)	10 (15.4%)	18 (27.8%)	21 (32.3%)	4 (6.2%)

The results show that the majority of the respondents did not view most of the databases as being essential for their academic studies. The most-used electronic resources were Websites, where 35 (53.8%) and 21 (32.3%) of the respondents indicated that Websites were essential and very important, respectively. Twenty-one (32.3%) of the respondents viewed the Online Public Access Catalogue (OPAC) as not important for their academic studies.

This was followed by 16 (24.6%) of the respondents, who indicated that electronic journals (e-journals) were not important. Very few respondents, one (1.5%) respondent each, viewed Websites as somewhat important and not important.

4.2.4.2 Respondent's use of electronic resources for their academic studies

In question 15, the students were asked to indicate how often they used electronic resources for their academic studies. Like print resources, this question wanted to determine to what extent electronic resources were being utilised. Sixty-five respondents completed this question. Results (Table 9) show that CD-ROM databases were rarely used, with ten (15.4%) respondents using them once a week and once a month. Fifteen (23.1%) of the respondents used CD-ROM databases once a month and 26 (40%) never used them. Electronic databases were mostly used once a month by 15 (23.1%) of the respondents, while 25 (38.5%) never used them. Only three (4.6%) indicated that they used electronic databases daily.

The use of electronic books (e-books) was evenly distributed between daily and every two weeks, though the respondents were very few. Only five (7.7%) used e-books daily, while the majority of the respondents (29 or 44.6%) never used e-books. With the OPAC, 12 (18.5%) of the respondents used the resources mostly once a month and 27 (41.5%) never used them. Websites were the most used electronic resources. Thirty-seven (56.9%) and 20 (30.8%) used Websites daily and two to four times a week, respectively. Only one respondent indicated that that he/she never used Websites.

Table 9: Respondents' use of electronic resources for their academic studies (N=65)

Electronic resource	Daily	2-4 times a week	Once a week	Every two weeks	Once a month	Never	No response
Websites	37 (56.9%)	20 (30.8%)	4 (6.2%)	2 (3.1%)	1 (1.5%)	1 (1.5%)	0
E-books	5 (7.7%)	9 (13.8%)	7 (10.8%)	5 (7.7%)	6 (9.2%)	29 (44.6%)	4 (6.2%)
Electronic databases	3 (4.6%)	6 (9.2%)	8 (12.3%)	5 (7.7%)	15 (23.1%)	25 (38.5%)	3 (4.6%)
E-journals	3 (4.6%)	2 (3.1%)	13 (20%)	1 (1.5%)	17 (26.2%)	27 (41.5%)	2 (3.1%)
Online Public Access Catalogue	3 (4.6 %)	7 (10.8%)	5 (7.7%)	8 (12.3%)	12 (18.5%)	27 (41.5%)	3 (4.6%)
CD-ROM databases	1 (1.5%)	2 (3.1%)	10 (15.4%)	10 (15.4%)	15 (23.1%)	26 (40%)	1 (1.5%)

4.2.4.3   Electronic databases used by respondents

Respondents were asked to indicate which online or electronic databases they used for their academic studies. The researcher wanted to ascertain how these databases were being utilised, as the COM Library was subscribing to some of these databases through MALICO. Of the 65 respondents that indicated that they used electronic resources, very few (26) respondents completed this question. This is shown by the respondents' indication in the previous question that very few used electronic databases. Results are shown in Table 10.

Table 10: Electronic databases used by respondents

Electronic database	Frequency (N=26)	Percentage (%)
African Journals Online	11	42.3
HINARI	10	38.5
Oxford Reference Online	9	34.6
Cambridge University Press	5	19.2
PubMed	5	19.2
Blackwell Synergy	4	15.4
BioOne	4	15.4
EBSCOHost	4	15.4
Wiley Interscience	3	11.5
E-Medicine	1	3.8
Emerald	0	0
Total	**56**	**215.4**

The results show that African Journals Online, HINARI and Oxford Reference Online were the most used databases. Eleven (42.3%) of the 26 respondents used African Journals Online, ten (38.5%) used HINARI, while nine (34.6%) used Oxford Reference Online. The least used database was E-Medicine, which was used by only one of the respondents. Blackwell Synergy, BioOne and EBSCOHost received an equal number of responses (four or 15.4%). Only three (11.5%) of the respondents used Wiley Interscience. Emerald was the only electronic database that was not used by the respondents.

4.2.4.4 Sources used to access electronic resources

Question 17 asked the 65 respondents who used electronic databases to indicate how often they used different sources to access electronic resources. The sources included: the COM

Library Webpage, the "Resources" Webpage on the COM Website, a Department Webpage and search engines. The reason for asking this question was to establish which sources were mostly used by respondents, because some of the electronic resources that appeared in one source did not appear in the other and *vice versa*. Though many respondents in question 15 indicated that they rarely or never used resources such as electronic databases and e-journals, a number of the respondents used sources like the Library Webpage to access electronic resources. This may have been due to a lack of understanding of the term "electronic database". The results of question 17 are given in Table 11.

Table 11: Sources used by respondents to access electronic resources (N=65)

Source	Frequently	Sometimes	Never	No response
Through search engines e.g. Google	64 (98.5%)	1 (1.5%)	0	0
Library Webpage	15 (23.1%)	26 (40%)	22 (33.8%)	2 (3.1%)
"Resources" Webpage on College Website	15 (23.1%)	25 (38.5%)	21 (32.3%)	4 (6.2%)
Department Webpage e.g. Dept. of Community Health	9 (13.8%)	46 (70.8%)	10 (15.4%)	0

All the respondents accessed electronic resources through search engines. Sixty-four (98.5%) of the 65 respondents indicated that they used search engines frequently and only one (1.5%) of the respondents used them sometimes. A number of the respondents rarely used the Library Webpage to access electronic resources, where 15 (23.1%) used it

frequently and 26 (40%) used it sometimes. Twenty-two never used the COM Library Webpage. The "Resources" Webpage on the COM Website was rarely used. Fifteen (23.1%) and 25 (38.5%) of the respondents used the "Resources" Webpage frequently and sometimes, respectively. Department Webpages were used sometimes by more than half of the respondents (46 or 70.8%). The results show that the respondents depended more on search engines, compared to electronic resources available through other sources.

4.2.4.5   Problems encountered by respondents in accessing electronic resources

Respondents were asked to indicate the problems that they encounter when accessing electronic resources. This was to establish what problems respondents encountered in accessing electronic resources, if any. The responses would assist the researcher to determine if these problems contributed to the underutilisation of electronic resources. The question allowed multiple responses and was intended for the 65 respondents who used electronic resources. Only 48 of the respondents completed this question.

Limited access to computer terminals was the main problem encountered by respondents, followed by slowness of the Internet, or failure of the Internet server to access electronic resources. Forty-six (95.8%) indicated that there was limited access to computer terminals, while 77.1% (37) indicated that slowness of the Internet and failure of the Internet server inhibited them from accessing electronic resources. The third problem encountered was lack of computer skills to effectively retrieve electronic resources. Nineteen (39.6%) indicated this problem. Following this problem was the availability of staff to assist respondents to access electronic resources. Some respondents (17 or 35.4%) indicated that staff were not always available to help them in accessing electronic resources.

Few respondents indicated that they had problems with back issues (two or 4.2%), computers were slow or lacked maintenance (two or 4.2%) and one respondent (2.1%) had problems

with downloading information. The respondent explained that it was difficult to download information from other Websites. These results are shown in Table 12.

Table 12: Problems encountered by respondents in accessing electronic resources

Problem	Frequency (N=48)	Percentage (%)
Limited access to computer terminals	46	95.8
Slowness of the Internet/server always down	37	77.1
Lack of computer skills to effectively retrieve electronic resources	19	39.6
Staff not always available to help	17	35.4
Too much information retrieved	14	29.2
Problem with back issues	2	4.2
Slow or lack of maintenance of computers	2	4.2
Problems with information downloading	1	2.1
Total	138	287.6

4.2.5 Preference for print and electronic resources

This section (questions 19 to 22) asked respondents about their preferences for print and electronic resources and reason(s) for their preferences. The respondents' view on the future

of print and electronic resources was also investigated. All 67 respondents were asked to complete this section. One respondent did not complete this section and explained that he/she did not have any preference for either of the resources.

4.2.5.1   Respondents' preference for print and electronic resources

Respondents were asked to indicate, between print and electronic resources, what resources they would prefer if they were given a choice. This section wanted to establish the respondents' preference in their use of print and electronic resources. Sixty-six respondents completed this question. The majority (40 or 60.6%) indicated that they would prefer print resources, whilst the rest (26 or 39.4%) indicated that they would prefer electronic resources.

4.2.5.2   Reasons for preferring print resources

Respondents who indicated that they preferred print resources were asked to complete question 20, to reveal the reasons for their preference. Of the 40 respondents that preferred print resources, only 27 respondents completed this question. The question allowed respondents to indicate more than one reason. Results are shown in Table 13.

Table 13: Respondents' reasons for preferring print resources

Reason	Frequency (N=27)	Percentage (%)
They are more convenient, e.g. books are portable	24	88.9
Easy to read from print than computer screens	22	81.5
Have higher quality graphics, photos, and tables	4	14.8
No additional expenses e.g. printing	1	3.7
Easy to locate information	2	7.4
Total	**53**	**196.3**

Two major reasons for preferring print resources were indicated. These were convenience of print resources and ease of reading from print compared with computer screens. Twenty-four (88.9%) of the respondents indicated that print resources were convenient. One respondent who indicated that print resources were convenient explained that it was easier to carry books than wait for the Library to open to access the computers. Other reasons why the respondents preferred print resources were that print resources have higher quality graphics, photos and tables (four or 14.8%), it is easy to locate information in print resources (two or 7.4%) and the print resource required no additional expenses such as printing (one or 3.7%). The last reason could be related to the point that it was easier to read from print than computer screens and respondents thus printed out electronic information.

4.2.5.3 Reasons for preferring electronic resources

In question 21, the respondents who indicated that they would prefer electronic resources were asked to indicate their reasons. Out of the 26 respondents that indicated that they prefer electronic resources, 19 completed this question. Fourteen (73.3%) of these indicated that electronic resources were easy to browse, followed by seven (36.8%) of the respondents, who indicated that electronic resources were available 24 hours a day. Six (31.6%) and five (26.3%) of the respondents indicated that electronic resources were convenient and more up-to-date than print resources, respectively. Table 14 shows the results of this question.

Table 14: Respondents' reasons for preferring electronic resources

Reason	Frequency (N=19)	Percentage (%)
They are easy to browse	14	73.3
They are available 24 hours a day	7	36.8
They are convenient, e.g. do not have to go to the Library	6	31.6
They are more up-to-date	5	26.3
Total	32	168.4

4.2.5.4 Views on the future of print and electronic resources

Question 22 asked the respondents their views on the future of print and electronic resources. The reason for this question was to determine the respondents' views on the future of print and electronic resources due to rapid technological growth, which has seen more information being produced electronically. This was a multiple response question, to which respondents could indicate more than one view.

Of the 67 respondents, 42 completed this question. The majority of the respondents (33 or 78.6%) indicated that print resources will co-exist with electronic resources. Twenty (47.6%) had the view that electronic resources will supplement print resources. Four (9.5%) indicated that electronic resources will eventually replace print resources. Only one respondent said that electronic resources will dominate print resources. Results are shown in Table 15.

Table 15: Respondents' views on the future of print and electronic resources

View	Frequency (N=42)	Percentage (%)
Print resources will co-exist with electronic resources	33	78.6
Electronic resources will supplement print resources	20	47.6
Electronic resources will eventually replace print resources	4	9.5
Electronic resources will dominate print resources	1	2.4
Total	**38**	**138.1**

4.2.6 User education

The last section of the questionnaire was on user education. This section consisted of questions 23 to 28. Areas covered included the respondents' views of the importance of computer literacy in accessing electronic resources and their level of computer literacy. The respondents were also asked if they had received any form of training in information searching and retrieval from the COM Library and how they rated this training. The last two

questions asked respondents for recommendations which they felt would be useful for the improvement of user training in accessing print and electronic resources in the Library.

4.2.6.1 Views on the importance of computer literacy in accessing electronic resources

In question 23, respondents were asked to rate their views on the importance of computer literacy in accessing electronic resources. Results are given in Figure 3 below.

Figure 3: Respondents' views on the importance of computer literacy in accessing electronic resources (N=65)
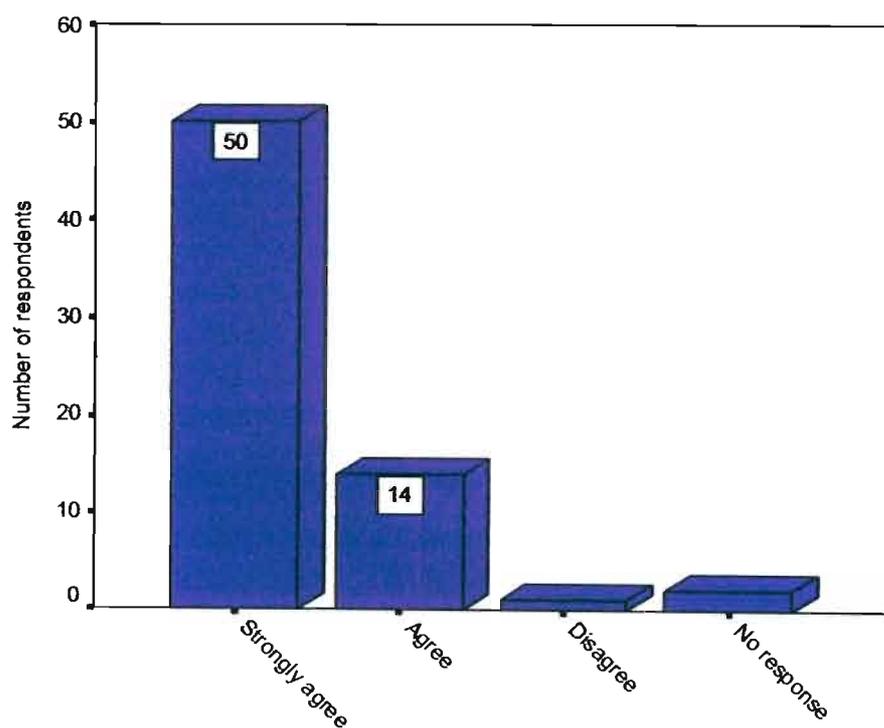
Sixty-five respondents completed this question. Most of the respondents (50 or 76.9%) strongly agreed that computer literacy was important for one to access electronic resources, while 21.5% (14) just agreed. Only one respondent did not agree that computer literacy was important in accessing electronic resources. None of the respondents disagreed strongly and two did not complete the question.

4.2.6.2   Level of computer literacy

Following the respondents' views on the importance of computer literacy in accessing electronic resources, they were asked to rate their level of computer literacy (question 24). This was to establish if the respondents were competent in accessing electronic resources. A total of 66 respondents completed this question.

Most of the respondents (34 or 51.5%) indicated that their level of computer literacy was average. Twenty-four (36.4%) indicated that they were competent, while five (7.6%) indicated that they were highly competent in using a computer. Two respondents indicated that they were less competent while one was not competent. The results are shown graphically in Figure 4.

Figure 4: Respondents' level of computer literacy (N=66)
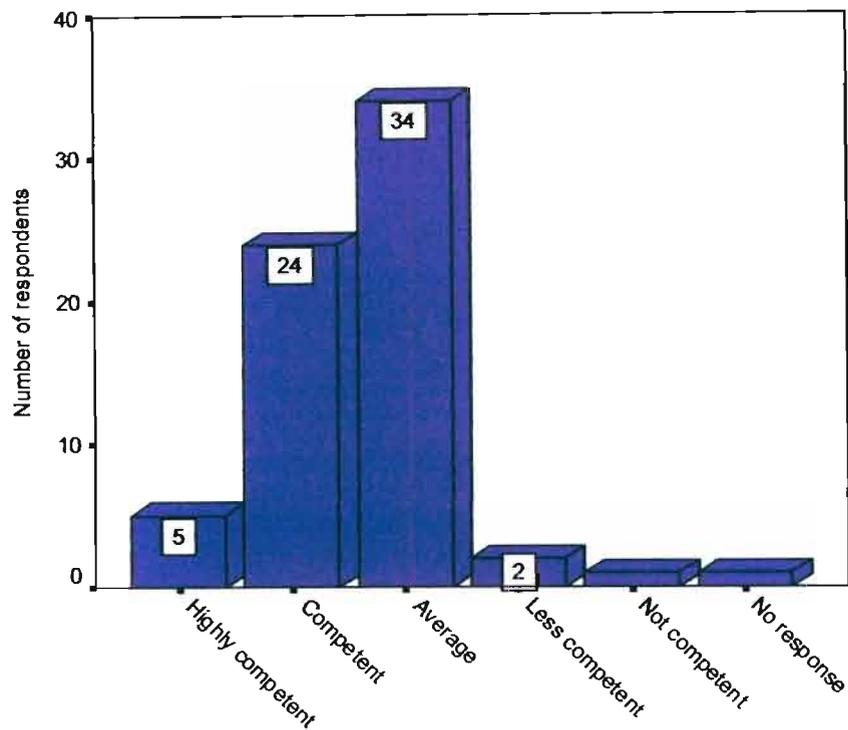
4.2.6.3   User training received from the COM Library

Question 25 was asked to establish if the respondents had received any form of training in information searching and retrieval from the COM Library. This question was completed by 66 respondents. Of these, 31 (47%) indicated that they had received training from the COM Library, while 35 (53%) indicated that they had not received any training. Slightly more than half of the respondents had not had any training in information searching and retrieval from the COM Library.

4.2.6.4 Respondents' level of satisfaction with training received

Respondents who indicated that they received training from the COM Library were asked to complete question 26. They were asked to rate their level of satisfaction with the training they received from the COM Library. Three (8.8%) of the 34 respondents who completed this question indicated that the training was highly satisfactory. Most of the respondents (16 or 47.1%) found the training satisfactory. The rest of the respondents were not satisfied with the training they received from the COM Library. Seven (20.6%) and another seven (20.6%) of the respondents indicated that the training they had received was less satisfactory and not satisfactory, respectively. One respondent indicated that he/she did not have an opinion regarding the level of satisfaction with the training he/she received from the COM Library.

4.2.6.5 Respondents' recommendations to the COM Library for the improvement of user training in accessing print resources

In question 28, the respondents were asked to provide recommendations for the COM Library to improve user training in accessing print resources. Though this question was more applicable to the respondents who had received training from the Library, it was left open to all the respondents, because they used the COM Library's print and electronic resources. Some of the responses were disregarded because the recommendations were made for the Library services rather than user training. Only 20 responses were valid and analysed.

Half of the respondents (10 or 50%) that completed this question stated that user training should be thorough. The respondents wanted more time allocated to user training than was currently the case. Five (25%) of the respondents recommended that the Library should conduct refresher or on-going user training in accessing print resources. Other recommendations included the incorporation of user training in the curriculum (one or 5%), simple and efficient user training (two or 10%), user training should be conducted at convenient times to allow students to attend the sessions (one or 5%) and there was a need to

have full-time staff responsible for user training (one or 5%). The question allowed for multiple responses, but all the respondents provided one recommendation. The results are shown in Table 16.

Table 16: Respondents' recommendations to the COM Library for the improvement of user training in accessing print resources

Recommendations	Frequency (N=20)	Percentage (%)
User training should be thorough	10	50
Provide refresher training for students	5	25
User training should be simple and efficient	2	10
Incorporate user training in curriculum	1	5
Conduct user training at convenient times	1	5
Have full-time staff responsible for user training	1	5
Total	20	100

4.2.6.6   Respondents' recommendations to the COM Library for the improvement of user training in accessing electronic resources

The last question asked respondents to recommend to the COM Library what they felt would improve user training in accessing electronic resources. Again, some of the recommendations were not used because they were not applicable to the study. Twenty-one responses were used in this analysis. Respondents provided one recommendation each, even though they could provide more than one recommendation.

The results show that slightly less than half of the 21 respondents (9 or 42.9%) wanted the teaching of computer, information searching and retrieval skills to be included in user training. Four respondents recommended that there should be qualified staff in the ICT room to assist students in accessing electronic resources. For the rest of the recommendations the frequencies of responses were evenly distributed. These recommendations included the following: instruction materials on how to access electronic resources to be made available online on the COM Library Webpage, the need for thorough user training, teaching of vital areas important to medical students, provision of refresher user training and the need to incorporate user training into the curriculum. The results are displayed in Table 17.

Table 17: Respondents' recommendations to the COM Library for the improvement of user training in accessing electronic resources

Recommendations	Frequency (N=21)	Percentage (%)
Teach computer, information searching and retrieval skills	9	42.9
Have qualified staff to man the ICT room	4	19
Make available instruction materials on Library Webpage	2	9.5
Provide thorough training	2	9.5
Provide refresher user training	2	9.5
Teach vital areas important to medical students	1	4.8
Incorporate user training in curriculum	1	4.8
Total	21	100

4.2.7 Summary of questionnaire results

In summary, the questionnaire results showed that most respondents used the COM Library resources through their perception of the resources. Most of the respondents felt that the Library's resources were essential for their academic studies. Use of the COM Library had increased over the past few years by the majority of the respondents.

The results showed that almost all the respondents used both print and electronic resources. In terms of print resources, books were the most used resources, while Websites were the most used electronic resources. Few respondents indicated the use of electronic databases. Out-dated materials, limited number of materials and materials missing from the Library were some of the problems that respondents encountered in accessing print resources. With regards to electronic resources, respondents encountered problems such as limited access to computer terminals, slowness of the Internet or failure of the Internet server and lack of personal computer skills to effectively search and retrieve information.

It was shown that most of the respondents preferred print resources to electronic ones. Though the respondents agreed that computer literacy was important in accessing electronic resources, most of them rated their computer literacy as average. The majority of the respondents felt that print resources would co-exist with electronic resources.

4.3   Interview results

The College Librarian (CL) of the COM Library was interviewed using a semi-structured interview schedule. The areas covered were budget, infrastructure, staffing, licensing and copyright agreements, archiving of electronic resources, awareness of print and electronic resources and usage of print and electronic resources.

4.3.1 Budget

This section consisted of questions one to eight. The CL was asked questions regarding the budget allocation for the Library, how this was spent on print and electronic resources, the effect of electronic resources on print resources, preference for print and electronic resources amidst tight budgets and what mechanisms, if any, there were to guide the purchase of print and electronic resources.

4.3.1.1   Proportion of the COM budget allocated to the Library

The first question was asked to establish what proportion of the COM budget was allocated to the Library. The study attempted to establish if the Library was allocating sufficient finances for the purchase and subscription of print and electronic resources. The CL responded that the proportion allocated to the Library in 2005 was 3% (14 295 012 Malawi Kwacha) of the total COM Library budget. The budget allocation had dwindled when compared to what the Library was allocated the previous year. In 2004, the Library was allocated 4.1% of the COM budget.

4.3.1.2   Proportion of the COM Library budget spent on print
and electronic resources

A question was asked about what proportion of the COM Library budget was allocated to print and electronic resources. The CL responded that 6 500 000 Malawi Kwacha (MK) were allocated to print and electronic resources. Four million MK were allocated to print resources. A further breakdown was given on the allocation of this amount to periodicals and books. Both periodicals and books were allocated MK2 000 000 each. MK2 500 000 were allocated to electronic resources. This amount was part of the membership fee for MALICO.

Print and electronic resources were allocated 45.5% of the COM Library budget. Print resources were allocated 28%, while electronic resources were allocated 17.5% of the total COM Library budget.

4.3.1.3 Effect of electronic resources on print resources and their comparison

The CL was asked how electronic resources had affected the acquisition of print resources. This was to establish if the availability of electronic resources had affected the purchase of print resources. The CL responded that the Library had to cut down on the acquisition of some print resources that were available in electronic format. Some of these were available online without cost, so it was not realistic to continue purchasing these resources in print format.

On the question concerning whether comparisons were made on the cost of print and electronic resources, the CL said that no comparisons were made.

4.3.1.4 Choice between print and electronic resources amidst tight budgets

The CL was asked how the Library chose between resources which were available in both print and electronic formats if the budget did not allow the Library to purchase both formats. The response was that the Library preferred to choose electronic resources. The reason given was that electronic resources usually came as a package, which was relatively cheaper for the Library to subscribe to, than to purchase a single print resource. Though the CL indicated that no comparisons were made in the purchase of print and electronic resources, the reason given in this question indicated that comparisons were made, to some extent.

4.3.1.5 Mechanisms that guide the COM Library in the purchase of, or subscription to, print and electronic resources

The study aimed to establish if there were any mechanisms or policies that guided the COM Library in the purchase of, or subscription to, print and electronic resources. The CL responded that the Library had no mechanisms or policies in place that guided it in this option.

4.3.2 Infrastructure

This section covered the problems or challenges faced by the COM Library, in terms of spacing and technological infrastructure.

4.3.2.1 Spacing

A question was asked about the problems or challenges that the COM Library was encountering in terms of spacing. This question aimed to establish if there were any problems regarding spacing which might affect the acquisition of print and electronic resources. The CL responded that the current library was temporary and small. It was therefore difficult for the Library to increase the number of computer terminals in the ICT room within the Library.

4.3.2.2 Technological infrastructure

The CL was asked if there were sufficient computers available in the Library for users, whether electronic resources were compatible with computer hardware and software available in the Library and if there was sufficient bandwidth for Internet access. This

question was asked in light of the rapidly changing technology which renders computer hardware and software obsolete after a short period of time. Some electronic resources have specifications in terms of hardware and software which then become inaccessible if technology changes.

The responses given were that the numbers of computers available to users were insufficient for user needs. The computer hardware and software available in the COM Library was compatible with the electronic resources that the users were accessing. Regarding bandwidth, the CL indicated that there was sufficient bandwidth for Internet access. The bandwidth was improved with the installation of the Very Small Aperture Terminal (VSAT) by MALICO on the COM campus, early in 2005.

The other challenge that the COM Library was facing was that many users were not conversant with accessing electronic resources. In other words, users lacked the information searching and retrieval skills to efficiently utilise the resources. She also pointed out that even though user training sessions were held, there was always a low turn-out of the targeted users.

4.3.3 Staffing

Questions were asked about staffing at the COM Library. The study aimed to discover if there were sufficient staff responsible for print and electronic resources and what their qualifications were. Other areas that were covered under staffing were on-going training for Library staff and plans that the Library had, if any, to create positions for staff responsible for user support in accessing print and electronic resources.

On the question if there were sufficient staff to offer a generally efficient service, the CL responded that there were sufficient staff, but she was quick to point out that some (three) of the Library staff were currently undergoing [full-time] training. They were, however, expected back by the end of December 2005.

The CL was asked if there were any staff responsible for user support in accessing print and electronic resources. She responded that there were staff responsible for user support in accessing print and electronic resources, separately. There was no staff responsible for user support for both of the resources. Responsibilities for user support regarding print and electronic resources were separated. In terms of the qualifications of Library staff, staff responsible for user support in accessing print resources held a Malawi Library Association (MALA) Certificate in Library Studies, in addition to a Malawi School Leaving Certificate. The other staff responsible for user support in accessing electronic resources only held a Malawi School Leaving Certificate.

The CL stated that staff received on-going training to improve their skills and knowledge. Most of the on-going training that the staff received was on-the-job. She gave examples of on-the-job training provided by the ICT department of the COM for Library staff. Library staff attended workshops organised by the Health InterNetwork Access to Research Initiative (HINARI) and the International Network for the Availability of Scientific Publications (INASP).

A question was asked if the Library had any future plans to create positions for staff responsible for user support in accessing print and electronic resources. The CL responded that at the moment there were no future plans for staff positions responsible for print resources. The Library was comfortable with its service in this area. She indicated that most users were able to locate print resources on their own. The Library was planning to create positions for staff responsible for user support in electronic resource access. In addition to this, she indicated that one staff member was undergoing training in computer studies and their skills would be used in this area. However, there were no plans for staff responsible for user support in both print and electronic resources.

4.3.4 Licensing and copyright agreements

This section investigated the nature of licensing and copyright agreements that the COM Library had with electronic access, what access restrictions there were for users and how licensing and copyright agreements determined the cost of electronic resources for the COM Library.

In response to the question concerning the nature of the licensing and copyright agreements, the CL said the electronic resources were licensed for network access. Users were able to access the same resources simultaneously within the COM campus. The COM Library provided Internet Protocol (IP) addresses to subscribers through MALICO, which allowed users to access electronic resources on the Local Area Network (LAN).

There were user access restrictions that accompanied licensing and copyright agreements. The CL responded that users were able to download information but they were not able to e-mail information or print it. In terms of cost of electronic resources compared with licensing and copyright agreements, the CL responded that network access was expensive when compared with simultaneous user access.

4.3.5 Archiving of electronic resources

Three questions were posed in this section. The first question asked if there were any user queries for electronic resources that were no longer accessible. In response to this, the CL said that the COM Library *had* received such queries. Secondly, in terms of the mechanisms that the COM Library had in place regarding the archiving of electronic resources, the CL indicated that the COM Library did not have any mechanisms in place. The third and last question asked the CL what problems the Library faced in archiving electronic resources. She indicated that at that time the COM Library staff did not have the necessary skills to archive electronic resources.

4.3.6 Awareness of print and electronic resources

The CL was asked how students are made aware of the existing or new print and electronic resources available in the COM Library. The study wanted to establish if the students were made aware of the print and electronic resources available in the Library, to promote their use.

On print resources, the CL responded that students were made aware of the existing resources during the orientation programmes. New print resources were displayed in the Library to alert users to the new acquisitions. Students were made aware of the existing electronic resources through the same orientation programmes for first year students and information literacy sessions for fourth year students when doing their projects. Overall, students were made aware of new electronic resources through promotional e-mails that were sent to all students.

4.3.7 Usage of print and electronic resources

The last section of the interview schedule was on the usage of print and electronic resources available to users at the COM Library. The CL was asked about the utilisation of print and electronic resources available in the Library and what barriers led to the underutilisation of print and electronic resources. It was also asked if statistics were kept of print and electronic resources.

The CL felt that print resources available in the COM Library were utilised. Electronic resources were underutilised, however. The reasons were that most users did not know how to access and use the electronic resources, in spite of efforts to train them. She also responded that statistics were kept for both print and electronic resources.

4.3.8 Summary of the interview results

The results of the interview with the CL indicate that the COM Library was operating on a tight budget, shown by the reduction in funding allocated to the Library by the parent organisation. The Library tries to balance the acquisition between print and electronic resources. The Library faces challenges in terms of limited space, which inhibits it from increasing the number of computer terminals that will enable more users to access electronic resources. Most print resources were being utilised. However, electronic resources were underutilised due to a lack of user information searching and retrieval skills.

Regarding the issues of staffing, on-going training was provided to staff and some of the staff were currently undergoing training. Plans were under way to provide staff support to users in accessing electronic resources. The COM Library staff did not have the necessary skills to archive electronic resources. Awareness of print and electronic resources was made by means of user training sessions and e-mails to students. Lastly, usage statistics were kept for print and electronic resources.

4.4   Summary of the chapter

Chapter 4 presented the results of the study, which set out to evaluate student use of print and electronic resources at the University of Malawi College of Medicine Library. The results of the study have sufficiently informed the research objectives of the study.

Questionnaire results presented the background information of the respondents, their use of print and electronic resources and preference for print or electronic resources. The respondents' perceptions of the future of print and electronic resources, the importance of computer literacy in accessing electronic resources and their level of computer literacy were also reported. Recommendations to the COM Library for the improvement of user training in accessing print and electronic resources by the respondents were also discussed.

As background information to the results of the questionnaire, results of the interview with the College Librarian were reported. These results comprised sections on budgeting, infrastructure, staffing, licensing and copyright agreements, archiving of electronic resources, awareness of print and electronic resources available in the COM Library and usage of print and electronic resources.

Chapter 5

Interpretation of results

5.   Introduction

The results of the study are discussed in Chapter 5. The purpose of the study was to evaluate student use of print and electronic resources at the University of Malawi College of Medicine. The results are discussed in relation to the objectives of the study and comparisons are made with findings in other studies discussed in the literature review (Chapter 2). It should be noted that due to the relatedness of the research objectives, the discussions in this chapter tend to overlap. The discussion is based on the students who responded to the questionnaire. Taking into account the low response rate to the survey, generalisations of the findings to the whole student population are difficult.

5.1   Revisiting the objectives of the study

The study set out to achieve the following objectives:

a.   To establish the extent to which students used print and electronic resources.

b.   To establish which resources, between print and electronic, students preferred to use when looking for information to meet their needs.

c.   To establish the reasons why students preferred these resources.

d.   To establish what problems students encountered when consulting these resources.

e.   To make recommendations to the library, based on the findings of the study.

5.2   The use of print and electronic resources

Advances in technology have perpetuated the production and availability of more and more information in electronic form. In the days of prevalence of print resources, users had little choice in the method of accessing information (Subramanian 1998: 128). At the present time, users are faced with a choice between information in print and electronic format.

The findings of this study indicate that students who responded used print resources more than electronic resources. There was a high level of usage of print resources, compared to electronic ones. These results were contrary to Morse and Clintworth's (2000) findings that students indicated high levels of electronic usage, compared to print. Of the 65 respondents that used print resources in the present study, the majority of the respondents 59 (90.8%) used books on a daily basis. Printed newspapers were used daily by more than half of the students (36 or 55.4%). The use of electronic resources was rather low when considering the electronic resources the Library subscribed to or, in some instances, had free access to for the users' academic needs. Of the 65 respondents that used electronic resources, only 37 (56.9%) used Websites on a daily basis.

5.2.1   Importance of print and electronic resources

Users depend on the Library for information for their academic studies. The majority of the students felt that the resources available in the COM Library were important for their academic studies because there was nowhere else they could access such information. The COM Library is the only medical library in Malawi. This means that students cannot depend much on interlibrary loans for materials found in the other libraries of the University of Malawi (Masanjika 2003: 3).

Apart from a computer laboratory managed by ICT staff at the COM, students relied on the COM Library for Internet access. Due to the limited number of computer terminals available

in the COM Library, users were allowed to use the computers for a maximum period of one hour only. Only six (9%) of the 65 students indicated that Library resources were somewhat important to them, either because materials were outdated or there were too few computers available, which inhibited them from accessing electronic resources. The latter implies that the students did not use or fully utilise electronic resources, due to a lack of sufficient computers and the limited time the students were allowed to use the computers.

More than half of the students, 35 (54.7%) out of 67, used the Library more than they did in the past few years, while 22 (32.4%) indicated that their use of the resources had not changed. As some students pointed out, the COM library resources were important because the information available was used to supplement information they received from their lecturers in the form of notes. Students were expected to find more on a particular topic than they had learnt in class. They were expected to be aware of current research in the medical field. This notion contributes to the value students hold for the COM Library resources. The majority of the students (97%) used both print and electronic resources. This finding agreed with Friedlander's findings, where users used both print and electronic resources. There were, however, differences in the extent of use of these print and electronic resources. Despite the changing patterns of use of the COM Library resources over the past few years, the students still rely heavily on print resources.

5.2.2 Use of print resources

Most of the students used print resources in their academic endeavours. The use of print resources can be said to be extensive, partly due to the fact that students do have limited access to computer terminals. This finding somehow confirmed Pullinger's (1999) statement. Pullinger (1999: 72) felt that users are affected by the local information content that surrounds them. In Pullinger's (1999) study, the use of print resources was affected by distance to the library and opening hours and the fact that users could access electronic resources outside the library.

The fact that students at the COM depended much on the Library to access electronic resources, limited access to computers led them to resort to the use of print resources. According to Valentine (in Lombardo and Miree 2003: 6), students tended to avoid resources that they were unfamiliar with, believed they were difficult to use and returned to tools they had successfully used in the past. Lack of access to computers, coupled with a lack of computer skills to effectively search and retrieve information, may have led the students to use print resources more.

The fact that students are more familiar with books than other print resources such as journals, which they encounter for the first time when they come to university, may be one reason why books were used more than any other print resource. In addition, lack of promotion of journals may have contributed to lack of awareness of the importance of other print resources. It was found that, of the 65 students who used print resources, 59 (90.8%) and 36 (55.4%) used books and short loan materials daily, respectively.

These resources were viewed as important for the students' academic resources and were used frequently, more than the rest of the print resources. Short loan materials comprised some reference materials which were in high demand. Some reference materials were prone to mutilation by students and are therefore put on short loan to monitor their use and instil user responsibility. It may thus be assumed that some reference materials were also used often. The use of newspapers by most students was not necessarily to do with academic studies, but more with the students' general awareness of current events, both local and international.

According to Lombardo and Miree (2003: 8), most students tend to avoid print resources at all costs, due to their perceived inconvenience and difficulty. In the present study, only two students did not use print resources because they experienced problems in accessing them. The use of print resources could not be ruled out entirely by the students. In Chapter 1 it was mentioned that students are entitled to make use of a Book Bank. These materials were core textbooks that were recommended by lecturers and lent to students for one academic year. It was assumed that the students used the Book Bank and it was thus not included in the

questionnaire. Based on this assumption, it could thus be said that the students who indicated that they did not use print resources relied on the Book Bank and electronic resources.

The use of print and electronic resources had to do partly with access to computers. The limited time that the students had access to computers indicates the underutilisation of electronic resources. Computer literacy and information searching and retrieval skills also contributed to the use of electronic resources, as will be discussed later in this chapter. Similar to Pullinger (1999), Bodomo, Lam and Lee (2003) and Evalued (2004), students who did not have access to computers and were computer illiterate and lacked skills to search and retrieve information, preferred to use print resources. Thus limited access to computers drove students to use print resources. This resulted in the students' lack of exposure to electronic resources.

5.2.3 Use of electronic resources

The Web was viewed as an essential resource by almost all students (65) who used electronic resources. Thirty-five (53.8%), 21 (32.3%) and seven (10.8%) of the 65 respondents indicated that Websites were essential, very important and important, respectively. Overall, electronic resources were important to the students in the following order: Websites, CD-ROMs, electronic databases, electronic books, electronic journals and the OPAC. The students (37 or 56.9%) also used Websites daily, as opposed to the rest of the electronic resources. A majority of the students did not use the other resources.

Twenty-seven (41.5%) of the students did not use the OPAC, which is an important searching tool for local resources available in the Library. The researcher was aware that the OPAC did not reflect the whole collection of the COM Library's resources. This was due to the fact that once resources were catalogued (mostly printed books), bibliographic records were sent to the Central Library Service (CLS), where they were re-checked and entered onto their server. The requirement for staff at CLS was to upload these files onto the servers of all the constituent colleges of the University of Malawi.

However, this was not often done, mainly due to limited staff at the CLS who cater for the needs of all the colleges. As a result, though books were released into circulation, students who were not aware of their existence did not use them. It is only through displays or by chance, when students went to the shelves, that they became aware of their existence.

The students depended on the Web for their academic studies more than they did on other resources such as the CD-ROMs and electronic databases. The importance attached to Web resources was also shown in their use. Websites were used almost daily by all 65 students who used electronic resources. Of the 65 students, thirty-seven (56.9%) and 20 (30.8%) of the students used the Web daily and two to four times a week. The results show that students relied heavily on Websites accessed through search engines such as Google. Sixty-four (98.5%) of the students used search engines to access electronic resources.

Use of the electronic resources was not reflected in the results, even though the students indicated that they used the COM Library's Webpage, the "Resources" Webpage on the COM Webpage and the Department Webpages to access electronic resources. Thus it may be assumed that students accessed the resources but did not actually use them. While 64 (98.5%) of the 65 students indicated use of electronic resources accessed through search engines, only 26 (40%) indicated use of electronic databases. The most frequently used database was African Journals Online, followed by HINARI. Similarly, Morse and Clintworth (2000) found that, though the students in their study used electronic resources, a few, only, were being used. The findings in the present study show that use of Websites accessed through search engines was high among the students, compared to scholarly electronic resources that the COM Library subscribed to or made freely available to its users.

The low use of electronic databases could be attributed to a lack of awareness of their existence by students. During the interview with the College Librarian, she indicated that students were made aware of new, acquired resources through the e-mail service. The fact that students had limited access to computers indicated that students did not have time to check mail. Students who did not read their e-mails were thus not aware of what the Library had in stock. In addition to this, students who were not information literate did not use CD-

ROMs and electronic databases and thus they used Websites accessed through search engines. According to Valentine (in Lombardo and Miree 2003: 6), students seek information sources that are easy to use and they favour convenience over quality of information.

Lack of effective information searching and retrieval skills might have led the students to search engines which they found easier to use. Lwehabura (in Mutula 2004: 6) stated that user education in most African universities is not comprehensive enough for the required skills. In the present study, students recommended the teaching of computer and information searching and retrieval skills by the Library (nine or 42.9% out of 21). Less than half (31 or 47%) of the 66 students indicated that they had received training from the COM Library.

Slightly less than half 16 (47.1%) of the students that had received training were satisfied with the training. This implies that the remaining 14 (41.2%), and those that did not receive any training (35 or 53%), may have lacked the skills to search and retrieve information unless they had received previous training elsewhere or learnt from their colleagues. It can be concluded that this lack of satisfaction with training led to the students' use of search engines more than the other electronic resources, which required more skills to navigate and to retrieve information.

5.3 Preference for print and electronic resources

Users tend to utilise and prefer print and electronic resources, depending on the advantages and disadvantages that are attached to these formats. Sathe, Grady and Giuse (2002) found that the majority of the students preferred electronic resources to print. The same was found by Pather (2004). The Pather (2004) study found that though users used print resources more than electronic resources, they preferred to use electronic resources.

The students in the present study used both print and electronic resources, but they preferred print resources. The students' preference for print resources agreed with Bodomo, Lam and Lee's (2003) study's findings, where students at HKU preferred print resources to electronic resources. In the present study, 40 (60.6%) of the 66 respondents indicated that they would prefer print resources, whilst 26 (39.4%) indicated that they would prefer electronic ones.

The students preferred print resources for the following reasons:

- They were more convenient (24 or 88.9%)
- It was easier to read from print than from computer screens (22 or 81.5%)
- They had higher quality graphics, photos, etc. (4 or 14.8%)
- It was easy to locate information (2 or 7.4%)
- There were no additional expenses, e.g. printing (1 or 3.7%)

The two major reasons for the students' preference for print resources were convenience and ease of reading. The students found it more convenient to use print resources than electronic resources mainly due to limited access to computers, which inhibited their use of electronic resources. Since access to electronic resources outside the COM Library was also limited, due to the availability of only one computer laboratory, students found it easier to borrow print resources that they could use at their own convenience. The use of electronic resources was thus confined to the opening hours of the COM Library and the computer laboratory.

The students also preferred print resources because it was easier to read from print than from a computer screen. The results showed that the students did not like reading from computer screens. This reason was closely related to the additional expenses that go with the use of electronic resources in terms of printing. The students were expected to pay for printing services in the COM Library. Students who could not meet these costs might have felt obliged to use print resources if they were unable to read from the computer screens for long periods. Restricted access to electronic resources due to licensing agreements might also have driven users to prefer print resources, if they were not able to download and print out the information. Bodomo, Lam and Lee (2003) found that students were not familiar with

copyright laws and restrictions to access hindered the use of electronic resources. Bodomo, Lam and Lee (2003: 46) stressed that users need to be aware of the extent to which they may copy, share, disseminate and use the resources.

Nineteen of the 26 students preferred electronic resources for the following reasons:

- They were easy to browse (14 or 73.3%)
- They were available 24 hours a day (7 or 36.8%)
- They were convenient (6 or 31.6%)
- They were more up-to-date (5 or 26.3%)

The use of Websites accessed through search engines like Google could make the students believe that electronic resources were easy to browse. Feather and Sturges (2003: 174) state that use of electronic information requires the user to be "increasingly competent in the judgment of the quality of information." In an academic setting, students are required to use authoritative information in their academic work. With limited information retrieval skills, students may use information that is not relevant to and authentic for their academic studies.

5.3.1 The future of print and electronic resources

The students' use and preference for print resources was related to their view on the future of print and electronic resources. Most of the students 33 (78.6%) indicated that print resources would continue to co-exist with electronic resources. Less than half of the 42 students (20 or 47.6%) indicated that electronic resources would supplement print resources. This implies that the students felt that electronic resources would not replace print resources but would complement them. Contrary to these findings, the students in Pather's (2005) study used print journals and they thought that electronic journals would replace print journals.

5.4　User training, computer and information literacy

The ability of library users to use a computer to search and retrieve information determines whether one uses electronic resources or not. As technology continues to evolve rapidly, there is a need for higher educational institutions to ensure that users have some basic level of technological competency (McDonald 2004). Fifty (76.9%) out of 65 students strongly agreed that computer literacy was important for one to access electronic resources. Most of the 66 respondents who completed the question considered themselves average (31 or 51.5%) and 24 (36.4%) were competent in their level of computer literacy and ability to access electronic resources.

Lwehabura (1999 in Mutula 2004: 6) felt that user education in most African universities is not comprehensive enough to teach the skills required to retrieve electronic resources. The COM Library provided user training for students upon request from lecturers and students. The sessions were mostly one hour or shorter, which was not long enough, according to some of the students. This was shown in their recommendations, where 10 (50%) of the 20 respondents called for thorough user training in accessing print resources. Other respondents (5 or 25%) recommended that user training should be on-going. Regarding electronic resources, nine (42.9%) out of 21 respondents indicated the need for training in computer literacy and information searching and retrieval skills for accessing electronic resources.

The ability to use a computer does not guarantee effective searching for, and retrieval of, information. Feather and Sturges (2003: 261) state that the provision of ICTs is only a starting point in achieving what a user requires to meet his or her information needs. In a study by Bodomo, Lam and Lee (2003), students who were not comfortable with using computers preferred to use print resources. In the present study, results indicate that students used and preferred print resources to electronic ones. In addition to this, the College Librarian stated that more students were able to locate and use print resources than they were able to search and retrieve electronic resources. Thus information searching and retrieval skills are a necessary component in the use of electronic resources.

5.5 Problems encountered when consulting print and electronic resources

The students indicated a number of problems that they encountered when accessing print and electronic resources. The various problems which students met in accessing print and electronic resources affected the use of, and preference for, these resources. It should be noted that no study covered in the literature review investigated problems experienced in accessing print resources and there is thus no mention of previous studies.

5.5.1 Problems encountered when consulting print resources

The students experienced a number of problems when consulting or accessing print resources. The major problems had to do with the currency and relevance of the COM Library materials, rather than with searching and retrieval. As already discussed, students used books more than other print resources. The problems that most students experienced included the following:

- Materials were outdated (26 or 57.8%)
- Materials did not meet their needs (18 or 40%)
- Materials were few (16 or 35.6%)
- Materials were missing from the Library (15 or 33.3%)
- Difficult to locate materials (11 or 24.4%)
- Staff were not always available to help (6 or 13.3%)

The researcher is aware that most medical books are often updated. This requires the Library to purchase new editions frequently. The other problem was that some materials that were donated to the Library were earlier editions, which students felt did not meet their needs. Medical research requires that students keep abreast with current information and hence the need for current resources. Low levels of use of print journals may also contribute to the

students' problems, because they rely more on books than journals, which contain more relatively current information than books. Few students found it difficult to locate print resources. This is in line with the College Librarian's view that students were able to search and retrieve print resources easier than electronic ones.

5.5.2 Problems encountered when consulting electronic resources

Accessing electronic resources was a major problem among the users of electronic resources. Forty-eight students in the present study indicated the following major problems:

- Limited access to computer terminals (46 or 95.8%)
- Slowness of the Internet, or server always down (37 or 77.1%)
- Lack of computer skills to effectively search and retrieve information (19 or 39.6%)
- Staff not always available to help (17 or 35.4%)
- Too much information retrieved (14 or 29.2%)

The limited number of computer terminals in the Library was the major problem that the students experienced. The COM Library was aware of this problem, which also led to limited time that the students were allowed to use the computers. The slowness of the Internet and frequent failure of the Internet server inhibited the students from accessing and using electronic resources. This was exacerbated by the limited time that was allocated to use the computers. Documents in some formats, such as Portable Document Format (PDF), take time to download. When the Internet is slow, downloading of these documents is difficult.

Some of the students (19 or 39.6%) indicated lack of computer skills to effectively retrieve information as one of the problems that they encountered when accessing electronic resources. When considering computer literacy, most students felt that their computer literacy levels were average. In related studies by Pullinger (1999), Morse and Clintworth (2000) and Bonthron *et al.*, (2003), students experienced the same problems. In their studies,

limited time and lack of information retrieval skills were some of the barriers to the access of electronic resources.

Evalued (2004) found that students who experienced problems in accessing electronic resources preferred print resources. Bodomo, Lam and Lee (2003: 42) found that students who were not confident about their computer competency preferred to use print resources. The same can be said for the students in the present study. Though the students agreed that computer literacy was important for one to use electronic resources, they felt that they did not have the required skills to effectively search and retrieve information. Dutton (in Ray and Day 1998) stated that "the skills required to maximise the potential of electronic resources are much greater than those required for searching print resources."

5.6   Implications of the findings for the COM Library

The findings of the present study have implications for the COM Library, which has had its budget allocation decreased from 4% to 3% of the parent organisation's budget. Costs of print and electronic resources continue to rise. This affects the Library's decisions on which resources to make available to its users. Decisions made by the Library need to take user needs into consideration.

The COM Library continues to acquire print resources and subscribe to electronic resources. However, according to the College Librarian, the Library had reduced the acquisition of print resources that are also available in electronic format. This could have serious implication for the users. The findings show that students use and prefer print resources to electronic resources. In addition to this, limited access to computers terminals and lack of computer skills to effectively search and retrieve electronic resources prohibits users from fully utilising electronic resources. The Library's preference for electronic resources over print, as a cost-cutting measure, means that the resources are not fully utilised by the users. The

College Librarian mentioned that electronic resources were cheaper to subscribe to, because they came as a package, compared to the purchase of a single print resource.

The College Librarian stated that print resources were being utilised by the students, while electronic resources were not. She indicated that, although user training sessions were organised for the students, the turn-out was low. The findings show that fewer than half of the students had received some form of training from the COM Library. One possible reason would be that the times for the sessions were not convenient for the students. One respondent recommended that user training sessions should be conducted at convenient times. Thus students who lack information searching and retrieval skills encountered problems in accessing electronic resources. As a result, they resorted to using print resources, which they were more familiar with.

Regarding licensing agreements, the College Librarian stated that users were not allowed to e-mail or print some of the electronic resources. If students cannot print out or e-mail the information that they need, their efforts to search and retrieve this information are complicated, since most students found it difficult to read from the computer screen.

5.7   Summary of the chapter

The results of the study were discussed in this chapter. The discussions were relevant to the research objectives that the study wanted to achieve. The objectives were highlighted at the beginning of the chapter. The major areas covered in the chapter included the use of print and electronic resources, preference for print and electronic resources, user training, computer and information literacy and problems encountered when accessing print and electronic resources. The chapter covered the implications that the results of the study have for the COM Library.

The students at the COM used and preferred print resources. This was perpetuated by a lack of sufficient computers available to the students. In addition, the students were not competent enough to effectively search and retrieve electronic resources. The COM Library preferred the provision of electronic resources to print, when resources appeared in both formats. This has implications for its users in terms of the students' limited access to computers and lack of computer and information searching and retrieval skills.

Chapter 6

Conclusion and recommendations

6. Introduction

In this Chapter, concluding remarks concerning the study are made. Recommendations are made in response to the analyses of data and interpretation of results covered in Chapters 4 and 5.

6.1 Revisiting the purpose and objectives of the study

The purpose of the study was to evaluate students' use of print and electronic resources at the University of Malawi College of Medicine. Objectives of the study were to establish the extent to which students used print and electronic resources; which resources, print or electronic, students preferred when looking for information to meet their needs; reasons why students preferred these resources; what problems students encountered when consulting these resources; and to make recommendations based on the findings of the study.

6.2 Conclusions

The outcome of the study shed light on how the COM Library's print and electronic resources were being used. The availability of more information in electronic format, due to rapid technological changes, demonstrated the need to establish what print and electronic resources the students at COM use and prefer. The problems that they encountered in using

these resources were investigated. The results of the study would assist the COM Library in decision-making, in terms of what resources its users use and prefer and what areas need improvement to ensure maximum use of both print and electronic resources.

The survey evaluated the use of print and electronic resources by undergraduate students at the COM Library. Libraries are expected to defend their spending on the acquisition of print and electronic resources. The use of print and electronic resources has to be justified. One hundred and seventy-nine (179) students were surveyed, of whom 67 responded to the questionnaire.

The results established that print resources in terms of books were used by most of the students, followed by newspapers and short loan materials. The rest of the print resources, that is reference materials, Malawiana materials and journals, were underutilised by the students. Problems that the students encountered in accessing print resources were that materials were outdated, materials did not meet their needs, materials were few, materials were missing from the Library, it was difficult to locate materials and staff were not always available to help. In spite of these problems, students still preferred print resources to electronic. The students said that it was easier to read from print than computer screens and that print materials were convenient to use.

In terms of electronic resources, the students used search engines to access electronic resources. Websites were used by most of the students who used electronic resources. Though some students used electronic databases, accessed either through the COM Library Webpage, "Resources" Webpage or Department Webpages, there were low levels of electronic resources usage. The three most used electronic databases were African Journals Online, HINARI and Oxford Reference Online. A number of the students did not use the CD-ROM databases, electronic books, electronic databases, electronic journals or the OPAC.

Students who used electronic resources experienced problems, such as limited access to computer terminals, slowness of the Internet or frequent failure of the Internet server, lack of computer skills to effectively search and retrieve information and that staff were not always

available to help. Some students retrieved too much information, which presented them with the dilemma of which information to use and which to ignore. In the light of these problems, few students preferred electronic resources. However, the students found that electronic resources were easy to browse, they were available 24 hours a day, they were convenient, in that students did not have to go to the Library, and they were up-to-date when compared to print resources.

The study reveals that the problems met by students in accessing electronic resources contributed partly to their use of, and preference for, print resources. The findings confirm Dutton's (in Ray and Day 1998) statement, that the skills needed to maximise the potential of electronic resources were much greater than those needed for searching print resources. Mutula (2004: 6) felt that the lack of information literacy was partly due to the underutilisation of ICTs and information resources. The present study shows that students had limited access to computers and this resulted in the underutilisation of electronic resources. The students also lacked computer, information searching and retrieval skills, to maximise their use of these electronic resources. Students preferred to use print resources which they had used successfully in the past (Lombardo and Miree 2003: 6).

6.3 Recommendations

Based on the findings of the study, the following recommendations have been made to assist the COM Library in its decision-making processes concerning the acquisition of, or subscription to, print and electronic resources. It is important that libraries find ways of combining information in various formats into useful, effective research tools (Brooks 2001: 316). Therefore it is vitally important that the COM Library effectively combine its print and electronic resources into useful and effective search tools.

6.3.1 Technological infrastructure

The use of electronic resources requires media such as computers. The acquisition and ability to access electronic resources is directly linked to the availability of, or willingness to purchase, suitable technology to use these resources (Fecko 1997: 11). These are important considerations when examining the acquisition of electronic resources. The COM Library should ensure that there is sufficient technological infrastructure such as computer terminals and compatible software to allow students to access and make use of electronic resources.

At the time of writing, the addition of more computers in the Library would be impossible, due to the lack of sufficient space in the present library. The researcher was informed that the building of a new library will start in the near future. The new library will have 73 computers available. They will be procured "to meet the necessities of that particular time" (Masanjika 2005). Regular investment plans for technological infrastructures are essential for academic libraries (Gallimore 1997: 14). As technology continues to change there will always be the need to update computer hardware and software, to enable continuous access to electronic resources. It is recommended that the Library should set up policies that will guide it in terms of the acquisition, maintenance or upgrading of technological infrastructures. Allowance in the COM Library budget should be made for these additional expenses.

6.3.2 User training in computer and information searching and retrieval

There is a need for user training in terms of computer basics and information searching and retrieval. Apart from orientation programmes, user training sessions were held at the request of lecturers and students. In spite of this, there was a low turn-out of students for the sessions. It is recommended that the COM Library staff liaise with lecturers on the appropriate times to conduct these sessions. Lecturers should encourage their students to use different sources of information in both print and electronic format. As mentioned in Chapter 2, Fecko (1997: 9) presents the following questions the Library needs to consider when planning for training:

- How basic or detailed should training be?
- In what areas should training be provided?
- Should training include traditional print as well as electronic resources, particularly for those electronic resources with print counterparts in the library?
- Should basic training courses be mandatory for new students, or should it be provided only on request for specific courses?

The COM Library should consider the above aspects when it develops a training programme for its users.

6.3.3 Awareness of print and electronic resources

Non-use of print and electronic resources is due partly to a lack of awareness by the students. Lack of awareness of other resources relevant to students' needs leads them to use the same materials that they are familiar with. Apart from displays of print materials and e-mails sent to users, the COM Library should put notices on boards on campus, where students can see them.

The COM Library OPAC is an important reference tool for its users. Therefore there is a greater need to update the OPAC so that it reflects the COM Library resources. The COM Library management, together with the CLS, need to put in place mechanisms which would ensure the constant updating of library records on the OPAC server. With this in place, students can then be encouraged to use the OPAC in searching for print and electronic resources. Currently, the OPAC accounts for most of the catalogued print resources available in the Library and the other colleges of the University of Malawi.

6.3.4 Staff training and user support

Effective training of library staff is important for them to cope with the rapidly changing situation (Pather 2004: 202). Library staff need to keep abreast with technological advances. They need to have the necessary computer, information searching and retrieval skills, without which they would be unable to assist users in accessing electronic resources.

The COM Library should ensure and encourage continuous training of its staff, because technology is always evolving. The skills obtained now may not be applicable in the near future. Library staff need to be continually aware of the technological advances in the global world and be able to use them and impart their use to users. Gallimore (1997: 15) states that library staff need to be trained in the effective use of ICTs. The provision of electronic resources to users would not be possible if there are no qualified or knowledgeable library staff to render user support.

The COM Library has plans to create positions for staff responsible for user support in accessing electronic resources. As is the norm at the COM Library, library assistants are rotated from one section of the Library to the other, at least yearly. Computer skills, information searching and retrieval skills are required for all library staff. The Library staff need to be "familiar with both print and electronic versions of resources, to help serve the information needs of several levels of patrons" (Fecko 1997: 13).

6.3.5 Archiving of electronic resources

Archiving is one of the issues to be considered by the COM Library regarding the access to electronic resources. The Library needs to put mechanisms in place that will ensure the continuous availability of electronic resources to its users. The Library has to make certain that electronic resources are accessible at all times to users, as far into the future as possible (Neavill and Sheble 1995; Montgomery and King 2002: 134). Issues of licensing and

copyright also need to be considered, if the archiving of electronic resources is to be done locally by the COM Library staff.

6.3.6 Future research

Further research should be carried out in the following areas. First, a similar study should be conducted after the COM Library moves into the new library building, when students will have easier access to computers terminals. The proposed study will investigate changes in the students' use of information in terms of print and electronic resources. The study would also establish the level of students' awareness of the existence of print and electronic resources. The study will assist the Library in determining if it is making headway in ensuring the maximum utilisation of both print and electronic resources. Second, a further study should investigate the COM Library staff's levels of information and computer literacy and their perception of the changing roles brought about by the availability of electronic resources. This could assist the Library management to identify the areas in which staff need to be trained. Finally, similar studies should be undertaken in other colleges of the University of Malawi. For instance, library user training is incorporated in the curriculum at Chancellor College. An investigation into the effects of training library users in the use of print and electronic resources will be helpful to the University of Malawi Libraries.

6.4 Summary of the chapter

Conclusions on the major research findings were discussed in this chapter. Following these conclusions, recommendations were made which could assist the COM Library to improve access to, and use of, print and electronic resources.

Students used and preferred print resources to electronic resources. Problems associated with the access to electronic resources contributed to the use of, and preference for, print

resources. Since more information is being made available in electronic format, there are issues that the Library needs to examine further. These include technological infrastructure, user training in accessing print and electronic resources, awareness of print and electronic resources, staff training, support and archiving of electronic resources. Suggestions for further research were also made in the chapter.

List of works cited

Ashcroft, Linda and Chris Watts. 2005. ICT skills for information professionals in developing countries: perspectives from a study of the electronic information environment in Nigeria. *IFLA Journal* 31(1): 6-12.
<http://ifl.sagepub.com/cgi/reprint/31/1/6> 27 March 2005.

Association of Research Libraries. 2002. The role of print in research library collection. *ARL Bimonthly Report* 225.
<http://www.arl.org/newsltr/225/print.html> 18 August 2005.

Babbie, Earl and Johann Mouton. 2001. *The practice of social research*. South African ed. Cape Town: Oxford University Press Southern Africa.

Barker, Philip. 1997. Electronic documents and their role in future library systems. In: Raitt, David *(ed.) Libraries for the new millennium: implications for managers*. London: Library Association Publishing. pp. 89-113.

Barnes, John. 1997. Electronic archives: an essential element in complete electronic journals solutions. *Information Services and Use* 17(2).
<http://web4.epnet.com/> 17 August 2005.

Blanche, Martin Terre and Kevin Durrheim. *(eds)*. 1999. *Research in practice: applied methods for the social sciences*. Cape Town: University of Cape Town.

Bodomo, Adams, Mei-ling Lam and Carmen Lee. 2003. Some students still read books in the 21st century: a study of user preference for print and electronic libraries. *The Reading Matrix* 3(3): 34-49.
<http://www.readingmatrix.com/atricles/bodomo_lam_lee/article.pdf> 27 March 2005.

Bonthron, Karen *et al.* 2003. Trends in use of electronic journals in higher education in the UK: views of academic staff and students. *D-Lib Magazine* 9(6). <http://www.dlib.org/dlib/june03/urquhart/06urquhart.html> 22 March 2003.

Borque, Linda B. and Eve P. Fielder. 1995. *How to conduct self-administered and mail surveys.* London: Sage Publications.

Brennan, Patricia, Karen Hersey and Georgia Harper. 2002. *Strategic and practical considerations for signing electronic information delivery agreements.* <http://arl.cni.org/scomm/licensing/licbooklet.html> 11 April 2005.

Brooks, Sam. 2001. Integration of information resources and collection development strategy. *The Journal of Academic Librarianship* 27(4): 316-319.

Brophy, Peter. 2000. *The academic library.* London: Library Association Publishing.

Busha, Charles H. and Stephen P. Harter. 1980. *Research methods in librarianship: techniques and interpretation.* New York: Academic Press.

Crawford, Walt and Michael Gorman. 1995. *Future libraries: dreams, madness and reality.* Chicago: American Library Association.

Doyle, James K. 2001. *Handbook of IQP advisors and students.* <http://www.wpi.edu/Academics/Depts/IGSD/IQPHbook/ch10.html#10> 23 March 2004.

Drabenstott, Karen Markey. 1994. *Analytical review of the library of the future.* Washington, D.C.: Council on Library Resources.

Evalued. 2004. *Student opinion survey: electronic information sources.* <http://www.evalued.edu.ac.uk/resources/docs/UCN/UCN.htm> 10 June 2005.

Feather, John and Paul Sturges. 2003. *International encyclopedia of information and library science*. 2nd ed. London: Routledge.

Fecko, Mary Beth. 1997. *Electronic resources: access and issues*. London: Bowker Saur.

Fowler, F. J. 1993. *Survey research methods*. 2nd ed. Newbury Park, Ca.: Sage Publications.

Friedlander, Amy. 2002. *Dimensions and use of the scholarly information environment*. <http://www.clir.org/pubs/reports/pub110/contents.html> 21 March 2005.

Gallimore, Alec. 1997. *Developing an IT strategy for your library*. London: Library Association.

Gorran-Farkas, Meredith. 2000. *Electronic resources policy*. <http://meredith.wolfwater.com/Gorran_Electronic.doc> 8 June 2005.

Gurnsey, John. 1985. *The information profession in the electronic age*. London: Clive Bingley.

Haigh, Susan. 2000. Connectivity, content and collaboration: the Canadian digital library experience. In: Fletcher, Patricia Diamond and John Carlo Bertot. (*eds*). *World libraries on the information superhighway: preparing for the challenges of the new millennium*. Hershey: Idea Group Publishing. pp. 26-42.

Himmelfarb Health Sciences Library. 2004. Life in the age of electronic resources/journals: focus on reality. *Information Interface* 32(1). <http://www.qwumc.edu/library/inforinterface/Jan2004/electage.cfm> 8 June 2005.

Hoskins, Ruth Geraldine Melonie. 2002. Information and communication technology (ICT) knowledge and skills of subject librarians at the university libraries of KwaZulu-Natal. MIS thesis. Pietermaritzurg: University of Natal.

Humes, Barbara. 1999. *Understanding information literacy*.
<http://www.ed.gov/pubs/UnderLit/info-literacy.html> 30 August 2005.

Ithaka Harbors, Inc. 2004. *The archiving problem*.
<http://ithaka.org/e-archive/problems.htm> 17 August 2005.

Kadzamira, Gift. 2005. E-mail to author. 25 May.

Katundu, Desdery Rutalemwa Mushumbusi. 1998. The use and sustainability of information technology (IT) in academic and research libraries in Tanzania. Ph.D thesis. Pietermaritzburg: University of Natal.

King, Donald. 2004. Some thoughts on academic library collections. *The Journal of Academic Librarianship* 30(4): 261-264.

Lee, Stuart. 2002. *Electronic collection development: a practical guide*. New York: Neal-Schuman.

Liu, Ziming. 2005. Print vs. electronic resources: a study of user perceptions, preferences and use. *Information Processing and Management* [In press, corrected proof].
<http://www.sciencedirect.com> 23 February 2005.

Lombardo, Sharon V. and Cynthia E. Miree. 2003. Caught in the Web: the impact of library instruction on business students' perceptions and use of print and online resources. *College and Research Libraries* 64(1): 6-22.

Luther, Judy. 2001. *White paper on electronic journal usage statistics.* Washington, D.C.: Council on Library and Information Resources. <http://www.clir.org/pubs/reports/pub94/pub94.pdf > 24 August 2005.

MALICO. 2004. *Electronic resources.* <http://www.bunda.unima.mw/malico.html> 28 April 2005.

Masanjika, Ralph. 2003. University of Malawi College of Medicine Library: official opening, 29 January, 2003. Speech delivered at the official opening of the College of Medicine Library, College of Medicine, Blantyre, Malawi.

Masanjika, Ralph. 2005. E-mail to author. 16 November.

McDonald, David S. 2004. Computer literacy skills for computer information systems majors: a case study. *Journal of Information Systems Education* Spring: 1-6.

McNight, Cliff. 1997. *Electronic journals: what do you think of them?* <http://www.dlulis.ac.jp/ISDL97/proceedings.mcnight.html> 23 June 2005.

Meho, Lockman I. and Stephanie W. Haas. 2001. Information-seeking behaviour and use of social science faculty studying stateless nations: a case study. *Library and Information Science Research* 23(1): 5-25.

Montgomery, Carol Hansen and Donald W. King. 2002. Comparing library and user related costs of print and electronic journal collections. *D-Lib Magazine* 8(10). <http://www.dlib.org/dlib/october02/montgomery/10montgomery.html> 3 August 2005.

Morse, David H. and William A. Clintworth. 2000. Comparing patterns of print and electronic journal usage in an academic health science library. *Issues in Science and Technology Librarianship* Fall. <http://ww.istl.org/00-fall/refereed.html> 22 March 2005.

Mutula, Stephen. 2004. *IT diffusion in Sub-Saharan Africa: implications for developing and managing digital libraries*.
<http://disa.nu.ac.za/workshops/Gaberone%20workshop/MutulaIFLAworkshop.pdf > 30 August 2005.

National Forum on Information Literacy. 2005. *Definitions*.
<http://www.infolit.org/definitions/index.html> 30 August 2005.

Neavill, Gordon B. and Mary Ann Sheble. 1995. Archiving electronic journals. *Serials Review* 21(4).
<http://web4.epnet.com/>17 August 2005.

Ngulube, Patrick. 2005. Research procedures used by Master of Information Studies students at the University of Natal in the period 1982-2002 with special references to their sampling techniques and survey response rates: a methodological discourse. *The International Library and Information Review* 37(2): 127-143.

Ngwira, Margaret. 2004. Accessing electronic information: opportunities and constraints. The Malawi situation. In: FAO Corporate Repository. *Report of and papers presented at the Regional Workshop on Networking for Improved Access to Fisheries and Aquaculture Information Africa, South Africa, 3-7 November 2003*.
<http://www.fao.org/documents/> 30 August 2005.

Palmquist, Ruth A. and Kyung-Sun Kim. 1998. Modeling the users of information systems: some theories and methods. In: Iyer, Hemalata (ed.) *Electronic resources: use and user behaviour*. New York: The Haworth Press. pp. 3-25.

Pantry, Sheila and Peter Griffiths. 2002. *Creating a successful e-information service*. London: Facet Publishing.

Pather, Roshini. 2004. A comparative study of the costs and benefits of journal ownership versus full-text electronic access in the Faculty of Science at the University of Natal, Durban Libraries. MIS thesis. Pietermaritzburg: University of KwaZulu-Natal.

Pester, David. 2004. Finding legal information: a guide to print and electronic resources. *Library and Information Update* 46.

Powell, Ronald R. 1997. *Basic research methods for librarians.* 3rd ed. Greenwich, Conn.: Ablex.

Prytherch, Ray. *(comp.)* 2000. *Harrod's librarians' glossary and reference book.* 9th ed. Aldershot, Hants: Gower.

Pullinger, David. 1999. Academics and the new information environment: the impact of local factors on use of electronic journals. *Journal of Information Science* 25(2): 164-172.

Ray, Kathryn and Joan Day. 1998. Student attitudes towards electronic information resources. *Information Research* 4(2).
<http://informationr.net/ir/4-2/paper54.html> 17 March 2005.

Reitz, Joan M. 2004. *ODLIS: Online dictionary for library and information science.* Portsmouth, NH.: Libraries Unlimited.
<http://lu.com/odlis/index.cfm> 9 May 2005.

Rosenberg, Diana. 1997. *University libraries in Africa: a review of their current state and future potential.* Vol. 1: Summary. London: International African Institute.

Salant, Priscilla and Don A. Dillman. 1994. *How to conduct your own survey.* London: Library Association Publishing.

Sathe, Nila A., Jenifer L. Grady and B. Giuse. 2002. Print versus electronic journals: a preliminary investigation into the effect of journal format on research processes. *Journal of the Medical Association* 90(2): 235-243.
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=100770> 17 March 2005.

Schottlaender, Brian. 1998. The development of national principles to guide librarians in licensing electronic resources. *Library Acquisitions: Practice and Theory* 22(1): 49-54.

Shuman, Bruce A. 2001. *Issues for libraries and information science*. Englewood, Colo.: Libraries Unlimited.

Subramanian, Jane M. 1998. Patron attitudes toward computerized and print sources: discussion and considerations for reference service. In: Iyer, Hemalata (*ed.*) *Electronic resources: use and user behaviour*. New York: Haworth. pp.: 127-138.

Tenopir, Carol. 2003a. Online databases: what user studies tell us. *Library Journal* 128(14): 1-32.

Tenopir, Carol. 2003b. *Use and users of electronic library resources: an overview and analysis of recent studies. Executive summary.*
<http://www.clir.org/pubs/execsum/sum120.html> 8 June 2005.

Trochim, William. 2002. *The research knowledge base.*
<http://www.socialresearchmethods.net/kb/questype.htm> 6 September 2005.

The University of Malawi College of Medicine. 2003a. *History.*
<http://www.medcol.mw/history.php> 24 April 2005.

The University of Malawi College of Medicine. 2003b. *Introduction.*
<http://www.medcol.mw/introduction.php> 24 April 2005.

The University of Malawi College of Medicine. 2003c. *Resources.*
<http://www.medcol.mw/resources.php> 24 April 2005.

The University of Malawi College of Medicine Library. 2005. *Information literacy skills.*
<http://www.medcol.mw/library/literacy.html> 23 May 2005.

University of North Carolina-Chapel Hill Writing Center. 2002. *Literature reviews.*
<http://www.unc.edu/depts/wcweb/handouts/literature_review.html> 6 September 2005.

Wallis, Trevor. 2002. *How electronic resources are affecting collection development policies.*
<http://ausport.gov.au/fulltext/2002/siw/ercdp.asp> 10 June 2005.

Weisberg, Herbert F., Jon A. Krosnick and Bruce D. Bowen. 1996. *An introduction to survey research, polling and data analysis.* 3rd ed. Thousand Oaks: Sage Publications.

Witten, Ian H., Michael Loots, Maria F. Trujillo and David Bainbridge. [n.d.] *The promise of digital libraries in developing countries.*
<http://www.cs.waikato.ac.nz/~ihw/papers/01IHW-ML-MF-DB-PromiseDL.pdf> 17 August 2005.

Youngman, Daryl C. 1999. Library staffing considerations in the age of technology: basic elements for managing change. *Issues in Science and Technology Librarianship* Fall.

123

Appendices

Appendix 1

QUESTIONNAIRE ON STUDENT USE OF PRINT AND ELECTRONIC RESOURCES AT THE UNIVERSITY OF MALAWI COLLEGE OF MEDICINE

INSTRUCTIONS

1. Please complete the questionnaire as honestly as possible.
2. Please answer all the sections to the questionnaire unless if you are advised otherwise.
3. Return the questionnaire to Library staff at the issue counter at the College of Medicine Library.
4. PLEASE RETURN THE QUESTIONNAIRE BY THE:
   19TH OF JULY 2005 OR EARLIER.
5. Please tick or cross box(es) that best represent your choice(s).
6. Please write your answers legibly in the space provided where applicable. Should you need more space to write your answers, use the back of the questionnaire, but make sure to indicate the number(s) of the relevant questions/items.

A.   Background Information

Please provide the following:

1.   What is your gender?

   ☐ Male
   ☐ Female

2. What age category are you?

☐ Less than 20 years old
☐ 20-25 years old
☐ 26-30 years old
☐ Over 30 years old

3. What year of study are you?

☐ First year
☐ Second year
☐ Third year
☐ Fourth year
☐ Fifth year

B. Use of print and electronic resources

4. How important are the resources of the College of Medicine Library for your academic studies?

☐ Essential
☐ Very important
☐ Important
☐ Somewhat important
☐ Not important
☐ No opinion

5. Please provide a reason(s) for your answer in 4 above:

_____

_____

_____

6. How has your use of the Library's resources changed over the past few years?

    ☐ I use Library's resources more.

    ☐ I use Library's resources less.

    ☐ My use of the Library's resources has not changed.

7. Do you use print resources?

    ☐ Yes

    ☐ No

8. If No, please explain why.

    _____

    _____

    _____

9. Do you use electronic resources?

    ☐ Yes

    ☐ No

10. If No, please explain why.

    _____

    _____

    _____

If you use print resources ONLY, answer questions 11, 12, 13 and continue with question 19.

If you use electronic resources ONLY, answer questions 14, 15, 16, 17, 18 and continue with question 19.

If you use BOTH print and electronic resources, then answer all the questions that follow.

B1.   Print resources

11.   How important are the following print resources for your academic studies?

	Essential	Very Important	Important	Somewhat Important	Not Important
Books	☐	☐	☐	☐	☐
Journals	☐	☐	☐	☐	☐
Reference materials e.g. dictionaries	☐	☐	☐	☐	☐
Short loan materials	☐	☐	☐	☐	☐
Malawiana materials	☐	☐	☐	☐	☐
Newspapers	☐	☐	☐	☐	☐
Indexes and Abstracts	☐	☐	☐	☐	☐

12. How often do you use the following print resources for your academic studies?

	Daily	2-4 times a week	Once a week	Once every 2 weeks	Once a month	Never
Books	☐	☐	☐	☐	☐	☐
Journals	☐	☐	☐	☐	☐	☐
Reference materials e.g. dictionaries	☐	☐	☐	☐	☐	☐
Short loan materials	☐	☐	☐	☐	☐	☐
Malawiana materials	☐	☐	☐	☐	☐	☐
Newspapers	☐	☐	☐	☐	☐	☐
Indexes and Abstracts	☐	☐	☐	☐	☐	☐

13. What problems do you encounter when accessing print resources? (Please tick or cross all that apply)

☐ Materials are outdated

☐ Materials do not meet my needs

☐ Materials are missing from Library e.g., stolen, vandalised, etc

☐ Difficult to locate materials

☐ Staff not always available to help

☐ Other (Please specify)

_____

_____

_____

B2.   Electronic resources

14. How important are the following electronic resources for your academic studies?

	Essential	Very Important	Important	Somewhat Important	Not Important
CD-ROM databases	☐	☐	☐	☐	☐
Online databases e.g. EBSCOHost	☐	☐	☐	☐	☐
E-books	☐	☐	☐	☐	☐
E-journals	☐	☐	☐	☐	☐
Online Public Access Catalogue	☐	☐	☐	☐	☐
Websites	☐	☐	☐	☐	☐

15.   How often do you use the following electronic resources for your academic studies?

	Daily	2-4 times a week	Once a week	Once every 2 weeks	Once a month	Never
CD-ROM databases	☐	☐	☐	☐	☐	☐
Online databases e.g. EBSCOHost	☐	☐	☐	☐	☐	☐
E-books	☐	☐	☐	☐	☐	☐
E-journals	☐	☐	☐	☐	☐	☐
Online Public Access Catalogue	☐	☐	☐	☐	☐	☐
Websites	☐	☐	☐	☐	☐	☐

16. Which of the following online databases do you use in your academic studies? (Please tick or cross all that apply)

☐ African Journals Online
☐ Blackwell Synergy
☐ BioOne
☐ Cambridge University Press Journals
☐ EBSCOHost
☐ Emerald
☐ HINARI
☐ Oxford Reference Online
☐ Wiley Interscience
☐ Other (Please specify)

_____

_____

_____

17. How often do you use the following sources to access electronic resources?

	Frequently	Sometimes	Never
Library Webpage	☐	☐	☐
"Resources" Webpage on College Website	☐	☐	☐
Department Webpage e.g. Dept. of Community Health	☐	☐	☐
Through search engines e.g. Google	☐	☐	☐

18.   What problems do you encounter when accessing electronic resources? (Please tick or cross all that apply)

☐ Slowness of the Internet
☐ Limited access to computer terminals
☐ Problem with back issues
☐ Lack of computer skills to effectively retrieve electronic resources
☐ Too much information retrieved
☐ Staff not always available to help
☐ Other (Please specify)

_____

_____

_____

B3.   Preference for print and electronic resources

19.   If you were given a choice between print and electronic resources, which one would you prefer?

☐ Print resources
☐ Electronic resources

If you chose print resources, answer question 20 and continue with question 22.
If you chose electronic resources, answer question 21 and continue with question 22.

20.   I prefer print resources because: (Please tick or cross all that apply)

☐ They have higher quality graphics, photos and tables
☐ It is easy to read from print than computer
☐ They are more convenient e.g. books are portable
☐ Other (Please specify)

_____

21. I prefer electronic resources because: (Please tick or cross all that apply)

☐ They are easy to browse

☐ They are available 24 hours a day

☐ They are convenient e.g. I don't have to go to the Library

☐ Other (Please specify)

_____

_____

_____

22. What is your view concerning the future of print and electronic resources? (Please tick or cross all that apply)

☐ Print resources will continue to co-exist with electronic resources

☐ Electronic resources will supplement print resources

☐ Electronic resources will eventually replace print resources

☐ Other (Please specify)

_____

_____

_____

C. User education

23. Computer literacy is important for one to use electronic resources:

☐ Strongly agree

☐ Agree

☐ Neutral

☐ Disagree

☐ Strongly disagree

24.   How do you rate your level of computer literacy?

☐ Highly competent
☐ Competent
☐ Average
☐ Less competent
☐ Not competent
☐ Not sure

25.   Have you had any form of training from the College Library on information searching and retrieval skills since you enrolled at the College of Medicine?

☐ Yes
☐ No

26.   If your answer is yes, how would you rate the training that you received from the College Library?

☐ Highly satisfactory
☐ Satisfactory
☐ Less satisfactory
☐ Not satisfactory
☐ No opinion

27.   What would you recommend to the College Library for it to improve user training in accessing print resources?

_____

_____

_____

28. What would you recommend to the College Library for it to improve user training in accessing electronic resources?

_____

_____

_____

THANK YOU FOR YOUR CO-OPERATION

Appendix 2

15 July 2005.

Dear Student,

EVALUATION OF STUDENT USE OF PRINT AND ELECTRONIC RESOURCES AT THE UNIVERSITY OF MALAWI COLLEGE OF MEDICINE

The purpose of this study is to evaluate student use of print and electronic resources at the University of Malawi College of Medicine. Due to rapid technological growth, more information is being produced in electronic form. Users are hence faced with a choice between print and electronic resources. At the same time, this choice is dependent upon what is available in the library.

This study is being done in partial fulfillment of my Master in Information Studies degree. Besides this being an academic exercise, I also hope that the findings of this study will assist the College of Medicine Library to know what resources its users use and why. This will allow the Library to plan how best to meet the information needs of its users.

The attached questionnaire is designed to elicit student views on the use of, and preference for print and electronic resources. The population of this study is undergraduate students at the University of Malawi College of Medicine. Therefore, your participation in completing the questionnaire will be greatly appreciated. All responses to the questionnaire will be kept confidential.

Yours sincerely,

Diana M. Mawindo
MIS Student

University of KwaZulu-Natal
Email: dimawindo@yahoo.com

Appendix 3

EVALUATION OF STUDENT USE OF PRINT AND ELECTRONIC RESOURCES AT THE UNIVERSITY OF MALAWI COLLEGE OF MEDICINE

INTERVIEW SCHEDULE FOR THE COLLEGE LIBRARIAN

A.   Budget

1.   What proportion of the College budget is allocated to the Library?

_____
_____
_____

2.   What proportion of the budget is spent on:
     a. Print resources?

_____
_____
_____

     b. Electronic resources?

_____
_____
_____

3.   Do you have separate budgets for print and electronic resources?

- Yes
- No

4.   How have electronic resources affected the acquisition of print resources?

_____

_____

_____

5.   Do you compare the cost of print and electronic resources?

- Yes
- No

6.   If resources are available in both print and electronic formats and the budget does not allow you to purchase or subscribe to both, how do you choose between the two?

_____

_____

_____

7.   Are there mechanisms or policies in place that guide you in the purchase or subscription of print and electronic resources?

- Yes
- No

8.   If yes, what are they?

_____

_____

_____

B. Infrastructure

9. Are there any particular challenges/problems for the Library in terms of infrastructure with regard to the following:

a. Space (e.g. for print resources and computer hardware)

_____

_____

_____

b. Technological infrastructure such as computer hardware and software:

- Are enough computers available to users?
    - o Yes
    - o No
- Are electronic resources compatible with computer hardware and software available in the Library?
    - o Yes
    - o No
- Is there sufficient bandwidth for Internet access?
    - o Yes
    - o No
- Are there any other problems?

_____

_____

_____

C.   Staffing

10.   Does the Library have sufficient staff to offer a generally efficient library service?

_____

_____

_____

11.   Are there any staff who are specifically responsible for user support in accessing:

a. Print resources?

- Yes

- No

b. Electronic resources?

- Yes

- No

c. Both print and electronic resources?

- Yes

- No

12.   If your answer is No to question 11 a, b, or c, please explain why.

_____

_____

_____

13.   If your answer is Yes to question 11 a, b, or c, what are their qualifications and skills?

_____

_____

_____

14. Do staff receive any form of on-going training to improve their skills and knowledge?

- Yes
- No

15. If yes, what form of training do staff receive e.g. on electronic database searching, troubleshooting, etc.:

- Do they attend short courses, workshops, etc. or receive on-the-job training?

_____

_____

_____

16. If your answer is No to question 15, please explain why?

_____

_____

_____

17. Are there any plans for the Library to create positions for staff who will be responsible for user support in accessing:

a. Print resources?

_____

_____

_____

b. Electronic resources?

_____

_____

_____

c. Both print and electronic resources?

_____

_____

_____

D.   **Licensing and copyright agreements**

18.   What is the nature of the licensing and copyright agreements that the Library has with electronic resources in terms of simultaneous user access?

_____

_____

_____

19.   Do licensing and copyright agreements restrict user access to electronic resources:

a.   Can users download information?
- Yes
- No

b.   Can users e-mail information?
- Yes
- No

c.   Can users print information?
- Yes
- No

20.   How do licensing and copyright agreements determine the cost of electronic access for the College Library?

_____

_____

_____

E. **Archiving of electronic resources**

21. Have you had any queries regarding electronic resources that a user had accessed previously but are now unavailable to him/her?

_____

_____

_____

22. Are there any mechanisms in place regarding the archiving of electronic resources?

_____

_____

_____

23. What problems does the Library meet in archiving electronic resources?

_____

_____

_____

F. **Awareness of print and electronic resources**

24. How are students made aware of existing or new print resources available in the Library?

_____

_____

_____

25. How are students made aware of existing or new electronic resources available in the Library?

_____

_____

_____

G.   Usage

26. Do you think print resources are underutilised in the Library?

- Yes
- No

27. If Yes, what do you think are the barriers that lead to underutilisation of print resources available in the Library?

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28. Do you think electronic resources are underutilised in the Library?

- Yes
- No

29. If yes, what do you think are the barriers that lead to underutilisation of electronic resources available in the Library?

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30. Do you keep statistics for print resources?

- Yes
- No

31. Do you keep statistics for electronic resources?

- Yes
- No