The preparedness of subject librarians to meet the challenges of information technology in higher education institutions in Kwa-Zulu Natal

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DECLARATION

I, Ntombizonke Sizeni Makhathini declare that this Dissertation is my original work except where proper referencing is made in the text. The Dissertation has not been submitted for the award of any degree to any other University. Where use was made of the work of other authors, it was duly acknowledged.

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N S Makhathini Date

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DEDICATION

This work is dedicated to my one and only daughter, Zesuliwe Makhathini. Baby this is for you.

ABSTRACT

This study investigates the preparedness of subject librarians to meet the challenges of information technology in higher education institutions in the province of Kwa-Zulu Natal. The objectives of the study were to identify different technologies that subject librarians use, also to investigate the preparedness of subject librarians to meet the challenges of information technology as it changes rapidly. Furthermore to determine the areas in their technological skills that subject librarians need to improve or strengthen; and to investigate whether the surveyed institutions are providing training and development programmes to re-skill and update subject librarians on new technologies.

The target population for this study was subject librarians from major academic institutions in Kwa-Zulu Natal. Electronic questionnaires were administered to subject librarians for data collection purpose. The study revealed some weaknesses in the use of some technology as well as challenges being faced in skills transfer using technology. Recommendations were made on support from the management of universities in re-skilling subject librarians and pro-active actions from subject librarians should they encounter something new in technology.

Contents

List of Tables

List of Figures

Chapter One

Introduction and background of the study

Introduction

The researcher has been employed in an academic library for the past ten years. Through informal observation, the researcher has noticed that some subject librarians in higher education institutions in the Durban area seem to be experiencing difficulties in using emerging technology. This observation triggered an investigation to ascertain whether subject librarians are prepared to meet the challenges of information technology.

Subject librarians depend on technology to perform their duties. For example, they need information technology to communicate with users, e.g. e-mails, Skype, *etc* they also need it for collection development, e.g. online ordering and e-books. Since the subject librarians' role has had another task, i.e. teaching, added, subject librarians need technology for slide shows and teaching plagiarism policy that was drafted by the Durban University of Technology (DUT) library using "turn it in" system, Subject librarians, therefore, need to be fully skilled and equipped with technological skills to be able to transfer knowledge to the users (Mhlongo, 2009).

1.2 Background of the study

The researcher felt that was important to give background information about the institutions surveyed. The study was conducted using five major academic institutions in the province of KwaZulu-Natal. The academic institutions surveyed were:

- Durban University of Technology (DUT);
- Mangosuthu University of Technology (MUT);
- University of KwaZulu-Natal (UKZN);
- University of South Africa (Durban) (UNISA); and

- University of Zululand (UZ).

1.2.1 Durban University of Technology (DUT)

Durban University of Technology was the result of the merger of two Technikons in Durban. Those Technikons were M L Sultan and Technikon Natal. They merged in 2002, and the then Durban Institute of Technology was conceived which later changed its name to the Durban University of Technology. DUT has four campuses around Durban and two campuses in the Midlands (Pietermaritzburg). Each campus has its own subject librarian(s) depending on the campus size, the number of departments, and the library serving that campus. DUT has six faculties which are:

- Faculty of Accounting and Informatics;
- Faculty of Applied Science;
- Faculty of Arts and Design;
- Faculty of Engineering and the Built environment;
- Faculty of Health Sciences; and
- Faculty of Management Sciences.

Each DUT faculty has one or two subject librarians depending on the size of the faculty (www.dut.ac.za/library)

1.2.2 Mangosuthu University of Technology (MUT)

Mangosuthu University of Technology, formerly Mangosuthu Technikon, is situated in the second largest township of South Africa, Umlazi, south of Durban, in KwaZulu-Natal. Three subject librarians work in the libraries which serve three faculties. The MUT faculties are:

- Faculty of Engineering;
- Faculty of Management Science; and
- Faculty of Natural Science.

As MUT is a two campus institution it has two libraries, one at the main campus and the other one situated at the department of agriculture in the nearby campus across the Umlazi Highway. Both libraries provide information services to the three faculties.

(www.mut.ac.za/library)

1.2.3 University of KwaZulu-Natal (UKZN)

The University of KwaZulu-Natal was formed on 1 January 2004 as a result of the merger between the University of Durban-Westville and the University of Natal. The new university brings together the rich histories of both the former Universities. UKZN has five campuses, two of them in the central part of Durban and another two on the Western side of Durban, while one campus is based in the Midlands (Pietermaritzburg). UKZN has different colleges within the university. Each campus has a library and subject librarians serving different disciplines. The colleges within UKZN are:

- College of Humanities;
- College of Agriculture, Engineering and Science;
- College of Health Sciences; and
- College of Law and Management Studies.

There are different schools within each college, and the subject librarians serve different disciplines in the colleges and schools.
(www.ukzn.ac.za/library)

1.2.4 University of South Africa (UNISA) (Durban)

The University of South Africa (Durban) is the regional office of the University of South Africa which is based in Pretoria. There is only one branch librarian on campus. The students from this campus have personal librarians based in Pretoria. This campus has its own library that serves UNISA students in the KwaZulu-Natal region.
(www.unisa.ac.za/library)

1.2.5 University of Zululand

The University of Zululand is situated in the Northern region of KwaZulu-Natal province. This university has two campuses, one in Kwa-Dlangezwa and one in Richards Bay. The University of Zululand has four faculties served by five subject librarians. Each campus has its own library. The University of Zululand faculties are:

- Faculty of Arts;
- Faculty of Commerce, Administration and Law;
- Faculty of Education; and
- Faculty of Science and Agriculture.

(www.unizulu.ac.za)

1.3 Research problem

Fox and Bayat (2007: 06) cited by Brynard and Hanekom (2006), are of the opinion that, "research entails the identification of a specific topic which needs to be investigated, or a problem that needs to be studied." Majola, (2010) is of the opinion that subject librarians are playing a major role in academic institutions by ensuring skills transfer to students and staff, developing the library collection in designated subject areas of the university curriculum, and liaising with academic departments on library integration and academic programmes, as well as assisting in research, and the formulation and evaluation of policies.

The challenge of the changing technology was documented by the Old Dominion University on university's information technology 2009-2014 strategic plan, which indicated that change in technology affect academic and administrative departments in academic institutions globally. Therefore, an on-going training on the application of new technologies is crucial for university staff to keep up with changing technology that impact the universities' teaching and learning, university research activities in fundamental ways, the way universities manage business processes and interacting with university community.

Change in technology can affect the operation of the university business due to the following:

1.3.1 Lack of technological skills:-

(Ntsele 2009) highlighted that subject librarians rely on system support people for training on new technologies; subject librarians do not get training directly from the vendors. Due to on-going technological changes, subject librarians need to be provided with training in order to enable them to use new technologies when performing their jobs. As new technologies are introduced on a regular basis, the tasks of subject librarians are becoming more challenging by the day.

1.3.2 Lack of human resource:-

Owing to the nature of work that subject librarians do, subject librarians are expected to be available in the library all the time for users; and therefore do not have time to attend training on new technologies frequently, and universities cannot afford to have subject librarians out of their offices without having any assistant left behind to assist the users. This study will reveal whether subject librarians are confident enough to exploit new technologies in supporting teaching and learning, and also reveal the benefits offered by different technologies used by subject librarians in academic libraries.

1.4 Aim of the study

The aim of the study is to survey the preparedness and competency in the use of information technology, as well as challenges faced with technology, by subject librarians in universities and universities of technology.

1.5 Objectives of the study

Hesse-Biber and Leavy (2006: 49) define aims and objectives as to explore and describe, to discover, explain and generate ideas or theories about the phenomena under investigation, and to understand and explain social patterns. The main aim of this study is to survey the preparedness and competency in the use of information technology provided, as well as its consequences, by subject librarians in universities and universities of technology.

The specific objectives of the study were to:

- identify different technologies that subject librarians are using;
- investigate the preparedness of subject librarians to meet the challenges of the information technology;
- determine the strength and weakness in their technological use; and
- Investigate whether the surveyed institutions are providing training and development programmes to re-skill and update subject librarians on new technologies.

1.6 Research questions

To accomplish the objectives the following critical questions were generated:

- What technologies do subject librarians use to perform their duties?
- What are subject librarians doing to improve their technological skills?
- Do subject librarians find challenges in using technology?
- Do institutions provide training and development programmes to assist subject librarians with new technology skills?

1.7 Significance for the study

The study contributes to the dimensions of information technology of subject librarians. The research is important in a theoretical context too, because it applies validated

theories of information technology. It is hoped that the findings of this study will reveal the strengths and weaknesses in the use of technology by subject librarians from surveyed institutions when providing services to the university community.

1.8 Scope and limitations of the study

For the purpose of this study, the unit of analysis was restricted to subject librarians because one of their duties is to transfer skills to the communities of universities and universities of technology. Institutions that were surveyed were three major universities and two universities of technology in the province of KwaZulu-Natal because the study focuses on the Province of KwaZulu-Natal. The universities that were surveyed were University of KwaZulu-Natal, University of South Africa (Durban), and University of Zululand, and the universities of technology were Durban University of Technology and Mangosuthu University of Technology. The current study focuses on the following technologies:

- Electronic Resources
- E-mail
- Facebook
- Skype
- Video Technology
- Twitter
- Telephone system and answering machine

1.9 Structure of the research report

Chapter one focuses on the Introduction and Research Problem, Objectives of the study, Critical questions, Rationale for the study, Scope of the study, and Structure of the research report.

Chapter Two provides a review of the literature related to the study of subject librarians and challenges of Information technology as follows: the. role of subject librarians in higher education institutions; the use of information technology; technologies used by subject librarians; why subject librarians use technology; changing roles of subject librarians; what subject librarians do to stay relevant; and the involvement of universities in staff development.

Chapter Three describes the research methodology by highlighting the research design, instruments of data collection, sample, and sampling procedures, and tools for data analysis.

In Chapter Four the author presents the findings and conducts an analysis of the data. When this is appropriate the author refers to the literature review chapter in order to confirm or contradict the data collected through the questionnaire or to introduce new arguments and views. This chapter contains the discussion of the findings from the questions asked from respondents and why each question was asked. It also gives further discussion about subject librarians and their qualifications, and, further, arguments about the age of the qualifications of subject librarians and how subject librarians are keeping up with new technology as it changes rapidly are presented.

Chapter Five provides a discussion of the findings in the context of the literature reviewed and the objective of the study. A conclusion and recommendations are given.

1.10 Conclusion

This chapter presented and introduction to the study. This chapter also presented aims, objectives, research problem and assumptions that guide the research. The research problem forms basis of the study, directs the focus of the research and guide the data collection and analysis process. Paul D Leedy and Jeanne Ellis Ormrod (2010:62) note that assumptions “are so basic that, without them the research problem itself could not exist”. In a way assumptions serve as springboards for discussions of the topic of preparedness of subject librarians in meeting the challenges of information technology. The next chapter reviews literature related to the study.

Chapter Two

Literature review

2.1 Introduction

A literature review offers a synthesis of what has been written already on the topic, or what is written in such a way that it is conceptually inadequate and needs clarifying (Vithal 1999:14). The researcher should know the literature about the topic very well. The literature can help the researcher to pin down a research problem. A literature review can offer new ideas, perspectives, and approaches that may not have occurred to the researcher. Literature review can inform the researcher about other researchers who have conducted work in the same area, whom the researcher may wish to contact for advice. It can show the researcher how others have handled methodological and design issues in a study similar to his/her own. It can also reveal the sources of data that the researcher may not have known existed, and it can also assist the researcher to interpret and make sense of findings (Leedy and Ormrod 2005:64).

According to Hart (1998: 1), the literature review is important because without it the researcher will not acquire an understanding of the topic, what has been done on it, how it has been researched, and what the key issues are. Hart further argues that reviewing literature on a topic can, therefore, provide an academically-enriching experience, but only if it is done properly. Hart advises that research students should find out what already exists in the area in which they propose to do research before doing research itself. Hart (1998: 27) offers the following purposes of literature review:

- It distinguishes what has been done from what needs to be done;
- Discovers important variables relevant to the topic;
- Identifies relationships between ideas and practice;
- Establishes the context of the topic or problem;
- Rationalizes the significance of the problem;
- Enhances and enables the acquiring of the subject vocabulary;

- Provides an understanding of the structure of the subject;
- Relates ideas and theory to applications; and
- Identifies the main methodologies and research techniques that have been used.

It is important to understand the above purposes as they are all equally important in the literature review. It is vital for the researcher to discover important variables relevant to the topic.

2.2 Role of subject librarians in higher education institutions

Subject librarians provide reference and research services in their speciality field; they do reference services that include providing patron assistance via e-mails and in person (Feldmann 2006: 2). They work with faculties and departments to provide information literacy instruction, make purchasing decisions for materials in their subject collection area, training library patrons, work closely with faculties to incorporate research skills into their courses, provide an overview of services and subject specific resources for a class, and provide in-depth research assistance to students and student groups. The researcher felt that it is crucial to highlight the role of subject librarians in academic institutions to identify whether subject librarians' job requires the use of technology or not. While concentrating on subject librarians' preparedness in meeting challenges of information technology, it is important to understand their role in academic institutions.

Faculty perceptions of subject librarians are shaped partly by the role they play in committees. The active involvement of subject librarians assures the proper management and development of the library's collection (Qobose 2000: para. 17). He further states that, in liaison with the faculty, the subject librarians at the University of Botswana Library develop, deliver, and assess the following:

- library orientation for new students and staff;
- information literacy skills programmes for undergraduate students; and
- Workshops and seminars for postgraduate students.

It is essential for the subject librarian to introduce him/herself to all new academic staff and arrange to give them an introduction to the library. Qobose (2000: para. 19) advises, “Don’t wait for academics to come to you, go out of the library and meet them on their own territory”.

The initial contact can be done through telephones, a memorandum, and e-mail but all of these liaison methods should be accompanied by personal visits. Qobose further adds that, once academics at Botswana University appreciated the role of subject librarians in their teaching, they encouraged the use of library, and promoted the contact with subject librarians amongst their students. It is hoped that the findings of this study will actually reveal whether subject librarians from identified institutions do use e-mail technology and the telephone to communicate with the users, as Qobose advises.

According to Feldmann (2006: 1), “subject librarians are having an in-depth knowledge of information sources, i.e. teaching; people management; and negotiating skills that are valuable and will continue to be essential in the future”. He further stated that subject librarians are essential in subject-specific collection development. The relationship of subject librarians’ with faculty and departments can provide an essential collaborative environment to obtain database funding. Subject librarians and subject specialists are valuable resources regardless of the changes occurring in academic libraries. They offer much in the way of customer services, interaction, and relationship with students and campus departmental faculty and staff (Feldmann 2006: 6). It would be interesting to see whether the subject librarians at the five institutions being studied bring the same value to their institutions.

Dale, Holland, and Matthews, as cited by Mbambo-Thata (2006: 176) state that the contribution of subject librarians in an academic institution is primarily viewed as that of collection development; liaising with departments or faculty, and related activities, and in some countries like Australia and the United Kingdom has changed to include extensive teaching. The latter contribution of subject librarians is not, however, always acknowledged.

Ping and Zhang (2006: 178), as cited by Mbambo-Thata, state that changes in technology have considerably changed the role of subject librarians. It will be interesting to find whether subject librarians in the province of KwaZulu-Natal have migrated with the changes in technology.

Rodwell (2008: 116) argues that the historical role of a subject librarian as a major provider of information resources in a university is faced with multiple challenges, mostly the result of the development of digital technology. Rodwell further added that university libraries are trying to redefine their vital activities to maintain their importance in universities. New services and activities are being added, including providing quality learning space, creating metadata, virtual reference services, and information literacy, selecting and managing resource licences, collecting and digitizing archival materials, as well as maintaining digital repositories.

Campbell (2006), as cited by Rodwell (2008: 116), however, argues that these groups of activities do not qualify to as fulfilling a fundamental purpose for the academic library. Campbell further argues that, to define a role the university library for the present and the future, one broad approach for university libraries is to engage more closely with the university's core activities of research and teaching, therefore; the employment of technology by subject librarians should be aligned to that used by the university.

2.3 Use of information technology in higher education institutions

From a higher education institution's perspective the term "information technology" is defined as the degree programme that focuses on the computer equipment software that will be used by business and organizations, how it works and how it is secured, upgraded, maintained and replaced, or it can be seen as the use of computers and software to manipulate data (Parsons 2010: 514). In the library setting Kargbo (2012: 413) and Bansal (2010: 109), defines information technology as the application of computers in library services, and their accompanying services such as internet, e-mail, online sources and CD-ROM.

Venable (2010: 87) highlighted discussion boards as an example of technological integration which facilitates an online discussion forum that provides students with the opportunity to post their questions and comments to a group of people or to one person. Discussion boards that are provided as a basic way for students and instructor to interact and exchange ideas, and subject librarians could, for example, use these discussion boards to get comments from academics and students.

2.4 Technologies used by subject librarians

Dewey (2004: 6) indicates that subject librarians are information specialists in advancing colleges or faculties within universities; therefore they are expected to employ the use of technology to embed with faculties' vision. Therefore for libraries to accomplish collaborative effort different technologies need to be employed. Subject librarians rely on technology to render service to the university community in different ways. For speedy service delivery subject librarians need technology to communicate with library users and provision of access to library facilities and resources.

Subject librarians need to apply technology to make information available to library patrons, by providing access to different information resources e.g. academic databases and other electronic resources like e-journals and e-books. Therefore, subject librarians need technology application skills to render service effectively. Among technology needed by subject librarians, the following technology tools have been identified:-

2.4.1 Video Technology

According to Bell (2010: 20), video technology works well when it is relevant to the topic, simulates audience involvement, and is just plainly well done. For the librarians to be able to draw the attention of the audience, Bell recommends that librarians must show patrons. Bell further recommends that because audiences want video, for librarians to deliver more dynamic presentations with more powerful visuals, integrating video technology into presentations must be considered. According to Bell (2010: 20),

video grabs attention and bolts the eyes of the audiences to the screen. It quickly creates an emotional reaction that engages the audience to the presentation.

Zhang (2006:15) also confirmed that interactive video in an e-learning system allows pro-active access to video content; it is, therefore crucial for companies to offer effective training to employees and business partners to ensure that employees acquire new skills in a timely manner to be able to use video technology. In the academic context, education must be delivered to remote students who do not have physical access to the campus. It is, therefore, crucial for subject librarians to acquire the skills to use video technology to be able to deliver services to remote students, even off- campus students and alumni.

Zhang and Bell have a common opinion that a presentation with a video is a perfect way to wake up the audience to secure their investment in what you have to say. Bell recommends video because it generates discussion and it encourages attendees to comment.

Through this study it will be discovered whether subject librarians in the province of KZN ever consider including video in their information literacy classes to ensure that university students attend their training sessions seeing that Bell advised that video draws the attention of the audience. It will be interesting to find out whether subject librarians use video technology since their role involves teaching.

2.4.2. Electronic Resources

The term electronic resources refers to the system in which information is stored electronically and made accessible through electronic devices and computers through different networks such as Local area network (LAN), wide area network (WAN) etc. (Zahid, Khan and Waheed 2014: 71). Electronic resources include electronic databases, electronic journals, electronic books and other electronic resources accessible through the internet such as OPAC.

2.4.2.1 Electronic Databases

Databases in the information world have changed from a card system to electronic research tools demanding specific user skills (Stoffberg and Blignaut 2008: 2). Students and staff are not properly trained to use electronic databases.

2.4.2.2 Electronic journals and electronic books

The transition from print to electronic format of journals and books has changed the information seeking behaviour of library users. This transition cost subject librarians to acquire new information retrieval skills that will meet the training needs of library users in the environment that is dominated by electronic access (Gupta 2011:213). Therefore, subject librarians should position themselves by acquiring skills that will enable the delivery of training on electronic format to transfer the information retrieval skills to library users.

2.4.2.3 Online Public Access Catalogue (OPAC)

Online Public Access Catalogue (OPAC) is part of Integrated Library System (ILS) tool that enables library users to access library documents Yang and Hoffman (2012:253). Subject librarians are required to train library users on how to retrieve library documents on OPAC. It is important for subject librarians to transfer skill to library users on how to search the OPAC. To be successful in providing this training, subject librarians themselves should be familiar with OPAC and its functionality, to be able to respond to any queries regarding searching library documents on online library catalogue. Subject librarians faced a number of challenges to introduce the new programme successfully as information literacy training is a new library function; it is difficult for subject librarians to conduct electronic resources trainings due to the following factors:

2.4.2.4 Inappropriate training facilities

Stoffberg and Blignaut (2008: 2) indicated that faculty frequently request library staff to address specific domain-related objectives during training sessions, while subject librarians are facing the challenge of venues that are not well equipped with modern training facilities. Due to the latter subject librarians completely exclude off-campus students unless subject librarians visit remote learning site. Soules (2010:10) highlighted that because library users are not well trained on how to use electronic databases, due to the lack training caused by inappropriate training venues, students prefer Google rather than electronic databases because Google is quick, free, and gives results no matter what has been typed into a search box. Therefore, the study hopes to reveal whether the surveyed institutions are providing training venues that are equipped with modern technology for subject librarians to conduct database training in venues that have modern technology infrastructure.

2.4.3 *Web 2.0 and social media applications*

Web 2.0 technology refers to the social use of the web which allows individuals to collaborate, be actively involved in creating a context, generate knowledge, as well as sharing information online (Grosseck, 2009: 479). According to Keach and Fagon (2010: 9), Web 2.0 is a social networking application tool that is free and inexpensive. This can be good for libraries without money or technical staff. Web 2.0 enables librarians to place a blog where their users can access the information about library services.

Social networking is defined as the web-based system which allows individuals to construct a public with whom they share a connection and view and navigate their list of connections and those made by others. Connections may vary from site to site (Ellison 2007: 210). Application of Web 2.0 has been growing as one of the most popular terms in the current network environment. The utilization of new technology tools and services using web 2.0 changes the way people use internet, making it easier to collaborate, communicate and share information (Han and Liu, 2009: 41). University libraries'

success in United Kingdom (UK) and United States of America (USA) has been depending on the application of Web 2.0 to engage library patrons and communicate with them. As libraries seek to remain relevant, the new wave of applying Web 2.0 related technologies have gained popularity in academic libraries globally. Therefore, subject librarians are expected to facilitate new approaches to library services by continuously assessing the impact that the explosion of Web 2.0 has on user perceptions of the library including the use of social networking sites, wikis, blogs etc. Most libraries use Web 2.0 applications because it is free and few technical skills are needed.

2.4.3.1 Facebook

Facebook is defined as a social networking website, an online community, a place where people can meet and interact, swap photos, and other information and generally connect with friends, co-workers, fellow students, and numerous others in their social network (Gunter 2010: 5) . Facebook connects people within cities or regions, work or school, and so on. Facebook is the one of the most popular social networking sites on the internet. It has a large number of registered users. Facebook allows individual users to share information and communicate with others. Librarians can create a Facebook group where they can communicate with their faculties and students. In the same way is done with Web 2.0, subject librarians can create a blog and post their notes for students and encourage them to register on Facebook. Young (2013: 351) confirms that two thirds of students surveyed in Oakland University indicated that they are comfortable with using Facebook for regular online discussions with faculty. Facebook has been discovered to have potential to connect students with other students and educators; subject librarians can, therefore, communicate with library users using Facebook.

2.4.4 Information and Communications Technology (ICT)

According to Zuppo (2012: 13), the challenge of defining information and communications technology in a universal sense becomes evident when one considers

that diverse applications of the term ICT. The terms ICT revolves around devices and infrastructures that facilitate the transfer of information through digital means.

2.4.4.1. Telephone systems and answering services

The job of a subject librarian also depends on the telephone to respond to users' queries. This type of telephone system allows one to leave a voice message on the desktop phone should one not get hold of a person. It is connected to the internet. One should create a list of contacts to this type of telephone system in the same way as one does with a cellular phone. This telephone system allows one to retrieve messages and numbers that have called one's line. Since subject librarians have to attend information literacy classes most of the time, this system can allow subject librarians to retrieve numbers that have called and return calls and so respond to the queries.

Mohler (2008:1) argues that many organizations have migrated to this communication system on which employees are required to be trained so that they can respond to queries. Universities and Universities of Technology, like any other organizations, might need this type of telephone system, more especially for use by the librarians, since they serve users who are inside institutions, i.e. staff and full time students, as well as outside users, which are off-campus students. It will be interesting to find out whether the identified institutions have this kind of technology, more especially for subject librarians so that the standard of responding to user's queries is maintained at maximal level.

2.4.4.2 E-mail

Thull and Hansen (2009: 530) are of the opinion that academic librarians serving as faculty- library liaison need to be proactive in promoting, marketing, and serving as

ambassadors for the library. They need to make faculty and students aware of the services their libraries offer and the materials available to them. E-mail communication can therefore be employed to accomplish faculty liaison between faculty and subject librarians.

Thull and Hansen further advised that subject librarians need to use e-mail to bring awareness of services and facilities to student and faculty. Subject librarians, therefore, also require teaching and training skills to take library patrons to new heights in a faculty's research efforts by e-mailing articles requested by library patrons. If liaison or subject librarians do not take the initiative to reach to the patrons through e-mail and wait for patrons to come to the library for services, the patrons will satisfy their need for information elsewhere. If liaison librarians fail to reach university students and faculty, others will reach them and all that the libraries have to offer will become irrelevant to those lost patrons.

Now, more than ever, subject librarians need to meet their patrons where they work in their departments, offices, dormitories, and classrooms. While the increase of the internet and web technologies have presented librarians with greater competition for meeting users' information needs, these technologies also present new opportunities for extending the scope of the role of a liaison librarian. The internet provides an efficient and effective avenue for marketing the libraries' services because it facilitates meeting patrons where they are by sending them information about library services via e-mail and through social networks i.e facebook.

Thull and Hansen (2009: 530) further argue that targeted e-mails and facebook pages offer liaison librarians a vehicle for serving their faculties' needs practically anytime and anywhere while fulfilling liaison responsibilities by employing a timely and effective means. While subject librarians should not rely solely on e-mail for the marketing and promotion of library services, it is nonetheless the best means for reaching the largest number of faculties cheaply and efficiently. In addition to utilizing e-mail in the work of subject librarians, library liaison personnel can also utilize new technologies to extend

the library's instruction to remote users in both real-time and through archived learning objects. A multitude of both proprietary and free open-source technologies make it possible for library liaison personnel to play a more active role in library instruction for distance users by using the e-mail facility. It will be interesting to discover, through the findings of this study, whether subject librarians from the surveyed institutions use the e-mail facility and facebook to reach to a large number of users effectively.

2.4.4.3 Skype

Gurle (2011: 2) highlighted that approximately 37% of Skype users use Skype for business or business-related purposes. Skype is used by businesses wanting to reduce communication costs. Like any other organizations that are migrating to Skype to reduce telecommunication costs, universities and universities of technology are facing a problem of high bills on phones, while subject librarians are expected to use telephones to communicate with the library patrons. This study hopes to discover whether surveyed institutions ever consider migrating to technology that can try to eliminate telephone costs.

Booth (2008:149) is of the opinion that Skype differs from other telephony services because it enables peer to peer connection that leverages collective user bandwidth to create a uniquely inexpensive and robust connection. Subject librarians could use Skype to cut the telephone cost. By using Skype library users can feel personal interaction with subject librarians.

The study hopes to reveal whether the surveyed institutions have considered cutting telephone costs and trying other methods of communication, like Skype. Summers (2010: 3) agrees that, as the internet radically transformed the flow of information around the world, only a few companies have been successful in intertwining their own names with this particular aspect of the changes in telecommunication technology. Skype was identified as one company that provides free or cheap calls over the web.

2.5 Why subject librarians use technology

Van der Walt (2008: 145) with other librarians from different institutions presented a paper that focuses on the changes that librarians are facing daily, changes in users' expectations as well as in technology. Van der Walt further addressed sub-themes, such as the Google generation, alerting services, institutional repositories, as well as end-user training. Subject librarians need to have the skills necessary to be able to transfer those skills to their academic departments. As marketing library services form part of subject librarians' job, there is a need for the skills of creating alerts for Selective Dissemination of Information (SDIs).

Van der Walt also highlighted that the goals for twenty-first century school and academic librarianship have shifted to more active involvement of librarians in student learning through teacher and librarian collaboration. This shift requires more involvement by librarians in education to address increasingly complex global issues and technological advances with shrinking resources. Therefore; the use of technology by subject librarians is needed to be able to address technological advances to university students and the university at large. Librarians will become central in developing information literacy within the context of the regular curriculum. Subject librarians are expected to play a vital role in improving the academic achievements of students by providing relevant information which aligns with the programs of the faculty.

Van Der Walt's presentation, triggered many questions in an attempt to answer the following question, "What will the library's role be in this technological and changing environment?" It was highlighted that Google generations have different value structures. It was further insisted on that it is vitally important to build e-research collections that add value to the library. It was advised that subject librarians must not merely buy e-resources to have them in the collection but meets the users' needs, and subject librarians be able to demonstrate the skills of using and access those electronic resources.

A further emphasis was on the importance of librarians to be the quality assurers of information and be far more involved with relevance. Another emphasis in the paper was on the innovative use of new technology by librarians. Subject librarians were encouraged to illustrate to users the difference in quality and results when searching in Google and in commercial databases, and there was an emphasis on the importance of subject librarians' having teaching competencies, involving competency in slide presentation and competency in skills transfer to users, the university lecturers and students.

The paper went on to illustrate how technology can assist in providing 24/7 library services. The emphasis was on the changing role of libraries and librarians with regard to technology. It was demonstrated how telephone software could be incorporated into the library management system. It was argued that technology does not only free up staff time but also reduces notice delivery times. The system connects the user with the library via any phone and it prompts the user with various options when calling the library, for example, press one for renewals, press two for library hours, and so on. Technology also connects the library management system to send automated voice and text messages to user's mobiles reminding them of overdue items or items they have on hold. Since this paper was based within the South African context, it will be interesting to discover whether subject librarians from the surveyed institutions are aware of these technologies and know exactly how to use them, so that training can be provided for users.

Van der Walt concluded that today's libraries are not defined merely by their physical features, collections, and automation, but by the services they offer. For facilitating the demands of digital age clients, libraries must be equipped with the necessary technology and human expertise.

According to Batool (2010:3) technological core competencies for library professionals are defined "as a combination of skills, knowledge and behaviours related to library technology and are important for organizational success, personal performance and career building". Batool (2010: 3) describes how people with technological

competencies enjoy learning and applying new technologies, are analytical, familiar with concepts of computer use, able to transfer knowledge, pursue and demonstrate expertise in technology, and, as required, can apply internet and library system applications, can resolve routine problems without assistance, and are able to learn to use new technological skills and adapt to them quickly.

Batool (2010: 5) further insists that fast growing technology makes present academic libraries face with extra challenges with regard to supporting academic and research programmes, if they do not want to be perceived as being merely warehouses for books. To meet the demands of an information society, libraries should be furnished with advanced technological tools while librarians should advance the technological skills accordingly. Batool (2010: 5), expressed the concern as follows, “Do subject librarians know how to connect the library mission in line with the faculties? Do academic libraries understand their function? Academic libraries need to figure out answers to these questions to survive.” Information has become a fast growing commodity and its economical access is in demand. In this scenario libraries can be effective only if fully equipped with information communication technologies (ICTs). The literature establishes that a number of studies have been conducted to explore the needed competencies of librarians to meet the challenges of digital age. For example, Babu and Gopalakrishna (2007: 58) highlighted that the development of ICT affects the profession of LIS to a large extent in terms of growing material, equipment, space, staff, and readers as a whole.

Tyson (2007: 5) also emphasised that, with the shaping of libraries, library staff should also be transformed to serve the present generation who need information anytime, anywhere. The librarians’ skills should be linked to the technological infrastructure. Tyson pointed out that, during the late 90s, the position of system librarian was created in libraries, and it was as confusing then as it is today about whether the subject librarians’ position should be taken over by traditional librarians or by technical experts. It was suggested by Tyson that a skills audit of subject librarians could be a solution to address 21st century library issues so that future subject librarians are employed based

on technological skills demonstrated. Now IT is as necessary as electricity because anything revolves around technology. Therefore, for subject librarians to survive the changing technology they must be step ahead with technology skills.

Tyson emphasize on two areas that need to be addressed, viz (i) measuring librarian's technological skills; (ii) identifying the necessary IT competencies for librarians. Choi and Rasmussen (2009:459) conducted a study to identify the knowledge and skills required by current practitioners in United States libraries. Findings show that 35% of the job responsibility of respondents is based on website related activities, 26% based on digital project initiatives, 21.7% related to maintaining technical standards and practices, and only 17.3% related to other activities. These results illustrate the importance of acquiring technological expertise to survive in the information society.

Mathews and Pardue (2009:251) conducted a content-analysis of randomly selected job ads from an ALA online job list over the period of October 2007 - March. 2008. This study stressed the substantial need for web development, project management, system development, and system applications in the job requirements for librarians. This study suggests that librarians need a compulsory set of technological expertise. Mathews and Pardue identified the following necessary IT skills:

- Programming languages;
- Networking;
- Web development;
- Project management;
- System development; and
- System application.

2.6 The changing role of subject librarians

Library work and organizations have been increasingly confronted with the challenges and opportunities of technology among many other forces (Goetsch 2008: 157). How

are subject librarians responding in the first decade of the twenty-first century? Are they creating library jobs that address new and emerging user needs? What are the skills sets needed to do this work? Due to the demands of changing technology, the requirements for the subject librarians' position should also change and include technology application skills. It argues that these jobs were selected for the study because their responsibilities have changed and have overlapped as a result of a rapidly evolving technological environment.

For example, systems librarians have moved from working in a mainframe to a client-server environment, and users of their services migrated from stand-alone computers to networked workstations and on to handheld devices during that same period. In many libraries, these changes have pushed systems and information technology librarians out of the server room and into public spaces and interactions, such as computer usability testing. In turn, subject librarians have had to master the transition from print to electronic resources. They have gone from mediating those resources on behalf of the user through online search services to helping the user on site, and remotely, with a vast amount of electronic information that is provided by a number of different sources of which the library is only one. As a result, subject librarians have had to become increasingly technologically literate, incorporating some of the skill sets of a systems or information technology librarian, as information and productivity tools have converged on the desktop.

Goetsch also added that the subject librarian is a well-established position, an outgrowth of the bibliographer of earlier days, and his/her work has expanded to include reference, instruction, and liaison responsibilities. These roles come together in the subject librarian based on both a philosophical and practical view that each responsibility informs the other. Similarly to reference librarians, subject librarians have had to adapt to technological change in their reference and instruction work as well as in how they fulfil their collection development responsibilities. Rather than focusing on print collections, the selection of electronic resources now dominates the collection development landscape and an increasing number of non-traditional sources of information are emerging.

Technology has significantly influenced how students and faculty use the services and collections of academic libraries. In response, libraries are identifying new roles and responsibilities for librarians by both reinventing more traditional positions as well as creating new job roles that require different skill sets and mind sets. It will be very interesting to discover whether subject librarians, who obtained their degrees twenty years ago and have been in their positions for quite some time, have migrated with the ever-changing technology.

2.7 Subject librarians and the challenges of information technology

Myeza (2010) agreed that technology in the area of subject librarianship is a problem, not only locally but globally. Myeza highlighted that, in the United States of America, a new policy has been implemented that every subject librarian must have some information technology qualification in addition to the library qualification, because subject librarians are experiencing problems transferring relevant skills to academic staff and students.

Venable (2010: 92) also agreed that there is often a learning curve for professional staff related to the use of technology. Venable highlighted some areas in which subject librarians as professionals are expected to use technology to assist students by, understanding individual differences of students through bridging digital divide, ability to evaluate different technologies and make choices that meet users, and assess how these technologies will benefit users.

It may be advantageous for academic libraries to hire subject librarians with the primary responsibility of implementing technology integration (Venable, 2010: 92). Research conducted in this area shows that students tend to perceive that they have technology skills. Venable (2010: 92) further indicated that first year students are particularly at risk of this kind of misjudgement and warn these students that they may have basic skills but they are unaware that there are advanced features and uses of particular

applications. The tendency of these students is to rate themselves as having a higher level of skill than would be determined if given a practical test, Venable added.

Venable (2010: 92) however had a concern about specific technologies that subject librarians are familiar with, that might not match those being used in higher education institutions. This results in subject librarians seeing themselves as useless because the technology used in this century is totally different from the technology that was used twenty years ago. Subject librarians, therefore, need to be retrained on new technologies to be in a better position in the profession and regain their value in academic libraries (Venable, 2010: 92).

2.8 Universities involvement in staff development

According to Hatcher and O'Connor (2009:107), it is now common for organisations to acknowledge that competitive success is achieved through the people of an organisation. It is, therefore, important for organisations to take training back to the workplace. Hatcher and O'Connor indicate that organisations in the United States spend a lot of money on training and development programmes to fit staff for their increasingly challenging roles. According to the paper presented by Hatcher and O'Connor at Oxford University, trainers and educators need to be able to demonstrate that the return on investment is worth the cost of training and development, or face the risk of losing experienced staff. The paper highlighted that it is crucial for management of universities to contribute to university success by providing training and development programmes for staff and subject librarians respectively. The current study therefore set to establish whether the surveyed institutions are providing training and development programmes to subject librarians or whether subject librarians face the challenge of losing their jobs because of no positive contribution to success and research input of the universities.

2.9 Conclusion

The literature reviewed in this chapter discussed some of the technologies used by subject librarians to perform their duties. In addition, literature further covered the challenges of information technology in the job of the subject librarian. The literature also gave advice to subject librarians to position themselves in terms of technology in order to secure their value in academic institutions. The chapter revealed that technology in the area of subject librarians is a problem globally. The fast growing technology, therefore, makes academic libraries face extra challenges in supporting academic and research programme. Having given the literature review, the next chapter will focus on the methodology that was used to conduct this study.

Chapter Three

Research Methodology

3.1 Introduction

The aim of this chapter is to describe the research methodology that was applied during the empirical component of this study. Data collection is one of the most important components in the research process. There are different data collection techniques used in research, and each has its own advantages and disadvantages. There are interviews, questionnaires and observations. What counts as an advantage for one study may qualify as a disadvantage for another and vice-*versa (*Welman 2001: 127). There is no research project without data collection. Data collection is where the researcher collects the views of the respondents regarding the study's research questions. This chapter further discussed research design, methods and data collection instruments.

3.2 Research Design and methodology

According to Leedy as cited by Taylor (2001:244), research is a systematic examination to discover new information and to expand or verify existing knowledge in an attempt to solve a problem. As indicated in the preceding chapters, a number of problems encountered by subject librarians have been suggested, and to discover and/or verify the truth about the challenges that are put forward.

Although sometimes confused with each other, the research design and the research process/methodology are not synonymous. According to Mouton (2001: 56), the research design focuses on the logic of the research and the end product, with the point of departure being the research problem or question, whilst research methodology focuses on the research process and procedures, the point of departure being the specific tasks (data collection or sampling) at hand. In order to provide further clarification, the research design was then discussed.

3.2.1 Research design

According to Bless, Higson-Smith and Sithole (2013: 130) the research design relates directly to the answering of the research question. Mouton (2001:49), writes that the research design addresses one key question: What type of study will be undertaken in order to provide acceptable answers to the research problem or question? Put simply, what kind of study will the researcher be undertaking? In other words, what type of study will best answer the research questions. This study was based on a mixed method survey to determine; what technologies do subject librarians use to perform their duties, what are subject librarians doing to improve their technological skills, do subject librarians find challenges in using technology, and do institutions provide training and development programmes to assist subject librarians with new technology skills?

3.2.2 Research methodology

Brynard and Hanekom (1997:25) are of the view that research methodology can be also referred to as a strategy for research, which indicates the methods of data collection. This implies that research methodology is an operational framework within which the facts are placed so that their meaning may be seen more clearly (Leedy, 1993:91). In essence, research methodology is the means for the collection of data needed for a study (Maphazi, 2012:160).

Some of the commonly used research methods include quantitative or qualitative methods. When the two methods are combined, they form a triangulation paradigm also known as Mixed Methods. These will now be discussed, commencing with the quantitative paradigm.

3.2.2.1 Quantitative method

Bless, Higson-Smith and Sithole (2013:16) states that quantitative research relies extensively on numbers and statistics in the analysis of the findings. The collection of quantitative data usually requires the use of data analysis program such as SPSS to

analyse the collected data (Henn, 2006: 203). Quantitative or empirical analytical research methods relate to data being expressed as numbers (Neuman, 2007: 7). One of its most common disciplines is the use of statistics to process and explain data and to summarise the findings. In general, quantitative research is concerned with systematic measurement, statistical analysis and methods of experimentation (Fox & Bayat, 2007:7).

The quantitative approach is grounded in the positivist social sciences paradigm, which primarily reflects the scientific method of the natural sciences (Jennings, 2001:223). In order to be able to apply quantitative methods, the following requirements have to be met:-

- The research problem has to be clearly defined; and
- Analysis of such a problem must be meticulous and comprehensive.

Solutions must take place consciously, rationally, logically, systematically and scientifically (Leedy, 2013 :100).

Quantitative research is perceived to be objective in nature and involves examining and measuring the phenomena being studied. It involves the collection and analysis of numerical data and the application of statistical tests (Tonono, 2008:40). Quantitative research is more focused and aims to test assumptions, whilst qualitative research is more exploratory in nature.

Quantitative data is of the kind that may lead to the measurement of other kinds of analysis involving applied mathematics, while qualitative data cannot always be put into a context that can be graphed or displayed as a mathematical term (Babbie & Mouton, 2001:50-56).

For the purpose of this research, the quantitative research approach was regarded as best suited to obtain the views of subject librarians about their preparedness and competency in using changing technology and its applications. The quantitative

research design used in this study generated important information from the respondents. Quantitative research concerns aspects that can be counted. One of its most common disciplines is the use of statistics to process, explain data and summarise the findings. In general, quantitative research is concerned with systematic measurement, statistical analysis and methods of experimentation (Babbie & Mouton, 2001:52-54).

According to Babbie and Mouton (2001: 49), the quantitative paradigm in social science has a number of related themes, such as the following:-

- An emphasis on the quantification of constructs. The quantitative researcher believes that the best or only way of measuring the properties of phenomena is through quantitative measurement; that is, assigning numbers to the perceived qualities of things.
- A related topic concerns the central role of variables in describing and analyzing human behaviour. In some cases, this has become known as variable analysis;

The central role afforded to control of sources of error in the research process. The nature of the control is either through experimental control or through statistical controls. Critics of the quantitative approach would argue that this “obsession” with control is another sign of the positivist assumption that the social sciences should be modeled according to the natural sciences. However, the researcher in the current study employed some quantitative method; and the responses to questions were manually counted.

3.2.2.2 Qualitative method

Bless and Higson-Smith (2013:16) states that qualitative research is often used when the problem has not been investigated before. In this approach the researcher investigates the problem from the respondents’ point of view. In this regard, qualitative research is grounded in the interpretive social science paradigm (Maphazi, 2012: 165).

It can therefore be argued that qualitative research aims to explore, discover and understand or describe phenomena that have already been identified, but are not well understood.

The focus on the qualitative approach relies on what the respondents think and feel about the subject under investigation. Therefore, qualitative method in the current study was also used to obtain the opinions of subject librarians and their preparedness in using the changing technology as well as the challenges they encounter in using and applying technology.

3.2.2.3 Triangulation/Mixed method

Triangulation implies that techniques are used in a parallel sense; providing overlapping information makes it possible to check results from more than one viewpoint (Maphazi, 2012:169). Bless, Higson-Smith and Sithole (2013: 58) states that mixed- methods research combine the advantages of quantitative and qualitative methods to avoid their disadvantages. For the purpose of this study, the methodological triangulation type was applied. The quantitative and qualitative research findings were combined to generate final findings and conclusions.

3.3 Population

The term “population” is defined as the set of elements that the researcher focuses upon and to which the results obtained by testing the sample could be generalized. Sometimes it is called the target population Bless, Higson-Smith and Sithole (2013: 394). According to Kumar (2005: 165), the population is the group which the researcher selects to question in order to find answers to research questions. The population that was used in this study was subject librarians from five academic institutions in the province of KwaZulu-Natal (KZN). The province of KwaZulu-Natal has three universities and two universities of technology. The number of subject librarians per institution is shown on table 3.1.

Table 3.1 Institutions surveyed and number of subject librarians per institution

Name of institution	No. of subject librarians	Percentage
Durban University of Technology	12	24%
Mangosuthu University of Technology	3	6%
University of KwaZulu-Natal	29	58%
University of South Africa	1	2%
University of Zululand	5	10%
Total	**50**	**100%**

3.4 Census

When data is collected from the entire population, rather than a sample, this is referred to as census (Remler and Van Ryzin, 2011: 146). The term “census” refers more generally to any study in which data is collected from the entire target population. With a small population, census is possible and convenient. Gray (2009:220) defined census as a study of every member of a given population, and it is mostly used to survey the entire population of a country. The researcher decided to use a census because the study focused on subject librarians from major academic institutions in the province of KZN, the total number of whom in the province is 50.

3.5 Data collection instruments.

The data collection instrument that was used for this study was a questionnaire because of the geographical factor. The researcher was based in Gauteng Province while the surveyed institutions are based in the Province of KwaZulu-Natal. Furthermore questionnaire was chosen because it can be administered to many respondents

simultaneously. A questionnaire was administered to subject librarians from the identified institutions; however there are other different data collection instruments that can be employed in research which are as follows:

3.5.1 Interviews

According to Kumar (2005:123) interviewing is a commonly used method of collecting data from people. Data can be collected through different forms of interaction with respondents. Interviews can be a person to person interaction between two or more respondents with a specific purpose in mind and this is called an interview. On the other hand interviewing can be flexible as when the interviewer formulates questions as they come to mind around the issues of investigation, while on the other hand it can be inflexible when the investigator has to keep strictly to the questions decided beforehand. However this study did not use interviews for the convenient of respondents.

3.5.2 Observations

Observation is another data collection method that is used in social research. Observation techniques form part of both quantitative and qualitative research (Fox & Bayat 2007: 84). In observation the researcher can observe the people's behaviour on the subject under investigation and take notes. In observation the researcher observe the procedure and take notes on how matters are dealt with. Bless and Higson-Smith (2013:188) indicated that there are two scientific ways of observation, which are as follows:

3.5.2.1 Participant observation

In this approach the observer joins the population or group under investigation and shares all activities. Bless and Higson-Smith (2013:188) is of the opinion that in participant observation the researcher becomes an insider which allows a deeper

insight into the research problem. The advantage of this method is that the researcher shares the experience of the population under investigation.

3.5.2.2 Non participant observation

In this approach an observer is an outsider who records events as an outside person. The researcher can observe social behaviour of people without interacting with the people under investigation (Bless and Higson-Smith 2013:188). The advantage of this method is that the population who feel they are investigated may change their behaviour and become uneasy or stop their activities altogether under investigation can change the behaviour. However, the current study did not use observation because the researcher wanted to get the views of subject librarians about the changing technology and not investigating the behaviour of subject librarians.

3.5.3 Questionnaires

A questionnaire is a written list of questions, the answers to which are recorded by respondents. In a questionnaire, respondents read the question, interpret what is expected, and then write down the answers (Kumar 2005: 126). According to Leedy and Ormrod (2005: 197) questionnaires can be sent to a large number of respondents, including those who are thousands of miles away. It was, furthermore, convenient for subject librarians to complete the questionnaire at their own pace. For the convenience for subject librarians to complete the questionnaire at their own pace, and for the convenience of the researcher to distribute questionnaires to a number of respondents concurrently, questionnaires were distributed to subject librarians from the identified institutions. In this study open-ended questions and closed questions were used. Closed questions are convenient to code and record, and responses to them are convenient to analyze. Some open-ended questions were used because they were objective and gave respondents an opportunity to express their views freely. Items that were selected for questionnaires were largely based on the objectives of the study.

The content of the questionnaire covered different technologies used by subject librarians and technology tools available for subject librarians. The questionnaire also covered the strengths and weaknesses of librarians in using different technology tools and what these tools are used for.

3.6 Administering data collection instruments

Administering of the data collection instruments took place over the period of two months which was from 01 September 2012 to 31 October 2012. There was no pilot study done. Due to the Library and Information Association of South Africa (LIASA) conference that was hosted by the KwaZulu- Natal province, the researcher faced the challenge of the unavailability of subject librarians during the data administration period the data collection process; therefore, the researcher had to send three follow up reminders to subject librarians to complete the questionnaire.

3.6.1 Administering questionnaires

The questionnaire was administered electronically because of the geographical factor. The researcher was based in Gauteng province while study was conducted in KwaZulu-Natal province. Online questionnaires can be administered either by e-mail or via the web. Each online survey has its own advantages and disadvantages. According to Gray (2009: 366), administering questionnaires through e-mail is relatively easy if one is able to obtain people's e-mail addresses, but it runs the risk of an accusation of spamming which is sending unwanted messages. Another danger is that anonymity will be lost as respondents can be identified by their e-mail addresses.

According to Gray (2009: 231), with web a based survey, if the site is not password protected, there is no control over who completes the questionnaire, and, if the site is password protected, it presents a further barrier to respondents and could push down the respondent's response rate. Gray, 2009: 231 argues that the response rate for a web-based survey is likely to be higher for groups who have internet access, are

experienced in using computers, and have some motivation to complete the survey. The researcher, therefore, first communicated with surveyed institutions to get details of whether subject librarians have access to computers and internet. The researcher then had evidence that the surveyed population had access to computers and experience in the use of computers and decided to use a web-based questionnaire called Survey Monkey. The content of the questionnaire was based on the technological competency of subject librarians, challenges that subject librarians face in using technology, as well as solutions to overcome the identified challenges.

Electronic questionnaires were administered to 50 subject librarians from five academic institutions, of which two were Universities of Technology (UoTs), and three universities in the province of KwaZulu-Natal. Out of the census of 50 subject librarians in the province, 30 (60%) responded to the survey. The survey questionnaire was not designed to specify which institution had the largest response value. The findings were, therefore, generalised based on the total number of responses per question.

3.7 Data Analysis

To analyse the data collected in this study, the author used the grounded theory approach described by Denscombe (2007: 92) as an approach that is particularly useful when social researchers want to “investigate the participants’ points of view. According to Kumar (2005: 244), coded data can be analysed manually or with the help of computer. If the number of respondents is reasonably small, a researcher can analyse data manually. The researcher analysed the data herself manually because the number of the population was reasonably small. The data analysis process allows the researcher to generalise findings from the population surveyed. The findings are presented in the form of graphs, tables, and narrative so that the trends and patterns become evident. Based on this, discussion is provided using the literature reviewed and the objectives of the study therefore conclusion and recommendations are then drawn.

3.8 Conclusion

This chapter has discussed the research methodology used for this study. The chapter also discussed data collection instruments, for this study which were questionnaires. The data collection method, electronic questionnaires, was also explained as well as the population surveyed where the researcher used a census of 50 subject librarians in the province of KwaZulu-Natal. The chapter further covered the data analysis method which was the manual method where the researcher counted responses manually. The following chapter will present the findings of this study.

Chapter Four

Results and discussion

4.1 Introduction

The previous chapter discussed the methodology and data collection methods used in this study. In this chapter, the data obtained from the questionnaires is discussed and analysed in detail. As mentioned in the previous chapter, the aim of the research was to establish the perceptions of the respondents on questions set out in the questionnaires and provide possible solutions to the problem statement. The presentation is based on analysis of data collected by means of electronic questionnaires that were used to survey subject librarians from five academic institutions in the province of KwaZulu-Natal. A total of 50 subject librarians were surveyed, of whom 30 responded.

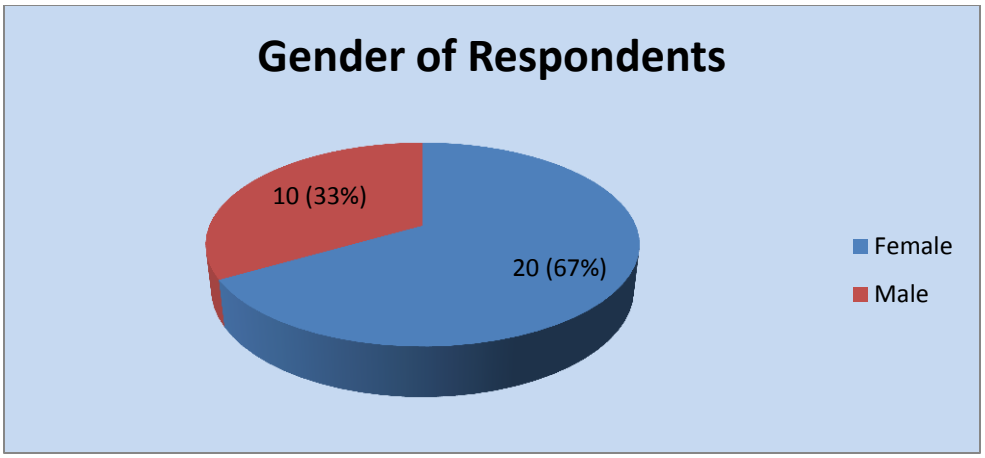
4.2 Presentation of findings

Questions were asked from subject librarians and administered via electronic questionnaires (refer to Appendix A). Some responses to the questions were grouped together because they are related. Descriptive statistics were used to analyse responses to closed questions, and, where possible, frequency distributions are presented in tables and graphs. Content analysis was used to analyse responses to open-ended items, and findings are presented in a narrative form.

4.2.2 Gender

The purpose of the question as represented in figure 4.1 was to establish the gender profile of subject librarians.

Figure 4.1 Gender



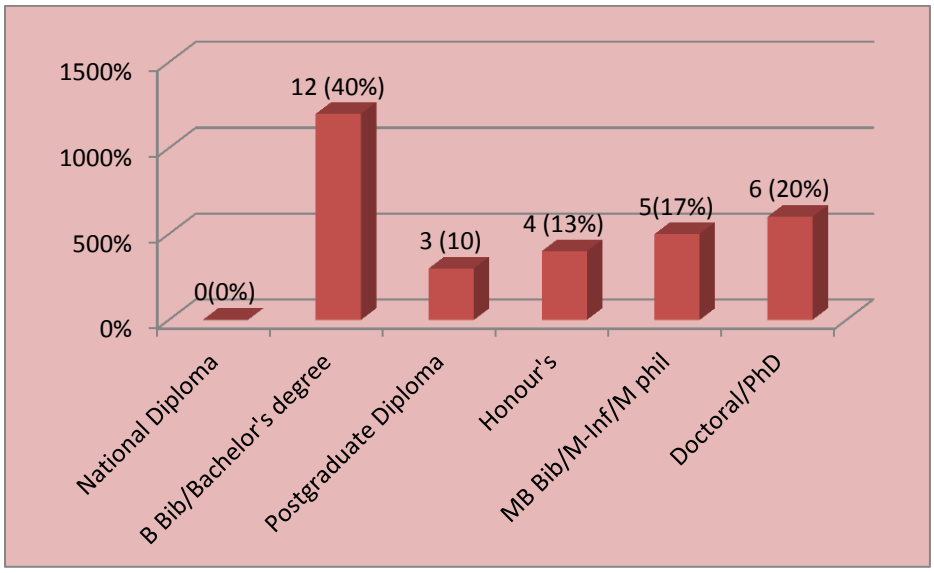
The overwhelming results indicate that, from 30 respondents, (20) 67 % were female and (10) 33% were male. Ocholla (2002: 30) stated that the profession of librarianship in academic, public, private, schools, and special libraries is known as predominately a female profession.

Based on the results, female librarians dominate in positions of subject librarians in KwaZulu-Natal academic institutions.

4.2.3. Highest qualifications

The purpose of asking this question was to determine the highest qualifications of the respondents.

Figure 4.2 Highest qualifications of respondents



The findings shown in figure 4.2 reveal that the majority of respondents in the position of subject librarian, (12) 40% are in possession of a Bachelor's Degree/B-Bibl, and (3) 10% are in possession of the Postgraduate, while (4) 13% are in possession of an Honours Degree and (5) 17% are in possession of Master's Degree, while only (5) 20% possess a PhD. The majority of subject librarians in KwaZulu-Natal province are in possession of a Bachelor's Degree other than Library and Information science.

4.2.3.1 Highest qualification in Library and Information Science.

Respondents were asked to specify the highest qualifications they possessed in Library and Information Science. According to Bickley (2011: 223) several studies have been conducted on student's perception about the role, services and resources offered by academic librarians. Among the perceptions about subject librarians' role, the following have been highlighted again as Ocholla highlighted in chapter two, section 2.7 that competency in the use of technology is based on qualifications. This question was asked to support, or dispute, the perception that anyone can occupy a professional

position without qualifications and be competent in the use of technology. The result of this question is presented in Figure 4.3.

Figure 4.3 Highest qualifications in LIS

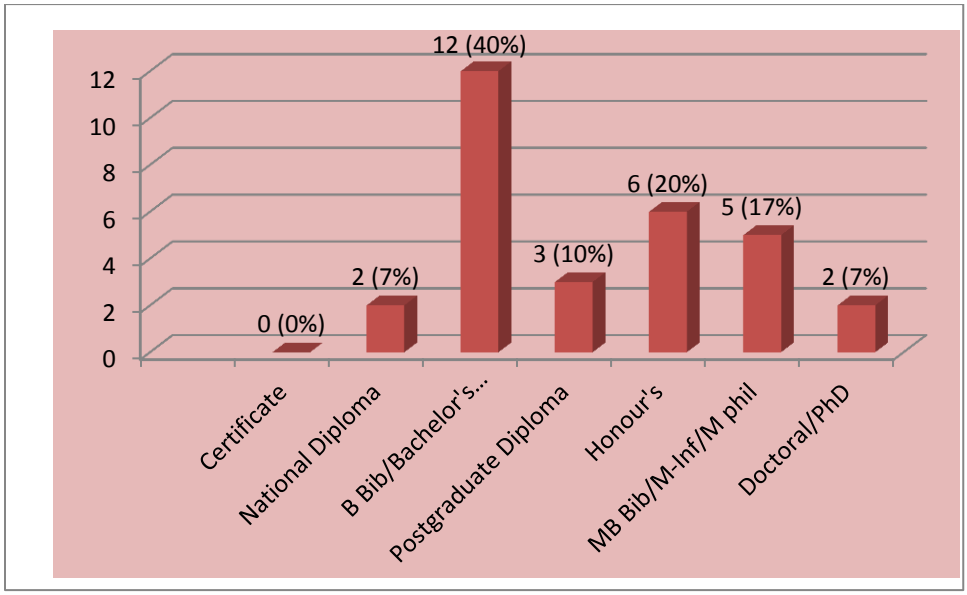


Figure 4.3 illustrates the educational background of the subject librarians in the province of KwaZulu-Natal. The majority of subject librarians 12 (40%) are in possession of a Bachelor's Degree in Library and Information Studies. The findings provide a clear picture that subject librarians are in possession of LIS qualifications with only 2 (7%) having a National Diploma. According to the paper presented by Ocholla (March, 2007) continuing education and professional development is crucial as it enables professional to keep their practices current and relevant and involves "learning to know" and "learning to do". Therefore it is crucial for subject librarians to obtain relevant qualifications and be provided with professional development to keep their practices current and relevant especially technology as it changes on regular basis.

4.2.5. Age group of subject librarians

Table 4.1 Age group of respondents

Years of age	No. of respondents	%
Under 30 years	4	13%
Between 31 – 40	11	37%
Between 41 – 50	10	33%
51 and above	5	17%
Total	30	100%

The purpose of the question was to compare and contrast the age of the subject librarians.

Table 4.1 shows the different age groups of subject librarians who participated in the survey. The findings reveal that the majority, 11 (37%), of subject librarians are between the ages of 31 and 40, and 10 (33%) between 41 and 50.

4.2.6. Years of experience as Subject Librarian

Respondents were asked to indicate their years of experience as subject librarians. The findings from this question are presented in table 4.2.

Table 4.2 Years of experience as subject librarian

Years of experience	No. of respondents	%
0-2	3	10%
2-5	9	31%
6-10	5	17%
10 and above	12	41%
Total	**29**	**100**

The findings on table 4.3 show that the majority of subject librarians, which is (12) 41%, have been in this position for more than 10 years. In some cases it is crucial to keep people with many years of experience because of their commitment and dedication to their work, but in some cases, when people have held the position for a long period, they become too comfortable and are resistant to change Beard and Land (2012:239). In the case of this study, (12) 41% of subject librarians have been in this position for over twenty years.

4.2.7. When LIS qualifications were obtained?

Respondents were asked to indicate when they had obtained their qualifications as well as their qualifications in Library and information Science. The findings to these questions are presented in Table 4.3.

Table 4.3 When LIS qualifications was obtained

Age of LIS Qualification	No. of respondents	%
1 – 5 years ago	8	27%
6 – 10 years ago	14	46%
11 -15 years ago	2	7%
16 – 20 years ago	2	7%
21 +	4	13%
Total	30	100%

The findings, shown in table 4.3, indicate that 73% of subject librarians have been in possession of their LIS qualifications for more than 6 years. These findings support the need to conduct the study in this area as a majority of subject librarians obtained their **LIS** qualifications for 6 years and longer. The fact that these qualifications were obtained over 6 years ago, might indicate a need for constant training in new and emerging technologies.

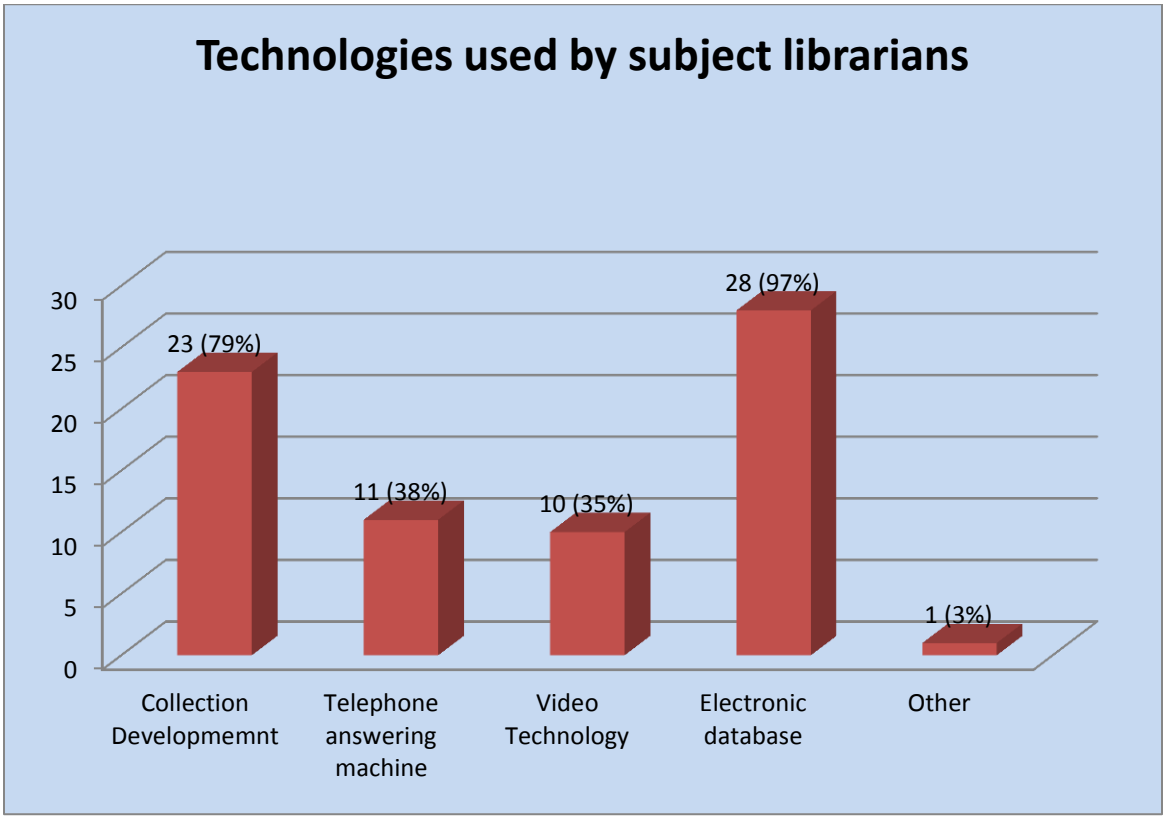
4.2.8. Nature of the job of subject librarians and the use of technology

Subject librarians were asked whether the nature of their job required the use of technology. All 30 respondents agreed that the nature of subject librarians require the use of technology. This indicated that obviously subject librarians rely on technology to perform their duties.

4.2.9. Technologies used to perform subject librarians' job

Subject librarians were asked to identify the technologies used in the performance of their work, and they were allowed to select more than one. The purpose of the question was to get a view of the technologies that are frequently used by subject librarians. The results are shown on in Figure 4.4.

Figure 4.4 Technologies used by subject librarians



Overwhelming results showed that the majority, 28 (97%), believe that an electronic database is the most important technical facility used by subject librarians, while 23 (79%) highlighted online collection development. The results presented in figure 4.4 shows that subject librarians in KwaZulu-Natal uses electronic databases more than other technologies.

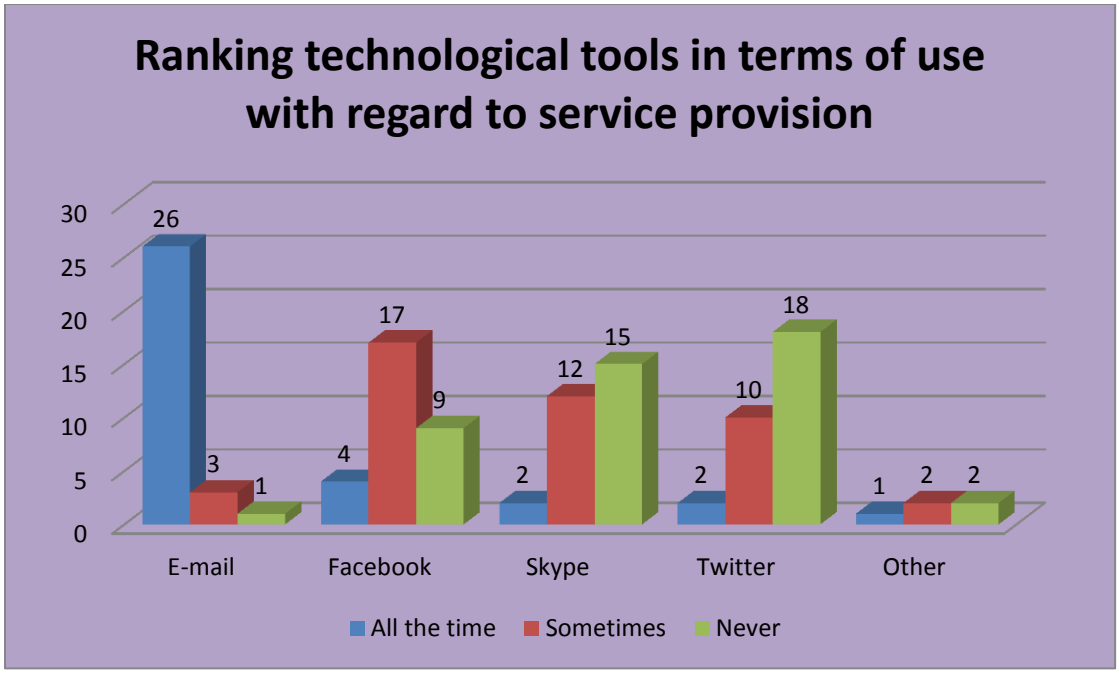
4.2.10. What technologies are used for.

There are common reasons that enforce subject librarians to use technologies listed in figure 4.5. Twenty four (24) respondents answered this question, while six (6) did not answer the question. The reasons that were highlighted were accessing information through online databases, collecting and distributing information to library users, and inter-library loans.

4.2.11. Ranking technological tools in terms of use with regard to service provision

The purpose of this question was to be given an indication of the frequency in using technologies that subject librarians highlighted as the most popular as shown on figure 4.5.

Figure 4.5 Ranking technological tools in terms of use with regard to service provision



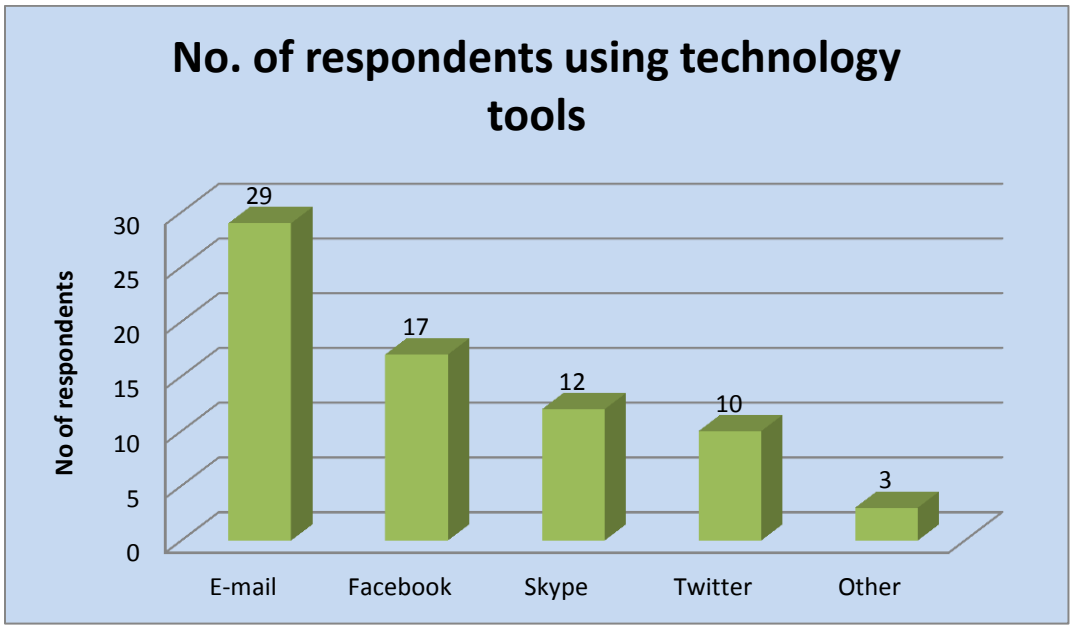
The rankings presented in the figure 4.5 shows that the majority, 26 (87%), of respondents use e-mail all the time, while 17 (57%)) use face book sometimes and 18 (60%) never used Twitter at all. Despite the fact that some of the above technological tools are new in the market, the responses give a clear indication that subject librarians, even those who obtained their qualifications a long time ago, are trying to keep up with modern technology tools like Skype and Facebook. Gurle (2010:2) agrees that businesses use Skype for business communication to reduce communication cost. Gunter (2010:5) also recommend the use of Facebook as most popular social network site that allows one to share information and communicate with large number of people.

Other was specified as Blackboard, and one respondent indicated the use of Blackboard all the time, while two respondents indicated that they use Blackboard sometimes and other two respondents never use Blackboard. York and Vance (2009: 197) states that university students who are taking online courses has risen substantially over the past years. Therefore communication to off campus students from instructors and librarians takes place on Blackboards. Librarians also conduct trainings through Blackboards.

4.2.12. How do subject librarians use technology tools

Respondents were asked to indicate how they use technology. 29 responded to this question while one (1) did not respond to the question.

Figure 4.6 No of respondents using technology tools



The emphasis was on e-mail. The results are shown in figure 4.6 and the following section describes how the subject librarians used each technology tool? Each technology tool is described on how it is used.

4.2.12.1 E-mail

All 29 respondents as shown in figure 4.6 indicated that they use e-mail for different reasons ranging from receiving requests from users to responding to the requests. The findings indicate that e-mail technology is the most used technology. The findings also indicated that the subject librarians search for articles from electronic databases and scan the results and e-mail to users. It was also highlighted that e-mail is used frequently for sending correspondence to management as well as other fellow librarians from other institutions.

4.2.12.2 Facebook

Seventeen (17) respondents as shown in figure 4.6 responded to how they used Facebook. Most responses show that Facebook is not only used for social networking,

but can be also used as a communication tool. Results indicate that subject librarians use Facebook to communicate with users, especially students. It was also highlighted that most of the students are on Facebook. It, therefore, makes it easy for subject librarians to send urgent messages to students. Further to that, subject librarians indicated that they use Facebook to market library services as well as facilities. It was also highlighted that subject librarians use Facebook to update students on new development in the library.

4.2.12.3 Skype

From the results as indicated in figure 4.6 it was found that some subject librarians do use Skype to communicate with international users and with other librarians. The emphasis was on using Skype for tele-conferencing with sub-committee members. Only twelve respondents indicated that they use Skype.

4.2.12.4 Twitter

The use of Twitter was answered by 10 respondents as indicated in figure 4.6. Most of the responses show that subject librarians use twitter only for personal use. They use it primarily to communicate with friends. Four (4) subject librarians, however, indicated that they used twitter to communicate with other librarians about some challenges in the profession at hand.

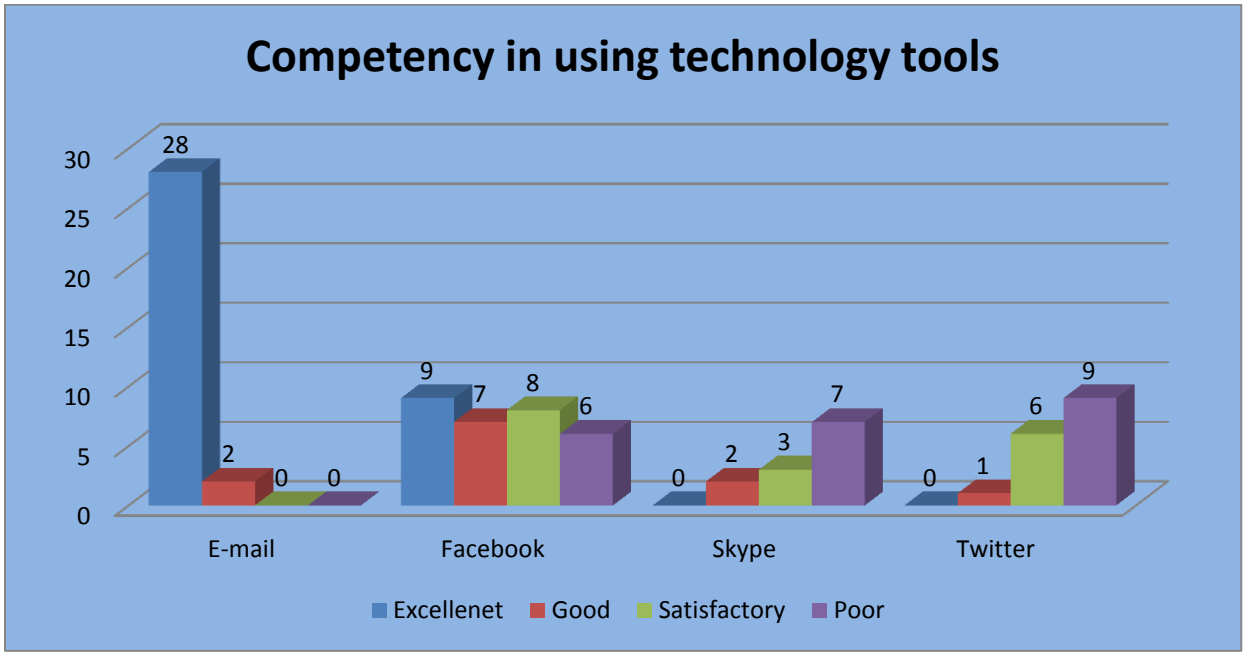
4.2.12.5 Other

Other was specified as using Blackboard to set online classes with students and sending updates to lecturers and students with regard to future bookings and training. Three responded to this.

4.2.13. Competency in using technology tools

Respondents were asked to indicate their competency level in using technology tools using the scale 4 to 1 where 1 is excellent and 1 is poor. Figure 4.7 indicates how subject librarians rated themselves.

Figure 4.7 Competency in using technology tools

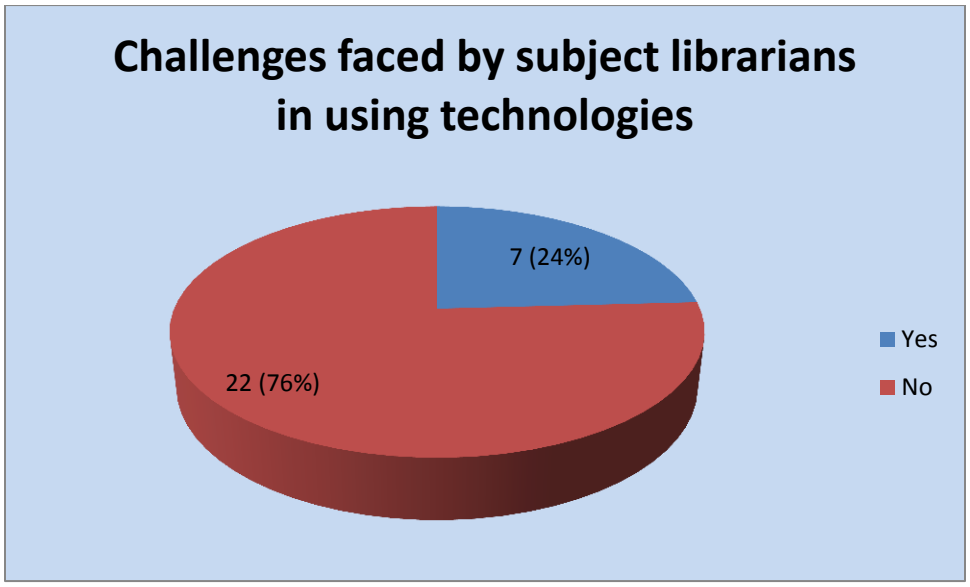


Out of the 30 respondents who completed this questionnaire, 28 (93%) rated themselves as **excellent** in using e-mail, while 9 (31%) believe they are also excellent with Facebook, another 9 (31%) believe they are poor with Twitter and 7(23%) also rated themselves poor with Skype. Eighteen (18) respondents did not respond to the question on Skype while fourteen (14) did not respond to the question on Twitter. As previously indicated, despite the fact that these technological tools are new, subject librarians are keeping up with the utilisation of them. The rating on the technology tools shown on 4.7 was answered by 30 respondents.

4.2.14. What are the challenges faced by subject librarians in the use of technology

Respondents were asked whether they found any challenges in using identified technologies and they were asked to specify the challenges they do find. Twenty nine responded to this question, and one did not answer this question. The findings of this question are presented in figure 4.8.

Figure 4.8 Challenges faced by subject librarians in using technologies



The results in figure 4.8 above indicate that 22 (76%) do not find any challenges in using the identified technologies, while 7 (24%) find some challenges. The challenges found were specified as follows:

- sometimes the responses are not as prompt as I would like them to be;
- Constantly changing nature of technologies makes it difficult to keep up;
- No Skype at work, do not use Twitter, have no time to go on to Facebook at work because of all the e-mails and queries that needs to be dealt with

- Network problems and the belief of the managers that if you are on Facebook you are not working. In our day Facebook is not for playing; you can also communicate work with the users of the library; and
- Using new technologies requires time to learn and play with it, and this is a luxury when the library is so busy.

4.2.15. How change in technology affects the work of subject librarians

Respondents were asked on how the change in technology affects their job. Twenty five (25) responded to this question and five (5) did not answer. Subject librarians have different opinions on this subject. Some of the responses are as follows:

- “it affects my job because I have to understand and know the new technology to be able to give excellent service to the users especially in an academic institution since I work with students who are advanced in technology”;
- “positively, because it puts me on the edge to learn new technology and be up to speed with the changing information nature of information provision and it makes my job very much easier than before”;
- “I have to ensure that I'm in line with the changes in technology and that enables me to perform my work efficiently and also to render an excellent service to the library patrons”;
- “Large amount of information produced in digital format. Users find the electronic information environment confusing & subject librarians have to learn how to use the different tools and platforms in order to facilitate access to information for learning teaching and research”;
- “We are moving from the traditional library to digital library so there is a lot of training. We spent a lot of time to train students and lecturers. It is important that we improve our services and skills”;
- “We need to keep up with the technology and find new ways to offer our services to clients, otherwise the technology is seen as a threat of

replacing Librarians if they don't incorporate/ use them when offering a service";

- "It affects us big time because here in our institution we are always behind with the changing technology we are not going with it"
- "We will have to keep up with new technologies as it is changing rapidly, and it affects how we communicate in the best possible way to users if we do not keep up with the change we might lose our value"
- Change is good, but as a librarian you need to be up to date and acquire new skills;
- More demanding as already work under considerable pressure with many users to assist and library tasks to fulfil, so if not adapt to new changes might find our profession useless;
- The way one delivers the library training and interacts with students need to change as well; and
- You need to be fully conversant with the developments in the various information platforms to render an excellent user education programme.

The responses above have different tones; some responses look at the changes in technology in a positive way. About 15 (50%) respondents, however, indicate that subject librarians see the change in technology as a threat in relation to their job as they can be easily replaced if not competent enough to deal with users who are more technologically advanced than they are.

4.2.16. Challenges encountered by subject librarians when transferring skills

Respondents were asked to disclose the challenges they encounter when transferring skills to the university community. In this question they were allowed to highlight more than one if that is the case for them. Twenty seven (27) responded, 17 (63%) highlighted that it is difficult to handle large groups of users in one session, while 14 (52%) complained about a lack of co-operation from academics as academics view subject librarians as academics' messengers and not as colleagues, and 12 (44%)

indicated that they lacked the necessary technological skills to deal with advanced technological users. On top of that, 8 (30%) highlighted that a lack of finance for proper resources is a big challenge. Furthermore, 5 (19%) are worried about library management always complaining about over spending when phoning users, while another 19% feel that library users are more knowledgeable than subject librarians.
The lack of support from university management was also highlighted by 4 (15%) and 3 (11%) specified other challenges as:

- Subject librarians feel that students are over-reliant on “Google” and ignorant when it comes to using library digital resources;
- The training venues seem to be a problem for subject librarians, as they have to share the venue, which makes bookings difficult;
- It was also highlighted that subject librarians need training in new technologies to catch up with what users are using;
- Academics make it difficult for subject librarians to convince students that training in online databases is important, whilst academics themselves see no need to use those databases; and
- It was also highlighted that what subject librarians teaching is not highly valued.

The findings shows clearly that, as much as some institutions are working hard to re-skill subject librarians with technology, there are some issues that need to be attended to in order to protect the value of subject librarians in academic institutions. Three respondents did not answer this question.

4.2.17. Overcoming challenges of changing technology in the LIS profession

The opinions obtained on this area can be discussed under the following themes:

4.2.17.1 Information technology qualification embedded in the LIS qualification

This question was answered by 26 respondents, and 4 did not respond. Subject librarians highlighted that there is a need for on-going training for subject librarians in the use of new technologies. Some librarians feel that the job of being a subject librarian needs someone with an Information Technology (IT) background. The findings supports Myeza's (2010) arguments that, in the United States of America, a new policy has been implemented that every subject librarian must have some information technology qualification in addition to the library qualification, because subject librarians are experiencing problems transferring relevant skills to academic staff and students.

4.2.17.2 On-going training on new technologies

Some subject librarians, however, feel that, as much as training is needed, subject librarians themselves need to be more engaged with users to be competent enough in skills transfer. Therefore, subject librarians need to be trained on new technologies to maintain their relevance to university community and be in line with current technologies. It is crucial for the management of universities to contribute to university success by providing training and development programmes to re-skill subject librarians with technology (Hatcher and O'Connor, 2009:107)

4.2.17.3 Provision of relevant facilities by university management

University management should provide relevant facilities for libraries for Skype and Facebook. Skype should be used in libraries to communicate with users to reduce telephone costs. This can be a win - win situation for both university and subject librarians in terms of telephone expenditure. The goal of Skype technology is to give power to businesses of all sizes and types with rich communication tools to set free their productivity, while reducing their telecommunications cost (Gurle, 2011: 2). Furthermore, Facebook should be used a tool for communicating with large number of students at one time and any communication sent on Facebook be audited and

standardised. In that way university management as well as library management will have a control on the use of facebook by subject librarians. Facebook connects people within cities or regions, work or school, and so on. Facebook is the one of the most popular social networking sites on the internet. It has a large number of registered users. Facebook allows individual users to share information and communicate with others. Librarians can create a Facebook group where they can communicate with their faculties and students (Gunter, 2010: 5. Subject librarians emphasized that management should change the way they view the library when it comes to operational planning.

4.2.17.4 Going e-route

It was also highlighted that some subject librarians are “old school”, and there is always a fear of the unknown when it comes to the “e-route”. Subject librarians need to be reskilled as the library services are taking an e-route. Subject librarians are therefore, advised to be step ahead when it comes to technology because university students will never take subject librarians serious if they are a step behind on the twenty first century technologies. Subject librarians are therefore advised not to view technology as a threat and embrace it as something to enhance their job performance and attract more users to the library. However, it is crucial for libraries to be step ahead and think on how are they going to provide access should they go e-route. The findings also highlighted that IT should be part of the curriculum for librarians.

4.2.18. Institutions role in preparing subject librarians

Respondents were asked to comment on whether institutions are playing any role to equip subject librarians with necessary skills. Figure 4.9 shows the findings of this question.

Figure 4.9 Institutions role in preparing subject librarians

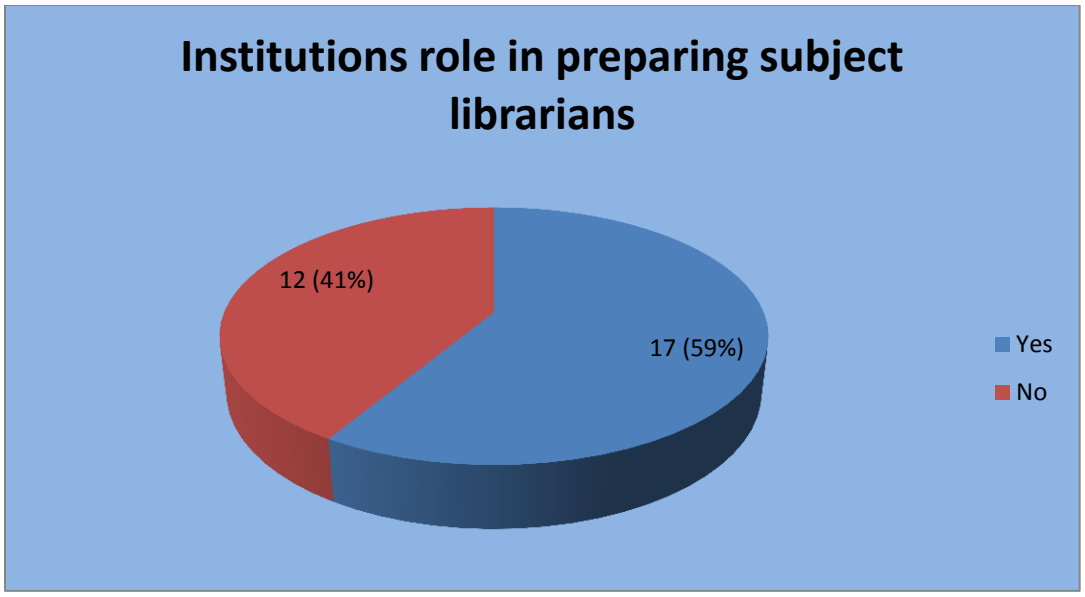


Figure 4.9 shows that majority, 17 (59%), agrees that institutions are trying to equip subject librarians with skills of using emerging technologies for their day-to-day performance; 12 (41%), however, are under the impression that academic institutions can do more than what they are doing. Sixteen (16) respondents highlighted what institutions are doing about the challenges they face. Subject librarians indicated that, whenever there are new technological developments, staff together with subject librarians are sent for training. It was also stated that, in one institution, there is a training librarian who is responsible for training staff on new developments and attending workshops. Subject librarians indicated that they attend workshops to discuss some challenges as well as new developments in the field.

Thirteen respondents disagree that institutions are doing something to assist subject librarians. The various roles that could be played by institutions were recommended. Firstly, it was recommended that university management should be competent in management. The issue of the budget was also highlighted with regard to the fact that more money needs to be allocated to libraries in the budget for modern facilities. Training in technology in education was also highlighted as it is closely related to what

subject librarians are doing, i.e. supporting teaching and research. All academic libraries should start focusing on e-strategy.

4.3 Conclusion

The use of technology by subject librarians in academic institutions in Kwa-Zulu Natal province is not a challenge. Subject librarians with the help of academic institutions are trying to fill the gap. The use of some technological tools, like Twitter and Face-book, is however still, a challenge. While subject librarians are working towards the challenges of technology, greater co-operation from academics is required. Furthermore, subject librarians need the full support of library management to explore 21st century technology, especially social networks, with confidence. The onus is on subject librarians to ensure that they adapt to the digital age and claim their status by demonstrating to university students what they are capable of. It is the responsibility of each and every subject librarian to prepare for technological challenges and ensure that technological skills obtained do not expire as Beard and Land advise in section 5.3. It is also the responsibility of every subject librarian to ensure that technological services offered are in line with the needs of users by conducting surveys and investigate what are the expectations and needs of users, as Beard and Land advised in section 5.3.

This chapter has presented the findings of the study. The presentation was based on data collected by means of an electronic questionnaire which was used to survey subject librarians in KwaZulu-Natal academic institutions. The findings showed a positive response to the competency in the use of modern technology by subject librarians in KwaZulu-Natal province. The next chapter discusses the main findings and presents a conclusion and recommendations.

Chapter Five

Conclusion and recommendations

5.1 Introduction

The previous chapter presented the findings of the survey of subject librarians in five major academic institutions in the province of KwaZulu-Natal. This chapter discusses the main findings of the study in the context of the objectives of the study as well as in the context of reviewed literature. Based on these discussions, the study draws conclusions and makes recommendations.

The objectives of the study were to:

- identify different technologies that subject librarians are using;
- investigate the preparedness of subject librarians to meet the challenges of the information technology;
- determine the strength and weakness in their technological use; and
- Investigate whether the surveyed institutions are providing training and development programmes to re-skill and update subject librarians on new technologies.

The research questions that were generated to meet these objectives are:

- What technologies do subject librarians use to perform their duties?
- What are subject librarians doing to improve their technological skills?
- Do subject librarians find challenges in using technology?
- Do institutions provide training and development programmes to assist subject librarians with new technology skills?

5.2 Conclusion

This section presents the conclusion drawn from the results on chapter four (4)

5.2.1 What technology do subject librarians use to perform duties?

The study on chapter 4, section 4.2.11 shows different technologies that subject librarians use to perform their duties as well as the number of subject librarians who indicated the use of these technologies. The literature on chapter 2 section 2.4 also highlighted these different technologies as used by subject librarians to perform duties. Among the different technologies, electronic databases were highlighted as the most important technology used by subject librarians as shown on chapter 4, section 4.2.11 figure 4.5. These results supports the statement indicated by Soules (2010:10) on chapter 2, section 2.4.2 that subject librarians in KwaZulu-Natal understand academic databases and can demonstrate on how to access them and ensure that Google do not take over their role in academic the universities.

5.2.2 What are subject librarians doing to improve their technological skills

The study reveals that subject librarians are attending workshops where they acquire new technology skills as they are introduced.

5.2.3 What are the challenges faced by subject librarians in the use of technology

Respondents specified different challenges that are faced in the use of technology. Among the challenges the following were highlighted on chapter 4, section 4.2.15, and figure 4.8. Venable advises that, depending on funding and resources, it may be advantageous for higher education institutions to hire someone to join the staff with the primary responsibility of implementing technology integration. The study revealed that first year students are particularly at risk of this kind of misjudgement. However, the current study reveals that subject librarians from identified institutions do not experience

difficulties in the use of current technologies which disputes that first year students are at risk of misjudgement as Venable stated.

5.2.4 Do institutions provide training and development programmes to assist subject librarians

According to the findings of this study, the majority, 17 (59%), of respondents agrees that institutions are trying to equip subject librarians with emerging technologies for their day-to-day performance. 12 (41%), however, are under the impression that academic institutions can do more than they are already doing. 16 respondents highlighted the fact that institutions are trying to deal with the various challenges. It was made obvious in the findings that, whenever there are new technological developments, members of staff are sent for training. It was also stated that in one institution there is a training librarian who is responsible for training staff. It was, in addition, revealed that subject librarians have workshops that they attend to discuss some challenges in the field.

5.3 Recommendations of the study

Based on the discussion and conclusions, the study makes the following recommendations:

5.3.1 Qualifications in LIS

The best practices are applied in KwaZulu-Natal province with regard to educational qualifications in the area of subject librarianship. The study reveals that the minimum requirement for the position is Bachelor's degree and majority of subject librarians are in possession of the bachelor's degree as shown on chapter four, figure 4.3. The study gives credit to all academic libraries in KwaZulu-Natal for the best practice in employing subject librarians who meet the requirements and not employ them because they reside in the area where the institution is located. Therefore higher education institutions

should be encouraged to maintain the standard with regard to educational qualifications by employing subject librarians with minimum qualifications of bachelor's degree.

5.3.2 Age of subject librarians

The study further reveals on chapter four, table 4.2 that over 87% of subject librarians are 31 years and above. Based on these findings the study makes the following recommendations. Libraries should employ young librarians in the position of subject librarian who currently graduated to empower them with skills in this area of subject librarianship and technology applied in this area. The results in chapter 4, section 4.2.6 show that only 13% of subject librarians are under the age of 30 and these subject librarians can be mentored by those above thirty years on how to keep up with change especially on technology. Van Der Walt (2010: 8) further highlights that at this time very few academic libraries recognise the need to recruit young staff members or implement a succession plan. Therefore the study recommends that young and emerging librarians should be empowered to be employed in professional and subject librarian positions if they obtain educational qualifications and be mentored by the subject librarians who are about to retire so that technology skills that these subject librarians possess are not lost and can be passed on to upcoming subject librarians.

5.3.3 Staff training and development programmes

The study finds that KwaZulu-Natal academic libraries provide staff development and training programs to reskill subject librarians by organising workshops to keep them up to date with the new technology landscape irrespective of age. However the study recommends that subject librarians competency should be measured by relevancy of what they offer to university communities and not by what they think they know. Therefore, the study recommends regular surveys on changing technologies' impact and effect to keep subject librarians' technological skills in line with the technology used and applied in universities. It is, therefore, important for universities and universities of technology to take technology skills back to the staff including subject librarians. This can be achieved through the results of the surveys to determine the areas that subject

librarians need to pay attention regarding technology. Providing subject librarians with technology skills that are applied and used in universities can impact positive in subject librarians' job and service delivery in academic institutions.

5.3.4 Different technologies used by subject librarians and competency in the use of those technologies

While the study reveals different technologies used by subject librarians and competency on using those technologies. The study shows that the telephone answering machine and video technology are not used.

5.3.4.1 Telephone answering machine

Based on the findings the study recommends that subject librarians should think of using telephone answering machines in libraries to allow users to leave messages in case subject librarians are not in offices to attend to students 'queries. Then the onus will be on subject librarian to return a call to the users and attend to the query accordingly. This telephone system allows one to retrieve messages and numbers that have called one's line.

5.3.4.2 Video Technology

Furthermore, the study recommends the use of video technology during information literacy classes, because students needs to interact with subject librarians during information literacy classes or face the challenge of not getting students to attend information literacy classes. This supports Bell's (2010: 20) argument that video grabs attention and bolts the eyes of the audiences to the screen. The video quickly creates an emotional reaction that engages the audience to the presentation. Therefore, subject librarians should be innovative and apply video technology to their training to attract the university community to attend trainings and information literacy classes.

5.3.4.3 Facebook

While study showed the moderate competency and use of facebook by subject librarians, the study recommends more workshops on the advantages of communicating with users using facebook as the majority of library users have access to facebook and it will make it easy for subject librarians to reach to a number of students for any library matters using facebook. The study further recommends the standard procedure of communicating with library users using Facebook for control purpose so that subject librarians can post work related issues to Facebook and library management can have control of what this tool is used for.

5.3.4.4 Skype, Twitter and Blackboard

Furthermore, study recommends that subject librarians should familiarise themselves with Skype, Twitter and Blackboard and investigate on why and how these technology should be used in this technological era as the results on chapter 4, figure 4.7 show a very low usage of these technology tools.

5.3.5 Challenges facing subject librarians

Challenges encountered by subject librarians were indicated as follows:

5.3.5.1 Electronic Resources

The study reveals that subject librarians are competent in skills transfer on electronic resources, however, subject librarians need to demonstrate to the university community that library offers more authoritative academic support than Google does as the study revealed in chapter 4, section 4.2.18 that students are being more reliant on Google than library digital resources. Subject librarians are also advised to address technological challenges they face to the library management before they turn into problems. Therefore, the study recommends that subject librarians needs to get out of their comfort zones and market these databases that universities' spend millions on as

subject librarians indicated that academics see no need of using electronic databases. The study further recommends that subject librarians should conduct regular surveys on the content of the database training they offer. This will assist in gap analysis on what subject librarians train users on. Appropriate training venues with technology infrastructure are also recommended. Last but not least the study recommends further investigation to the extent to the utilisation of electronic databases as subject librarians indicated excelling in this on section 4.2.11 figure 4.5. It is crucial for universities to spend budgets on electronic databases that are being utilised to support research and learning as well as return on investment. Therefore, the training provided on how to use databases should attract library users to be reluctant in using them.

5.3.6 Partnership with IT departments

Lastly, the study recommends that libraries from surveyed institutions form a strong partnership with Information Technology academic departments to strengthen subject librarians' technological competency. Therefore the study recommends that university libraries in KwaZulu-Natal take an initiative in building partnership with IT departments within institutions so that they strengthen the provision of current technological services to library clients.

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Appendix A

Dear respondent

My name is Sizeni Makhathini, I am conducting a study in fulfilment of the Master of Management Sciences in Library and Information Science at the Durban University of Technology. The study is being supervised by Dr N. Sentoo.

It will be much appreciated if you could please spare few minutes of your time to complete this questionnaire fully and honestly. Your response will be used for research purposes only and would be treated with strict confidentiality.

The study will benefit the Universities and Universities of Technology to be fully aware of the challenges in the area of academic librarianship and technology. The study will identify areas that subject librarians need to be trained on. The topic is "**Preparedness of subject librarians to meet the challenges of information technology in higher education institutions in KZN".**

Yours sincerely

Sizeni Makhathini

University of South Africa

Cell : 0721377257

Tel : 0124294665

Questionnaire.

Section A: Biographical details

Please answer the following questions by marking with an (X) in the appropriate box.

1. Gender:

Male	
Female	

2. Highest qualifications

Certificate	
National Diploma	
Bachelors Degree/ B Bibl	
Postgraduate diploma	
B BiblHonours	
M B Bibl/ M-Inf/ M Phil	
Doctoral/ PhD	

3. Highest qualification in library and information science/ studies.

Certificate	
National Diploma	
Bachelors Degree/ B Bibl	
Postgraduate diploma	
B BiblHonours	
M B Bibl/ M-Inf/ M Phil	
Doctoral / PhD	

4. What is your age:

Under 30	
31 to 40	
41 to 50	
51 and above	

5. Years of experience as a subject librarian

0 to 1	
2 to 5	
6 to 10	
10+	

6. When did you obtain your qualifications?

1-5 years ago	
6-10 years ago	
11-15 years ago	
16-20 years ago	
21 and above	

Section B: Technologies used by subject librarians

7. Does the nature of your job as a subject/faculty librarian require the use of technology? If No, please explain why, and ignore the rest of the questionnaire.

Yes	
No	

8. Which of the following technologies are used in your job performance? (Please mark with an X)(You may select more than one.)

Online collection	
Telephone answering machines	
Video Technology	
Electronic databases	
Other (Please specify)……..	

9. What are you using the above technologies for?

……

……

……

……

10. Kindly rank each of the listed tools in terms of use with regards to service provision

Rank: All the time= 1; Sometimes=2; Never=3

E-mail	3	2	1
Facebook	3	2	1
Skype	3	2	1
Twitter	3	2	1
Other: Please specify:	3	2	1

11. If you are using any of the technology tools listed, kindly indicate how you are using the technology?

E-mail	
Facebook	
Skype	
Twitter	
Other: Please specify	

12. Indicate your level of competency in each of the following tools, using the following scale.

Rank: Excellent = 4 Good = 3 Satisfactory =2 Poor =1

E-mail	4	3	2	1
Facebook	4	3	2	1
Skype	4	3	2	1
Twitter	4	3	2	1
Other	4	3	2	1

Section C: Preparedness of subject librarians in meeting challenges of IT

13. Do you find any challenges in using the technologies identified in question 13?

Yes	
No	

14. If your answer to question 14 is Yes, Kindly specify the challenges.

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15. How does change in technology affect your present job?

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16. Rate your confidence in technological skills transfer to the user in the use of the following technological tools using the scale **Very confident=3; confident=2; not confident=1**

Online collection	3	2	1
Telephone answering machines	3	2	1
Video Technology	3	2	1
Electronic resources	3	2	1
Other (Please specify)……..	3	2	1

17. Which of the following challenges do you encounter when transferring skills to the members of the university community? (You can tick more than one)

Time allocated per session not enough	
No relevant facilities	
Large group of users per session	
Lack of finance	
Management complains about overspending eg Telephone bills	
Lack of knowledge about new technologies	
Users more knowledgeable than librarians	
No co-operation from academics	
Lack of support from university management	
Other(Specify…….	

18. What can be done to overcome the challenges of changing technology in the Library and Information profession?

……

……

……

……

SECTION D: What is your institution doing?

19. In your opinion, is your institution playing a role in preparing subject librarians to be better equipped in using emerging technologies in their day-to-day activities?

Yes	
No	

20. If Yes, how is your institution overcoming the challenges of the emerging technology to support staff?

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.....

21. If No, what role can be played by your institution in preparing subject librarians to meeting the challenges of the changing technology?

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Thank you for your co-operation