UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Librarian Web-based training: an investigation into the Tshwane University of Technology's Library and Information Services use of broadband in training

---

Mini-dissertation by

Belinda Elfriede Boucher

(93367962)

Submitted in partial fulfilment of the requirements for the degree of

MASTER OF INFORMATION TECHNOLOGY (B)

in the

FACULTY OF ENGINEERING, THE BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

UNIVERSITY OF PRETORIA

Supervisor: Dr. M. Holmner

December 2015

ACKNOWLEDGEMENTS

My sincere gratitude goes to the Tshwane University of Technology, Library and Information Services Director, Ms. Agyei, to my supervisor, Ms. Nhlane, and to all my colleagues at work for their support and encouragement to proceed and complete this programme.

I would also like to thank Prof. Bothma and the MIT Carnegie team of the University of Pretoria for their assistance and encouragement, especially providing me with this awesome opportunity. I would also like to thank and acknowledge the funding from the Carnegie Corporation of New York, which provided me with this unforgettable, life changing experience. A special word of thanks goes to my supervisor, Dr. M. Holmner for her patience, understanding, guidance, encouragement and words of wisdom. Without her ongoing support and invaluable contributions, this work would not have seen light. To all my fellow students of Stream B, thank you for your friendship, encouragement and support.

To my mother, Nellie Boucher and my grandparents, Theun and Louisa Breytenbach who passed away during the course of this programme, thank you for teaching me the real values of life and your continuous support and prayers while still alive. I love you and I wish you were here to celebrate this moment with me.

My profound appreciation goes to my friends and family, especially my beloved father, Erik Boucher, my sister Louisa van der Hoek, my brother in law, Lennard van der Hoek, my best and dearest friends, Emmerentia du Plooy, Gerda Jordaan-van Zyl, Michelle van Eden and my gran Elfie Boucher for their continuous love, prayers and ongoing support. Thank you for all the times I could pick up the phone and ask for assistance, your dedicated hospital visits while continuously being hospitalised, especially the last couple of months, and your words of encouragement when I needed it most. You being there gave me the strength to carry on. I love you all very much.

Glory and praise to my Heavenly Father, who gave me the strength, the will and the fighting spirit, to push this mini-dissertation to the end.

ABSTRACT

Broadband is a critical success factor to improve overall living standards. This is especially the case for the development of skills through training. Broadband provided the human race with the ability to transfer data-intensive training material through the Internet using web-based training tools and technologies, such as video and video tutorials; Web 2.0, such as Facebook, blogs and vlogs; live streaming, such as virtual classes, online conferencing and webinars.

After establishing that the Tshwane University of Technology (TUT) has the broadband capacity to utilise web-based training tools and technologies, this study then investigated the advantages and disadvantages of using these tools and technologies and their effect on staff development.

This study adopted a mixed method approach. Two questionnaires gathered both quantitative and qualitative data. TUT librarians were asked whether they use web-based training tools, and technologies and based on their experience, to indicate what tools and technologies do they use, , what do they experienced as advantages and disadvantages and, based on that, what are the effects of Web-based training on their personal development and on their institution. TUT online service and product suppliers were also asked whether they offer Web-based training facilities, Which Web-based training tools and technologies do they use for their training programmes, what advantages and disadvantages have they experienced when offering Web-based training, and what are the effect on librarians.

This study found that TUT librarians use broadband to conduct Web-based training using various tools and technologies. Web-based training opportunities are offered to TUT by most online service and product providers. This study identified various advantages and disadvantages of using Web-based training tools and technologies, and found that they definitely play a role in staff development and in the improvement of work quality and productivity.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1 Background to the study

Information Communication Technology (ICT) has proliferated during the last 40 years from rooms filled with machines until the present moment where communication can reach thousands of people from the palm of one's hand (OECD, 2013b: 119). ICT has become embedded in our daily activities, especially with regards to communication and the distribution of information using the Internet (OECD, 2013b: 119). According to the OECD (2013a) this is critical to development, especially considering the speed at which large quantities of data is created and distributed. The array of formats in which data are being delivered require more skills to enable users of broadband to utilise the facilities. This coincides with the fact that skills can be transferred by using broadband after such skills have been conquered (OECD, 2013a).

The OECD (2013a) still questions the global impact of broadband technologies, especially concerning challenges ranging from access to computers to the use of high speed Internet access. Various investments and developments are driven by better and faster technologies, including the access and distribution of quality information (OECD, 2013a). Developing countries find this trend challenging, as basic human needs are prioritised above electronic empowerment, and people do not regard the use of ICT and broadband as critical success factors which can improve the overall living standards of a country, not even by developing skills to improve and enhance service delivery, especially in libraries (OECD, 2013a).

The OECD (2006: 6) states that digital content is expected to provide a new stimulus towards the growth of the digital economy. According to the OECD (2006: 6) digital content encourages innovation to the effect that skills levels are raised, which in turn triggers dynamic rapid developments and innovations, creating new demands, products and markets.

Economies are becoming more knowledge-intensive and information-rich (OECD, 2006: 7). Activities that contribute to this trend include content which are created, collected, managed,

processed, stored, delivered and accessed (OECD, 2006:7). Librarians, therefore, are central to all activities using broadband technologies to locate, manage, organise, seek information and information resources, and also to promote internal and external communication with colleagues, vendors and other suppliers (OECD, 2006: 6-7). According to the OECD (2006: 6-7) digital content is growing exponentially and therefore provides opportunities for new strategies concerning the use of broadband technologies. Data is therefore not the only format available and can be complemented by voice and video, which makes it important for librarians to stay abreast of these technologies, and also to utilise it for their own development in order to enhance service delivery (OECD, 2013a). Broadband technologies opened up the world for librarians by utilising a diverse range of formats such as voice, video and data (Wikinvest, 2012). According to the OECD (2013a) computer literacy should be a fundamental skill, especially for librarians whose job could be labelled as "information intensive". Therefore, the OECD (2013a) states that competencies using information technologies will in future will play a major role to equip and develop people in the effective and efficient use of products and services.

The Internet has become a global space with various applications, networks and devices such as Facebook, Google, Twitter, Skype, vlogs, blogs, video and video streaming, which makes everyday conversations possible (OECD, 2013a). Many questions concerning education and web-based training, and the use of these tools, have been raised regarding the objectivity, correctness and quality of information found when using the Internet in all its facets, although just as many advantages have also been identified (OECD, 2013a).

The use of broadband increasingly influences ways in which digital content is developed and accessed. Staying abreast of these developments has therefore a direct influence on the standard of living or the quality of service being rendered. This creates a knowledge economy made possible by Web-based training and broadband tools and technologies (OECD, 2006: 6).

This mini-dissertation will hopefully inspire librarians to utilise these broadband tools and technologies for Web-based training, not only to improve their own knowledge and personal development but also to improve institutional service delivery. As equal opportunities for all arise, the gap between the knowledge rich and poor will diminish and will inspire developing

countries to enhance their knowledge and aspire towards improved service delivery to change the institutional culture towards lifelong learning.

1.2 Central problem statement and sub-problems

The Tshwane University of Technology (TUT) is the product of a merger between three former Technikons, which resulted in an institution with multiple campuses across South Africa. A problem within the TUT Library & Information Services (LIS) is that the decentralisation of campuses and continuous service delivery required by library users, together with a shortage of funds, debilitate librarians to attend various face-to-face training sessions. When vendors visit the LIS to train staff on specific databases or to conduct demonstrations of various technological platforms, some of the librarians miss these opportunities to enhance their skills and knowledge. Most TUT libraries have a maximum of only two information librarians which means that if one of them attends training sessions the other one has to remain in the library to assist staff and students. When all available librarians attend these sessions they have to leave their users in the hands of assistants, which are often not able to answer queries from users. This puts pressure on the librarians' workload upon their return. Furthermore, due the vast number of database subscriptions available, the TUT LIS is compelled to only train librarians who might use resources for specific content. The lack of general knowledge demonstrated by librarians concerning the efficient and effective use of the databases, irrespective of content, appeared to have a negative effect on the services rendered by the LIS. It became eminent for TUT that knowledge transfer and training concerning the effective and efficient use of databases and other electronic products is a matter that should receive attention.

The use of broadband and the various tools and technologies used for Web-based training could provide solutions for staff development, and even more so for improved and standardised service delivery. This mini-dissertation will therefore concentrate specifically on knowledge transfer for the effective and efficient use of various electronic information resources, by obtaining knowledge about the resources and its functionality.

1.2.1 The central problem statement

An investigation determining the advantages and disadvantages of using broadband for librarian Web-based training, with specific reference to the use of online resources for staff development of librarians of the Tshwane University of Technology.

1.2.2 Sub-problem statements

The sub-problem statements of this study are as follows:

a) Establish if the Tshwane University of Technology (TUT) has the broadband capacity to use data intensive Web-based training tools and technologies.
b) Establish if librarians of TUT use data-intensive Web-based training tools and technologies offered by vendors.
c) Establish what Web-based training tools and technologies are used and why are they used.
d) Establish the advantages and disadvantages of using Web-based training tools and technologies.
e) Determine if the use of these Web-based training facilities will ensure the development of staff for better service delivery for the improvement of the community.

1.3 Scope and limitations of the study

The target group for this study was limited to information librarians, information literacy trainers and other staff members who participated in staff developing events utilising broadband tools and technologies for Web-based training. This study focussed mainly on specific broadband tools and technologies used by various library vendors and service providers of TUT and therefore did not explore all the current technologies available. The benefits and challenges identified in this study might therefore not apply to another sector or other institutions that use different technologies.

This study also focussed mainly on the 12 campuses of the Tshwane University of Technology in South Africa. Those campuses are situated in Pretoria, Ga-Rankuwa, Soshanguve, Polokwane, Mbombela, eMalahleni, Durban and Cape Town (Tshwane University of Technology, 2013).

This study also focussed on TUT Library and Information Services electronic information resource vendors and other service providers to obtain a view of Web-based training opportunities offered to librarians that involve various broadband tools and technologies, and to determine what the advantages and disadvantages of using these tools and technologies involve. The study further focussed on whether librarians believe that these tools and technologies could be used to enhance and improve service delivery at TUT.

The study was conducted in 2015.

To determine the advantages and disadvantages concerning the use of broadband tools and technologies of library vendors and service providers, it was necessary to keep answers provided by the various parties anonymous in order to prevent the leaking of possible competitive intelligence. Vendors and service providers who took part in the study were therefore assured, prior to data sampling, of the intent to keep information secured in order to conceal their efforts from other parties. The study itself also protected companies by using alphabetical letters instead of company names.

The limitations of this study include:

- Due to the fact that this study only involved TUT librarians, it only provided the views and perspectives of one institution. There is, therefore, an opportunity to broaden this study country wide or worldwide to include other views and perspectives or to focus on different types of libraries.
- By using only the views and perspectives of South African vendors and suppliers used by TUT this study was limited by not having the opportunities to include other institutions and countries with other experiences.
- This study also focussed only on Web-based training of electronic information resources. Since there are many other applications within the library world that could use Web-based training opportunities, it provides an opportunity to expand the depth and breadth of the study.

1.4 Purpose, relevance and contributions of the study

The purpose of this study was to establish the value of using broadband tools and technologies for Web-based training in academic institutions like TUT. The Library and Information Services utilise available technology for their users to select and find relevant information resources and it is therefore critical that librarians are knowledgeable and trained to utilize these technologies. Vendors and service providers are already using broadband tools and technologies for Web-based training opportunities for their own advantages although no studies have been conducted to express the use of broadband for these specific purposes. It was, therefore, the purpose of this study to determine the advantages and disadvantages of using these technologies by questioning librarians and suppliers. This mini-dissertation will further indicate which technologies are being used by librarians keeping abreast with new technologies using electronic information resources although indicating technologies being provided by library vendors and service providers. Participants also had to indicate whether the use of these technologies could enhance and promote improved service delivery, and to motivate their answers.

1.5 Overview of the literature

The aim of this literature review is to discuss the most relevant literature pertaining to the research question and sub-questions. The literature review also focuses on the clarification of relevant concepts, such as:

- Learning, education and training, especially training methods like Web-based training, and includes a discussion of the advantages and disadvantages of Web-based training;
- The term “development” and various aspects thereof, such as personal development, skills development and other factors that include improved service delivery. The clarification of the term “development” will therefore include a discussion of the concepts “capacity building” and “human capital development”;
- Broadband and broadband tools and technologies used for Web-based training, including a discussion on the characteristics of broadband that will clarify TUT’s use of broadband.

The literature review further focuses on:

- The role of broadband tools and technologies for professional development;

- Broadband as a tool for development in libraries;
- Web-based training opportunities for librarians;
- The use of broadband tools and technologies for Web-based training in TUT.

1.6 Research methodology

A research methodology discusses the process of the research study in detail, and includes the following aspects:

The research design selected for this study is a mixed approach, being mainly qualitative but also quantitative. In order to answer the research questions two surveys were conducted. The first survey targeted TUT librarians to establish whether librarians make use of broadband tools and technologies when making use of online library products and services. Secondly, it wanted to establish the advantages and the disadvantages of using these facilities and whether these services will benefit librarians and improve the quality of their services. The survey used both qualitative and quantitative questions and the qualitative questions incorporated both open and closed questions. The second survey targeted online library product and service providers. The aim of this survey was to be established whether librarians use broadband tools and technologies for Web-based training. The survey also wanted to determine which tools and technologies are used by librarians, and what are the advantages and disadvantages of using these facilities. This second survey also contains quantitative and qualitative questions, and the qualitative questions include both open and closed questions.

Both surveys were distributed by e-mail. For this purpose the SurveyMonkey software was used which contained a link to the official survey. The data was analysed with SurveyMonkey's analysis application. The data was also downloaded into Excel to create charts and tables.

A purposeful sampling technique was adopted because participants had to meet certain criteria, namely:

- Survey A:

- A participant must be an employee of the Tshwane University of Technology; and
- A participant must be employed as a librarian.

- Survey B:
  - A participant must be product or service provider of the Tshwane University of Technology;
  - A participant must have a South African office or have a full-time South African representative; and
  - A participant must supply online library products or services to the TUT Library and Information Service.

1.7 Division of chapters

This mini-dissertation consists of five chapters which are divided as follows:

1.7.1 Chapter 1

Chapter 1 provides this mini-dissertation with the necessary background information of the study, including the problem statement, the scope, the purpose, the description and the methodology.

1.7.2 Chapter 2

Chapter 2 provides an in-depth literature review concerning broadband, the various tools and technologies used for Web-based training and the successful implementation thereof in various countries around the globe. The chapter also clarifies concepts such as broadband, broadband tools and technologies for Web-based training, other important aspects such as training, education, learning and lifelong learning. This mini-dissertation also discusses terms like development, capacity building, staff development and personal development. A study of the history concerning aspects of broadband, successful applications of broadband in the academic sector as well as its global impact is reviewed. This mini-dissertation also focuses on the impact that broadband has on knowledge gain and knowledge transfer and the possible advantages of broadband in service delivery. The review indicates possible correlations between these studies and the present study. The correlations include Web-

based training with the use of tools and technologies especially those concerning the various vendors of electronic information resources.

1.7.3 Chapter 3

Chapter 3 entails the research methodology, philosophy and research approach. Chapter 3, therefore, provides a strategy concerning how the data was collected, analysed and accessed. The chapter also deals with reliability, validity and ethical issues that might be important as well as limitations that influenced this study and possible future studies.

1.7.4 Chapter 4

Chapter 4 focuses on the study methods and the results. The latter include all the figures and relevant descriptions of the findings. The chapter also justifies the research topic with an in depth discussion of the findings together with the most important issues found in the literature, analysing the results and thereby answering the research question and its sub-questions.

1.7.5 Chapter 5

In Chapter 5 conclusions are drawn from the research results in correlation with the literature. The chapter also recommends topics for possible future studies.

1.8 Conclusion

Web-based training is offered by numerous online library product and service providers. Many of these training opportunities are data-intensive as it utilise live data streaming, video, audio and also text and, therefore, require broadband facilities. In view of these new broadband tools and technologies specifically required for Web-based training, data was collected to determine whether broadband tools and technologies have any advantages and disadvantages, especially for staff development and service delivery.

The next chapter will present a literature review concerning the matter.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The Internet, or more so broadband, revolutionized the way in which the human race lives and work (Emerson, 2006). It created possibilities and an array of information resources, services, functionalities and technologies with unprecedented speeds (Emerson, 2006). The use of live video streams to remote locations to save lives serves as a good example of how broadband is used for sustainable development (Smith, 2011: p.37). Globally, the use of broadband resulted in the enhancement of living standards, making what used to be difficult or impossible, easy (Emerson, 2006).

The Internet revolutionized the way libraries operate and has become the platform for information retrieval (Plosker, 2003). The Internet, within the business environment and especially in the educational sector, has provided a new learning paradigm that made it possible to receive training and education without the restrictions produced by time and space (Saadi, Mirzayi & Movahedi, 2014). According to the Bill and Melinda Gates Foundation (2014) only 35% of people in the world have access to the Internet, which influence the economic development across the globe, especially in developing communities. Access to the Internet, and in many cases broadband, provides equal opportunities globally, especially for online information and human development. Libraries, therefore, need to be equipped with the necessary equipment and skills to provide guidance, especially considering the rapid change in technological developments (Bill and Melinda Gates Foundation, 2014).

Winthrop and Smith (2012: 13-14) state that the technological gap between the developed and the developing world is still significantly large. By providing infrastructure to access the Internet government authorities recognised the importance of overall development, especially concerning education and skills (Deloitte, 2014: 27; OECD, 2012: 7). The adoption and absorption of new technologies in developing countries play, therefore, a critical role (Winthrop & Smith, 2012: 13-14). Access to computers, but especially broadband, broadband tools and technologies has a direct influence in eliminating the digital divide (UNESCO Broadband Commission, 2012; Winthrop & Smith, 2012: 4). Broadband

and the speed at which data, voice and video is transmitted is a critical success factor in development (UNESCO, 2013: About).

According to Hansson (2008) the perspective concerning general development of individuals, firms, organizations, regions and the community at large lies within the development of human capital. Hansson (2008) states that although initial primary and secondary education is seen as the public vehicle for the improvement of the human capital, the real investment towards overall development is made within the labour market. This is evident from labour statistics which show that from 2007 until 2012, 2.3% , of total labour costs were spent on training in comparison with the European Union's percentage of between 15% 40% in 1999 (Hansson, 2008; OECD, 2013b: 72). This suggests that in developed countries a considerable amount is spent on on-the-job training. Education and training, according to Hansson, is usually seen as an investment for both the organization and the individual, although formal education generally receive more attention and encouragement than training attempts within the organisation (Hansson, 2008). Although some governments, like South Africa, consider employee development important - as is evident in the Skills Development Act (Adam *et al.*, 2011: 50) - only a few organisations attempted to promote the scope and importance of training, which provide no incentive for individuals to attend training (Hansson, 2008).

Broadband, and especially the World Wide Web, opened up opportunities for librarians to develop ways in which they could meet their patron needs in innovative ways (Tobin & Kesselman, 2000: 67). Since the early 90's organisations, and especially libraries, started to recognise the importance of the World Wide Web as a tool, not just to access information but also the dissemination of it. The dissemination of information could also transform products, activities and services. According to Tobin and Kesselman (2000: 68) one of these innovations was to deliver Web-based tutorials or training opportunities via an array of products, activities and services. These tutorials can be used for patrons but also as tools for librarians to develop skills. Web-based training is an innovative approach to distance learning and use technologies and methodologies via the Internet and the World Wide Web to enable self-directed instruction (Tobin & Kesselman, 2000: 68; Zhang & Nunamaker, 2003: 210). Since it allows flexibility and interactivity it can engage learners in various tools (Zhang & Nunamaker, 2003: 210) and applications such as, but not limited to, discussion forums, mailing lists and chat rooms (Tobin & Kesselman, 2000: 69). With today's broadband Internet capabilities and technologies the Internet has become ubiquitous with

multiple applications that can be used for video and audio streaming, which are perfect for Web-based training.

The use of technology in training, especially Web-based tools, in combination with technologies delivered by broadband, can be powerful tools to change and conquer the world's challenges. This chapter, therefore, focuses on clarifying and discussing concepts concerning broadband and Web-based training tools and technologies. It also discusses the advantages and disadvantages of Web-based training, but more importantly, it focuses on various concepts involving Web-based training and staff development.

2.2 Concept clarification

Five important concepts were identified for the purposes of this mini-dissertation and will be briefly clarified:

2.2.1 Broadband

Broadband is defined as a super highway with high speed capacity and infrastructure that transports data, via the Internet, in various formats across the world and around the clock (Emerson, 2006; American Library Association, 2013; Bacsich & Brown, 2002: 2; Maso & Rennie: 6). Broadband is facilitated by satellite or specialized cable transmission which allows a number of communication modes, including text, graphics, audio and video, using high speed network infrastructure via various devices (Emerson, 2006).

According to the International Telecommunications Union (ITU) (2011) and Mason and Rennie (2004: 6) the recommended transfer speeds of broadband for the transmission of data-intensive services such as video, audio and graphics should be a minimum of 2 Mbps (Megabits per second). Although this is seen as an international standard, it differs in various parts of the world and the average speed is regularly increased. Research on speeds measured in 2014 concluded that Hong Kong has the fastest download speed with an average of 80 Mbps while countries like Japan, South Korea, Sweden, Romania, the Netherlands and Switzerland followed closely. Speed in South Africa measured on average between 5 Mbps and 7.5 Mbps (Lee, 2015).

Broadband, for the purpose of this mini-dissertation, is defined as a high speed Internet connection that facilitates data transfer of data-intensive services via various tools, technologies and applications over the Internet, at a minimum speed of 2 Mbps. These data-intensive services include the transfer of data such as live or static demonstrations, instruction videos, text, graphics and audio to a preferred audience.

2.2.2 Training

There are various definitions which describe training (Masadeh, 2003: 63). Wheeler (2013), Salvi (2013) and Halim and Ali (1997) defines the term training as the teaching of a skill by practice. They describe it further as a systematic instruction provided by organisations to facilitate the transfer of knowledge for the purpose of addressing a possible lack of skills for the improvement for effective and efficient performance delivery. Training is therefore seen as building capacity to sustain and develop the institution as a whole and develop its entire environment (Salvi, 2013).

The Manpower Services Commission (MSC) in the U.K. (1981: 62) defines training as follows: “A planned process to modify attitude, knowledge or skill behaviour through a learning experience to achieve effective performance in any activity or range of activities. Its purpose, in the work situation, is to develop the abilities of the individual and to satisfy current and future manpower needs of the organisation’’.

This mini-dissertation will use the term “training” as defined by Masadeh. Masadeh (2003: 63) states that training, in the context of human resource development, is seen as employee training. This can be associated with the acquiring of on-the-job skills for a particular role, as the benefits for the institution lead to job satisfaction, productivity and profitability while the employee reap the rewards of added skills, knowledge and a positive attitude (Masadeh, 2003: 63).

2.2.3 Web-based training

Web-based training is training opportunities or instruction that is being conducted over the World Wide Web (Khan, 2001: 13; Rouse, 2005), either being synchronous or asynchronous

(Rouse, 2005). Web-based training is therefore delivered by either a combination of static methods, such as portals, web-pages, hyperlinked pages, documents, audio/video streaming and live or static broadcasts, or interactive methods such as desktop video conferencing and chats (Rouse, 2005).

2.2.4 Development

The term “development” is a complex term, as each stage in our lives and in the environment we live and function constitute towards development (Volunteering Options, 2008). Development is therefore the empowerment of people finding solutions to problems enriching their own lives and those around them (Volunteering Options, 2008).

Wheeler (2013) defines development in the framework of the organization where activities constitute towards individual and organizational growth. Development is therefore the transfer of skills for the purpose to improve traditional behaviours, ways and functions.

2.2.5 Development in context of staff development

For the purposes of this mini-dissertation development, in the context of human resource development or staff development, can be defined as a long term process, designed in order to improve the effectiveness and efficiency of employees (Masadeh, 2003: 65).

The concepts defined above are discussed in more detail in the rest of the chapter.

2.3 Broadband

Broadband is a super highway that can transport data-intensive material data in various formats across the world (Emerson, 2006; American Library Association, 2013; Bacsich & Brown, 2002: 2; Maso & Rennie: 6). Broadband, facilitated by satellite or specialised cable transmission, allows a number of communication modes, including text, graphics, audio and video, using high speed network infrastructure via various devices (Emerson, 2006). As mentioned earlier in this mini-dissertation under the heading “Concept clarification” the

recommended transfer speeds of broadband for the transmission of data-intensive services should be a minimum of 2 Mbps (Megabits per second). The speed at which data is transferred determines whether large quantities of data can be transferred and plays an important role in the use of broadband tools and technologies for successful data transfer.

Broadband has other characteristics apart from speed and capacity. These characteristics influence the way in which data is transferred and whether the capacity exists to receive or send data-intensive services such as web-applications or various media to a specific audience (Computer Science and Telecommunications Board, National Research Council, 2002: 83). These broadband characteristics also enable file downloading or uploading, such as video-on-demand, or streaming, such as radio or even live classes or demonstrations, for synchronous or asynchronous training (Computer Science and Telecommunications Board, National Research Council, 2002: 83).

Saadi, Mirzayi and Movahedi (2014) discuss the various restrictions of Web-based training where the lack of infrastructure, such as bandwidth for successful transmitting and the receiving of data-intensive material, seem to be a huge problem in most developing countries. This part of the mini-dissertation focuses on the characteristics of broadband in order to determine some of the advantages and disadvantages of broadband tools and technologies for Web-based training and its influence on the work performance of librarians.

The concept “availability” refers to connections that are consistently available and reliable and that allow librarians to download training material at any time (Bacsich & Brown, 2002: 3; Almeida, 2011). Latency and jitter refer to the time it takes for data packets to be delivered from one point to another. This is especially important for data-intensive services that require reasonable time frames for delivery (Almeida, 2011). Bandwidth symmetry refers to the symmetrical or asymmetrical delivery of information, namely the upload and download capacity which could either be similar or different where the upload or download capacity are either more or less (Mitchell, 2014; Almeida, 2011). Addressability allows computers to communicate with one another as each computer has its own Internet address, called an Internet Protocol (IP) address (Computer Science and Telecommunications Board, National Research Council, 2002: 75; Almeida, 2011).

2.3.1 Broadband in the Tshwane University of Technology (TUT)

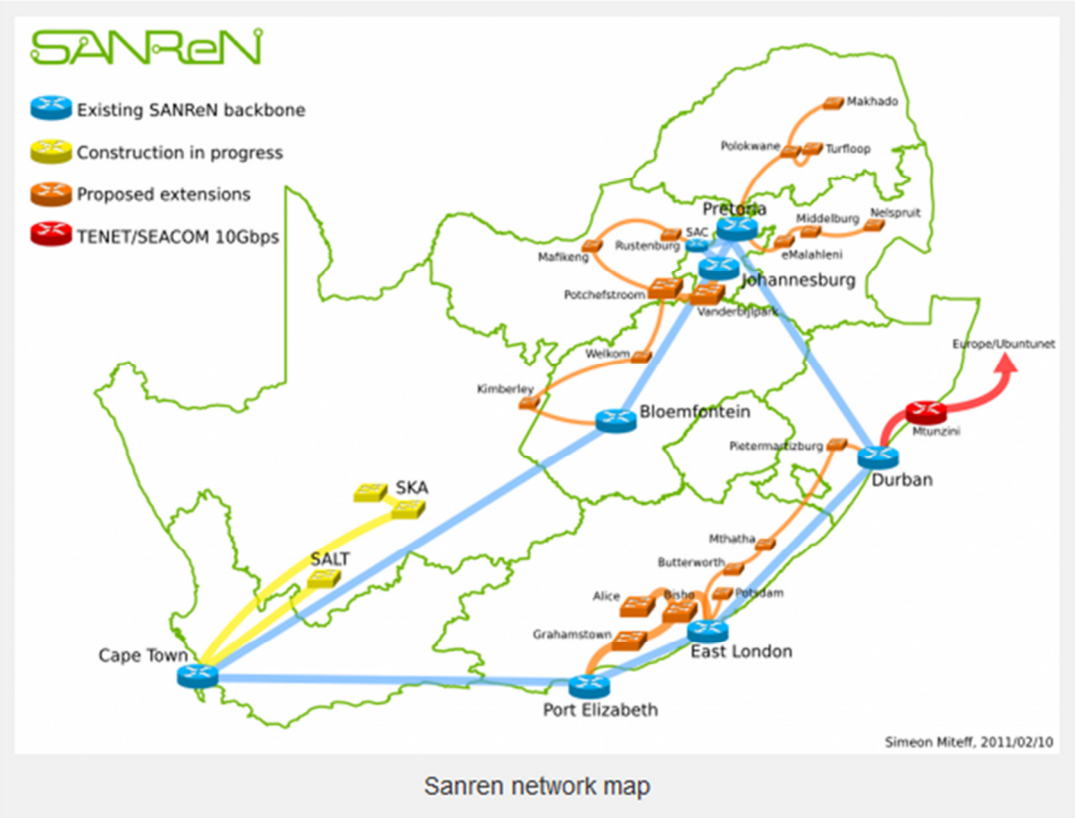
2.3.1.1 Tertiary broadband connectivity in South Africa

TENET (Tertiary Education and Research Network of South Africa) is currently operating the SANReN (South African National Research Network) under the terms of a Collaboration Agreement with the CSIR (TENET, 2014). The main purpose is to provide cost effective Internet and relevant information technology services to academic institutions to enhance higher education and research within the borders of South Africa. This network includes a 10 Gbps circuit on the SEACOM cable system as well as a 10 Gbps circuit on the WACS cable system from the SEACOM landing station in Mtunzini to the SANReN 10 Gbps backbone. The SANReN fibre rings, stationed in Johannesburg, Pretoria, Cape Town and Durban, forms the GEN3 MPLS network and Metro-E circuits which is provided by Neotel with IP Connect bandwidth into the ADSL cloud and various optical fibre and wireless access circuits (TENET, 2014) (SANReN, 2013). This was confirmed by Adam *et al.* (2011: 84) who described TENET's efforts at the time to secure a loan for the investment. The repayment of the loan by all the tertiary institutions in South Africa, including TENET, although keeping prices still high, promised an incentive that will provide broadband access at European and United States of America rates (Adam *et al.*, 2011: 84). The success of the establishment of this high speed broadband connection, according to Adam *et al.* (2011: 84), increased the credibility of South African research initiatives and should lead to additional research funding and opportunities for universities.

2.3.1.2 The structure of TUT's wide area network (WAN)

TUT's wide area network (WAN) presence in the Pretoria region hosts the main switch which connects all the campuses directly to SANReN (South African National Research Network) (Razwiedani, M. 2012).

The TUT WAN connects the various campuses via an ATM (Asynchronous Transfer Mode) network. Virtual circuits are established between the various campus endpoints to ensure that data transfer is formed (Figure 1, 2012). A mesh network topology is used in the WAN. Repeater stations that are strategically placed assure signal strength across long distance WAN circuits (Du Plooy, 2013; MyBroadband, 2014).



Sanren network map

Figure 1: SANReN network map

Note. Reprinted from SANReN (2013) with permission.

2.3.1.3 The Structure of TUT's local area network (LAN)

Each campus can be regarded as a separate LAN which differs in terms of size, building structure and organisational structure. The LAN is logically segmented by means of virtual local area networks (VLANs) connected to Hewlett Packard switches to achieve the desired structure. VLAN configurations are done via assigning specific IP ranges to computer laboratories, buildings, specific floors or departments (De Villiers, 2014).

2.3.1.4 TUT's connection to the Internet

The Tertiary Education and Research Network of South Africa (TENET) is currently the Internet service provider (ISP) for most academic institutions in South Africa, including TUT. TENET is a member of the Internet Service Providers' Association (ISPA). TUT's breakout to the Internet is fully managed by TENET, which include network connectivity (Razwiedani, M. 2012).

2.3.1.5 TUT's broadband statistics

The TUT network speed is measured at 1 Gbps on average. This is more than the required international line speed required for broadband. The TUT network has a capacity of 10 Gbps nationally and 564.81 Mbps internationally. The TUT network, especially the Pretoria region, has been set-up in a way that traffic can be re-routed in case of a tower or a node that that experiences downtime due to maintenance or other causes. The way that the TUT network is set-up makes the network reliable, fast and available, which are all attributes that make the use of broadband tools and technologies possible. This implicates that Web-based training may be possible for TUT staff, and especially for library staff, to perform training with Web-based tools and technologies. This could have a direct influence on better service delivery, which could lead to personal development and the development of the institution and the community.

In order to establish the advantages and disadvantages of using Web-based training tools and technologies, concepts such as training and Web-based training are discussed in the sections to follow.

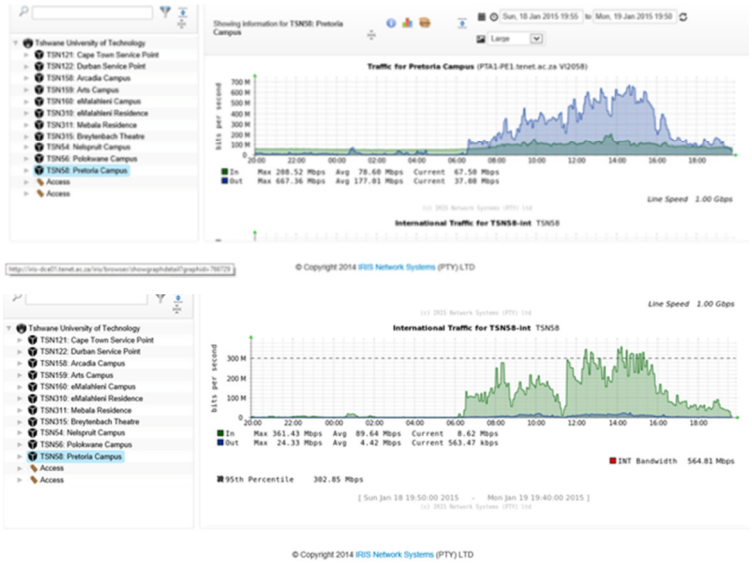


Figure 2: International traffic graphs for the TUT Pretoria Campus on 19 January 2015

Note. Taken from TENET (2015) with permission.

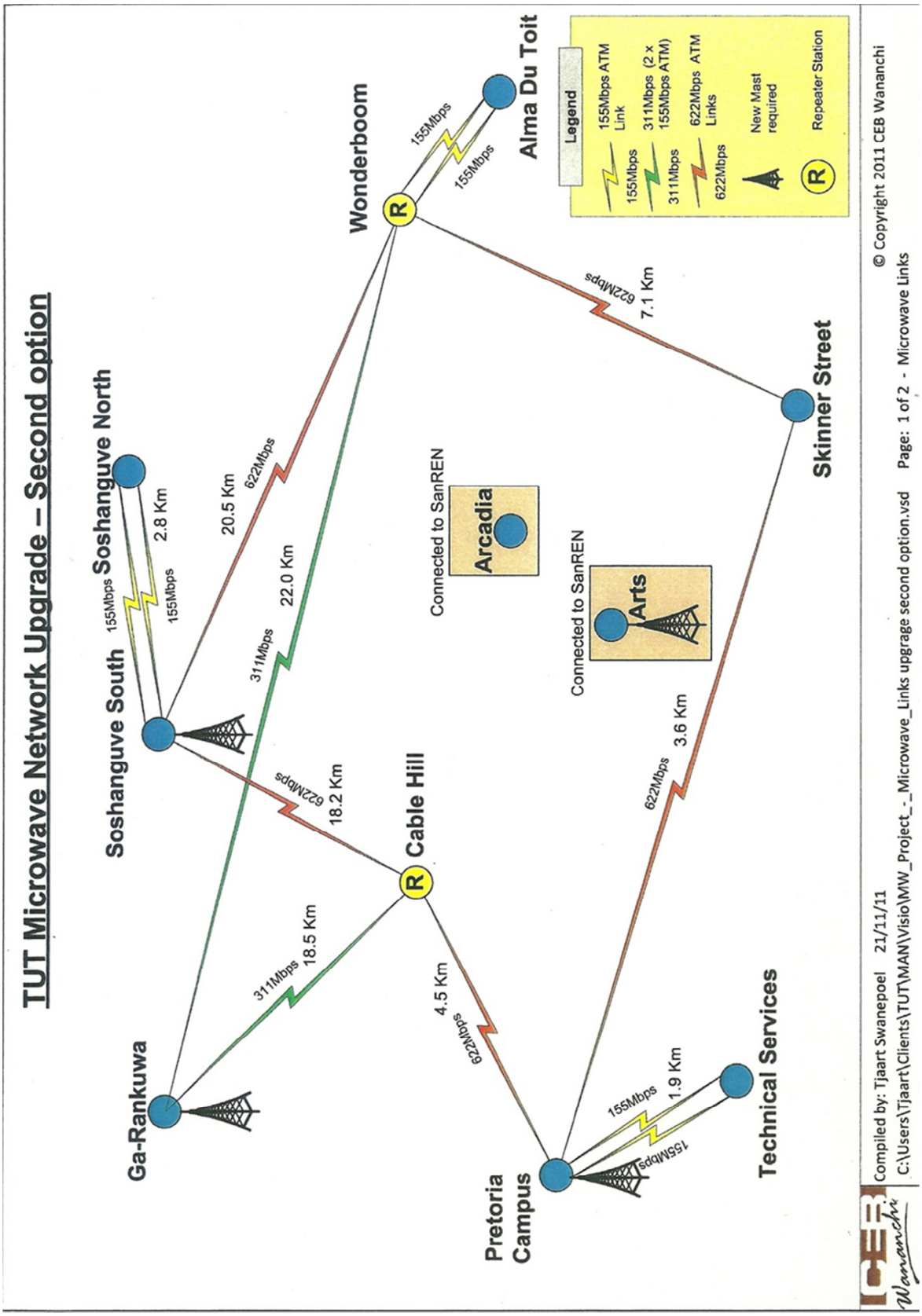


Figure 3: TUT microwave network

Note: Taken from De Villiers (2014) with permission

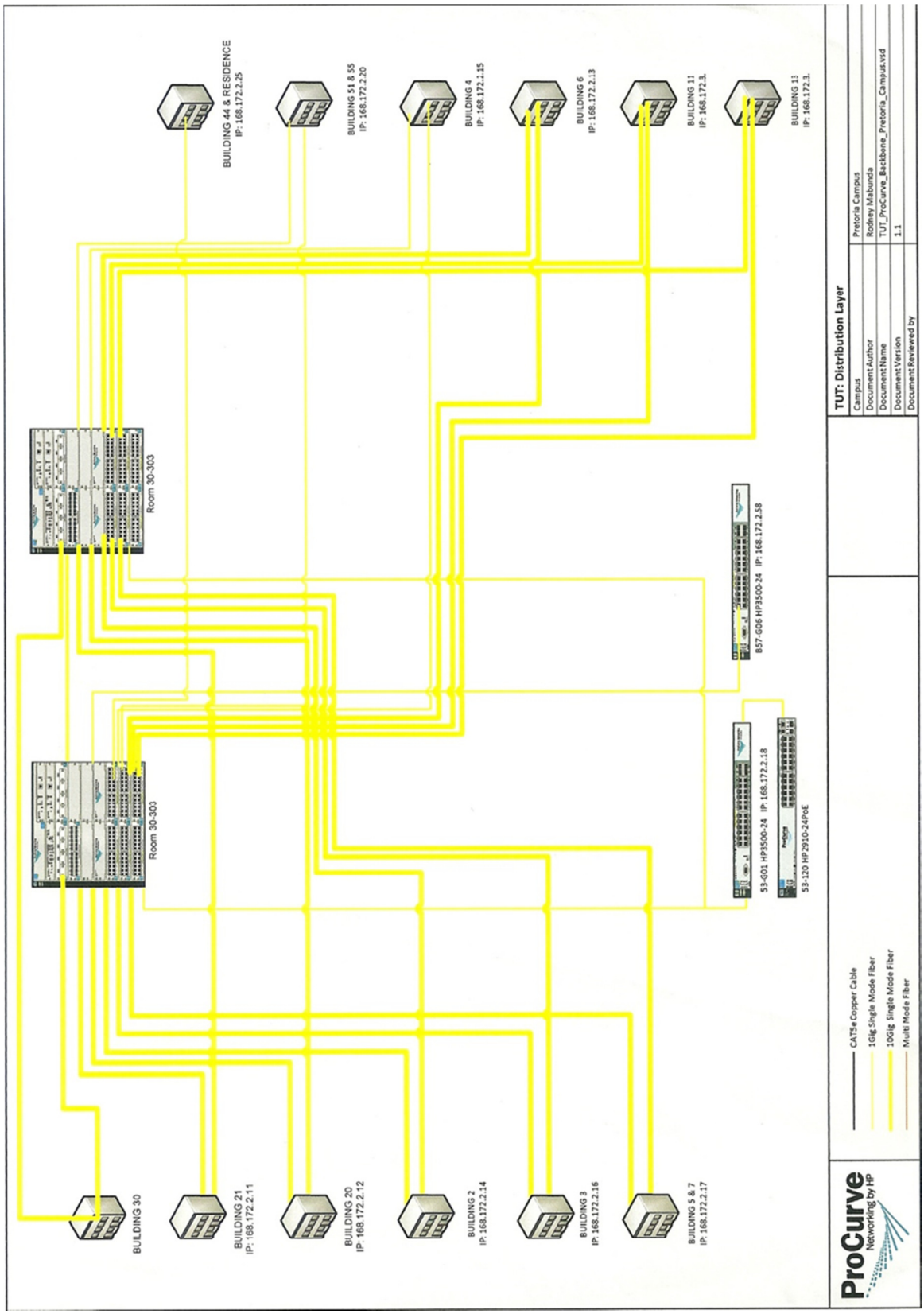


Figure 4: TUT backbone

Note: Taken from De Villiers (2014) with permission

2.4 Learning, education and training

Organizations such as UNESCO and the Organisation for Economic Co-operation and Development (OECD) state that broadband is necessary for overall development when it creates opportunities for learning through training (OECD, 2004: 4; UNESCO: Broadband Commission for Digital Development, 2012). It is therefore important to establish what the terms “learning”, “education”, “training” and “development” mean in order to establish the relationships between them.

The terms mentioned above overlap in meaning, especially in different contexts. (Masadeh, 2003: 63). These terms are therefore, within the literature, used interchangeably (Masadeh, 2003: 62). It is important for the purposes of this mini-dissertation to clarify these terms in order to establish their individual roles in overall development. Therefore, as suggested by Garavan (1997), learning is an umbrella term for education and training, where development is the outcome thereof. The discussion in this mini-dissertation follows the same approach.

2.4.1 Learning

To concur with the statement made by Garavan (1997) that learning is an umbrella term for education and training, Zhang and Nunamaker (2003: 207) define learning in the traditional context as “experiencing a radical change”. Learning is therefore a combination of formal, informal and non-formal education and is seen as on-going processes, in a lifelong journey, with experiences of change that is not necessarily intentional or planned, hence the term “lifelong learning” (Masadeh, 2003: 64; Zhang & Nunamaker, 2003: 207; Corcoran & McGuinness, 2014; Werquin, 2010: 21).

Learning can also be described, in a holistic way and in the context of human resource development, as a self-directed, work-based process that leads towards increased human capacity and an adaptive culture (Masadeh, 2003: 64). Learning can therefore be considered as a critical factor for human resource development to acquire the necessary skills in order to perform tasks that could not have been accomplished before (Masadeh, 2003: 64). In order to learn, one needs experience to obtain new knowledge to be used for purposes other than originally used (Masadeh, 2003: 65).

There are various types of learning that describe aspects of education and training, but for the purposes of this study only three types will be discussed, namely formal learning, informal learning and non-formal learning (Corcoran & McGuinness, 2014; Werquin, 2010: 21; Engeström, Rantavuori & Kerosuo, 2012). Engeström, Rantavuori and Kerosuo (2012: 99) state that learning creates opportunities for professional development that involve informal, voluntary training and formal education and training such as compulsory workshops and in-service training opportunities. The purpose of learning, therefore, aims to foster human and social development with the necessary skills to equip and prepare people for their jobs, especially in the fast changing environment of the digital age (The OECD Directorate for Education, 2013b: 3). By following a lifelong learning approach to education and training, the focus of learning directly influences quality, skills, equity, and innovation in the workplace.

2.4.1.1 Informal learning

Informal learning is usually referred to as experience or learning by experience. It stems from our daily activities such as work, school, leisure and communication methods from a learner's perspective and is unintentionally perceived (Werquin, 2010: 22). Informal learning usually involves activities that we do unconsciously, like balancing while walking. Informal learning is therefore unintentional and without structure and its learning outcomes is difficult to realise in terms of scope and standard. It can therefore not be used as a recognition factor in the work or accreditation environment (Werquin, 2010: 22). It is usually known as lifelong learning (Masadeh, 2003: 64; Zhang & Nunamaker, 2003: 207). Lifelong learning is learning activities undertaken through-out life and its aim is to improve knowledge, skills and competence for personal development, public, social and/or employment purposes (European Society of Association Executives, 2013).

The UNESCO report titled *Technology, Broadband and Education: Advancing the Education for All* (UNESCO, 2013: 4) acknowledges the fact that broadband is a critical success factor in the lifelong learning process that contributes to the global enhancement of lives. UNESCO (2013: 8) stresses the importance of using technology to promote lifelong learning within educational and workforce processes.

Bilandzic and Foth (2014) describe how librarians used their experience and applied new technology to learn their users' behaviour, and how they used that knowledge to enhance their library service. As shown by the definitions mentioned before, lifelong learning aims to improve personal development by using past experience, education and training to create not only personal development but also to contribute to the benefit of the institution or the community involved.

2.4.1.2 Formal learning

Formal learning occurs within an environment that is organised and structured and in terms of objectives, time and resources designed to encourage learning (Werquin, 2010: 21). The learning environment intentionally leads to validation and accreditation with the purpose to acquire knowledge, skills and competencies. According to Werquin (2010: 21) formal learning (education or training) usually occurs in a formal setting such as a formal educational system, initial training or training organised by an employer.

2.4.1.3 Non-formal learning

Non-formal learning can be defined in terms of learning objectives, time and support as unintentional learning opportunities embedded into planned activities (Werquin, 2010: 22). It is therefore learning without a formal learning system and occurs between people in communities that exchange viewpoints and ideas in the form of interest groups, clubs, workshops, organizations, etcetera, and can be seen as training.

Salvi (2013) defines workplace learning and development as a process that supports staff in a specific work environment with innovative, high-quality programs, resources and services for individual empowerment and organizational growth and development. Boisvert (2000) concur that corporate learning or training must be aligned with business and strategic objectives as it will contribute to the development of the organisation. Managers, therefore, need to know and understand the organisational goals and objectives and what training is necessary in order to accomplish the goals and objectives.

2.4.1.4 E-Learning

E-learning, online learning and Web-based learning are terms that are used interchangeably. Although subtle, the consequential differences are important for both educational and training communities (Tsai & Machado, [2003]; Bell & Federman, 2013: 167).

In most instances e-learning can be defined as learning when the Internet as medium deliver instructional material when and where it is needed, or where the Internet is used to learn specific content (Zhang & Nunamaker, 2003: 207; Arbaugh, 2002). Tsai and Machado ([2003]) state that e-learning focuses more on a learning activity that involves a computer, multi-media or network (Intranet or Internet). This view is supported by Adam *et al.* (2011: 49) and Saadi, Mirzayi and Movahedi (2014) who state that the characteristics of e-learning constitute to technologies being used to support both teaching and learning.

Zhang and Nunamaker (2003: 208) describe e-learning as a revolution complementing lifelong learning with electronic media, such as computers, networks, Web-based tools and technologies and digital resources, that facilitates collaboration between trainers and learners (Adam *et al.*, 2011: 49; Saadi, Mirzayi & Movahedi, 2014).

2.4.1.5 Online or Web-based learning

In most instances Web-based learning is defined as instructional content that is delivered by using a Web browser and Web-based tools and technologies. Online learning can be defined as content readily accessible via the Internet (Tsai & Machado, [2003]). Zhang and Nunamaker (2003: 208-210) and Saadi, Mirzayi and Movahedi (2014) describe online learning or Web-based learning as a process to gain experience by using Web-based tools and technologies such as browsers, communication technologies and electronic resources like e-mail, databases, Web 2.0 technologies and live streaming that make especially use of broadband technology for fast data delivery.

2.4.2 Education

Jackson (2011) takes the question, asked by John Dewey in 1938, “What is education?”, to heart. His quest leads him through various philosophical approaches exploring the transmission of knowledge and how it is accomplished within human society. His journey

takes him to conclude that education is at the root of the moral enterprise, making students, teachers and the human race, better people.

Halim and Ali (1997) and Berg (2012) state that the general believe among educators in the modern era is that education, by definition, constitutes to the delivery of knowledge, skills and information. They argue that education is far more than just that but agree with Jackson (2011) that it improves the human race.

Wheeler (2013) and Masadeh (2003: 63) define education as the physical instruction and training process that result in the gaining of knowledge and skills that equips an individual to assume a new position or future task.

Education, for the purposes of this mini-dissertation, focuses on formal learning with definite goals and objectives and with the assistance of a formal educational programme. In this environment, education for librarians is seen as a basic knowledge that inspires informal learning and non-formal learning.

2.4.3 Training

As briefly defined earlier in this chapter, training is associated with the acquiring of skills for a specific purpose in a work environment (Masadeh, 2003: 63). To elaborate on this it is important to discuss various types and methods of training.

2.4.3.1 Training methods

Halim and Ali (1997) and Corcoran and McGuinness (2014) identify various training methods, of which the most applicable to this paper are described below:

a) Performance-based training

The performance-based method focuses mainly on the effective and efficient performance of tasks with the necessary skills and is therefore mainly applicable to non-formal educational organisations. The goals and objectives of the training focus mainly on proficiency instead

of passing grades. Emphasis is therefore placed on the acquiring of specific skills for task performance. This could be applicable in the library environment in order to provide an enhanced service to users. It will provide library staff with the knowledge to understand these services to support users with necessary skills and assistance to find information they might need (Halim & Ali, 1997; Corcoran & McGuinness, 2014).

b) Traditional training

The traditional training method is also known as face-to-face instruction (Corcoran & McGuinness, 2014). In this mode of training the objectives, content, teaching techniques, assignments, methods, plans, motivation and evaluation are all provided by the trainees themselves. The focus of the training is determined by the intervention of the trainee (Halim & Ali, 1997). According to Corcoran and McGuinness (2014) this is a method that is still preferred by most librarians despite the development of technology and the availability of live streaming and Web-casts.

c) Web-based training

As briefly mentioned previously, Web-based training is training opportunities or instruction conducted over the World Wide Web (Khan, 2001: 13; Rouse, 2005). Web-based training is therefore delivered with the use of Web-based tools and technologies, such as Web pages containing audio/video streaming and live or static broadcasts, such as video conferencing, webinars, video tutorials or live streaming facilities, Web 2.0 technologies or downloadable documents (Rouse, 2005). Rouse (2005) believes that 75% of the workforce will need training in order to keep up with industry requirements and that Web-based training is the ideal solution for the quest to lifelong learning.

2.4.3.2 Training types

a) Pre-service training

Halim and Ali (1997) perceive pre-service training as more academic in nature and offered by formal institutions with an official curricula and syllabus followed by certification such as diplomas or degrees. Corcoran and McGuinness (2014) state that the spectrums of skills that librarians need far exceed the number of skills and knowledge required upon entrance

into the labour market. For the purpose of this mini-dissertation the term “education” will be used.

b) In-service training

Halim and Ali (1997) perceive in-service training, as training offered periodically by an organisation for the development of skills and knowledge. It is seen as a process of staff development. The training is conducted for the purpose of improving work performance for a specific position held and to accomplish specific responsibilities. The training, therefore, allows for professional growth and development and is mainly designed to strengthen competencies. According to Halim and Ali (1997) “In-service training is a problem-centred, learner-oriented, and time-bound series of activities which provide the opportunity to develop a sense of purpose, broaden perception of the clientele, and increase capacity to gain knowledge and mastery of techniques.” Since in-service training focuses on professional development it fits the purposes of this study and is therefore discussed in detail together with on-the-job training which is seen as sub-types of in-service training, refresher and maintenance training (Halim and Ali, 1997).

In-service training can be seen as an instrument for professionalism that leads to productivity that contributes to more effective, efficient and enhanced service delivery (Jain, 1999). According to Jain (1999) this leads to:

- Better quality in work performance;
- Increased productivity;
- A reduced need for supervision;
- Confident and flexible staff with low staff turnover;
- Increased staff morale;
- Overall job satisfaction.

Jain (1999) lists the importance of in-service training as follows:

- Customise the employee according to the job requirement;
- Develop employee confidence to urge a sense of productiveness;
- Improve skills from novice to expert;
- Correct skills deficiency;

- Reinforce formal training programmes where needed;
- Enhance the employee's skills for overall career development.

In-service training can therefore be categorised in five different categories, although only the refresher training or maintenance training category is applicable to this mini-dissertation (Halim & Ali, 1997). In-service training is offered to update and maintain a certain standard of knowledge about a specialised subject matter. The training is developed in order to keep professional staff up-to-date with the latest and most recent developments, methods and technologies (Halim & Ali, 1997; Corcoran & McGuinness, 2014; Pamment, 2008).

In the following section the advantages and disadvantages of Web-based training are discussed.

2.5 Advantages and disadvantages of Web-based training

Web-based training is seen as one of the most important uses of broadband and broadband tools and technologies. Mason and Rennie (2004: 2), Ellis, Wagner and Longmire, (1999: 20), WBTIC (2009) and Khan (2001:13) identify the following advantages:

2.5.1 Advantages of Web-based training

2.5.1.1 General and logistical advantages

- It caters for both individuals and groups;
- It offers flexible opportunities concerning time and place;
- It caters for the mobility of smaller devices;
- It offers guidance and access through Internet resources;
- It provides engagement and network opportunities for both associate learners and tutors;
- Training courses are adaptable for individual learning style and pace as time become available;
- It provides equal access to all, independent of location;
- Training resources and courses are easily accessible and can be downloaded on any device;

- Vendors/Instructors need less investment in time, money and space in order to conduct training sessions;
- It enables immediate implementation of new courses or when new technologies has been implemented;
- Training standardisation is more realistic as material becomes static at a central location where everybody can access the latest and most recent training material;
- Due to standardisation support and problem solving becomes quick and fast;
- Registration, training, scheduling, material distribution and evaluation are offered online and are therefore helping administration and logistical processes;
- Training material is compatible with most computers and devices;
- The World Wide Web, apart from the course itself, provides an array of information resources and applications that will assist learners with additional information to support course material.

2.5.1.2 Instructional advantages

- There are powerful tools available to assist with the planning and design of training programmes;
- Training materials are available in rich multi-media formats such as video, audio, animation, graphics and text, and provide enhanced instructional probabilities;
- Learners, in most cases, have control over lessons because they can redo or revise sections or modules as they please;
- Learner collaboration with chat rooms or live sessions is also a possibility, no matter geographical location;
- Web-based training can be conducted on-demand and immediately where needs for performance are required (Khan, 2001: 13).

2.5.1.3 Economic, financial and organisational advantages of Web-based training

- It eliminates or reduces travel expenses;
- It eliminates unproductive hours while traveling;
- It reduces the amount of time trainees spent away from work;
- It reduces the cost and duplication of updating and distribution training material since it is centrally available;
- It allows for greater flexibility in scheduling training sessions;
- It allows learners to simultaneously connect from various locations;

- It allows for standardisation of training across the organisation;
- It incorporates technology that is already owned and already in use.
- It makes access and support easier (Longmire, 1999: 28; Adam *et al*, 2011: 23 &108; Khan, 2001: 14).

2.5.2 Disadvantages of Web-based training

Mason and Rennie (2004: 2), Ellis, Wagner and Longmire (1999: 20), WBTIC (2009), Adam *et al.* (2011: 108) and Khan (2001: 17) identify some distinctive disadvantages of Web-based training, which are discussed in the subparagraphs below:

2.5.2.1 Infrastructure disadvantages

- Poor bandwidth or network limitations;
- Unreliable networks;
- Technical difficulties and poor or limited knowledge of technology;
- Unavailability of technology, especially in rural communities;
- Data-intensive content could take time to download, regardless of speed. Users that use dial-up connections could be restricted when downloading audio, video and graphics;
- If links to resources are not maintained, dead links could lead to additional frustrations;
- High costs of broadband connectivity can make access to high speed connections challenging;
- Online activities could be time consuming;
- Additional software might be needed;
- Initial implementation might be costly;
- It might be difficult for learners and instructors to accomplish optimal functionality.

2.5.2.2 Instructor-related disadvantages or limitations

- Instructors may have limited access if certain concepts are unclear;
- Although much has been done to advance Web-based training, especially concerning video-conferencing and other tools, it still does not replace face-to-face training opportunities;

- Due to the fact that most Web-based training opportunities are self-paced, some learners might find it difficult to motivate themselves to attend and complete the training;
- Because learners can join and exit training at any time, they might find it difficult to re-join or complete certain sections or modules, and may have to duplicate the training in order to complete a section or module;
- Learners may initially struggle to access the training if they don't know the technology and its applications;
- Some course material formats are more advanced than normal software and applications and students may need specialized equipment in order to access training material;
- Variance in size and quality of computer hardware might jeopardize the quality of instruction; and
- Training programmes might be poorly designed and may influence the medium used to deliver the message (Khan, 2001: 18).

2.5.2.3 Economic disadvantages

- The costs to develop Web-based training programmes could be expensive because it is time consuming to develop quality Web-based training programmes (Khan, 2001: 18);
- Considerable cost investment is necessary to develop equipment, software and other necessary applications; and
- Web-based training is more appropriate for larger numbers of people than for small, specialized groups, and once-off training sessions are too costly and should be avoided (Khan, 2001: 18).

It is necessary to identify applicable Web-based tools and technologies in order to understand the advantages and disadvantages of Web-based training opportunities and facilities.

2.6 Web-based training tools and technologies

Adam *et al.* (2011: 42) discussed new and emerging technologies for the distribution of content for e-learning. According to Adam *et al.* (2011: 42) new technological innovations

make the distribution of content for learning much easier, more accessible and customisable for dissemination purposes. This is in line with what Boisvert (2000) wrote about Web-based training expectations. Adam *et al.* (2011: 26) states that it is a general believe that broadband tools and technologies empower learning and promote change and development skills, although the evidence to support their impact is vague.

The emphasis of this study is on Web-based learning, but more specifically, on Web-based training tools and technologies. Broadband is a necessary requirement for all Web-based tools and technologies which require high transmission speed to transfer data, audio, video and graphics via the Internet (Emerson, 2006).

Burns (2013: 30) identified five e-learning tools, namely:

a) Audio learning tools
   Examples of audio learning tools include interactive radio instruction for broad- and narrowcasting, audio conferencing, two-way radio, broadcast radio and podcasting.

b) Televisual learning tools
   Examples of television learning tools include broadcast television, video and video conferencing.

c) Multimedia learning tools
   Examples of multimedia learning tools include interactive video, CD-ROM, DVD, interactive multimedia, computer aided instruction and gaming technology.

d) Web-based learning tools:
   Examples of Web-based learning tools include computer mediated communication, online courses, virtual classes, Webinars, Webcasts and simulations.

e) Mobile learning tools:
   Examples of mobile learning tools include smartphones, cell phones, tablets and MP3 players.

This study focuses on Web-based learning and training tools. According to Adam *et al.* (2011: 42) and according to the categories provided by Burns (2013: 30) the most relevant software tools and technologies for Web-based training are as follows:

2.6.1 Computer-mediated communication tools

Computer mediated communication is an information exchange via the Internet between individuals or groups from different geographical locations. One of its purposes is to share, communicate and disseminate information for Web-based learning and more specifically, for training (Lo, 2009: 205).

2.6.2 Web 2.0 tools

Web 2.0 refers to a second generation design and development of the Web which was designed for purposes of communication that uses applications that allow a user to be both receiver and contributor, resulting in a much wider audience (Tripathia & Kumarb, 2010; Adam *et al.*, 2011: 42). Adam *et al.* (2011: 45) argues that the use of these tools and technologies will create a demand for broadband which will facilitate more effective and efficient use of these tools. The use of these tools and technologies equalised the global access to education, and serves as the strongest argument for the digitisation of learning in all of its forms and formats (Adam *et al.*, 2011: 44).

The following section will discuss blogs, vlogs, podcasts and vodcasts as part of Web-based training, as it influences professional development within libraries.

a) Blogs and vlogs

“Blog” is a shorter word for “Web log” (Kajewski, 2007). Both Adam *et al.* (2011: 42) and Kajewski (2007) describe a blog as a frequently updated Website that features a diary-type commentary by a person or a group, usually covering a specific field of study that requires little technical background. Blogs are mainly used to speed up publishing processes since individuals can create and publish content on various Internet spaces such as Blogger (Kajewski, 2007). Apart from articles presented in blogs, other types of media can be presented in vlogs, including video material (Adam *et al.*, 2011: 42), sketchblogs that contain sketch portfolios, photoblogs comprising of photographic portfolios, and phlogs hosted on gopher protocols (Wikipedia, 2013). Although blogs are text based, vlogs and photoblogs contain video, audio and graphics and need broadband connectivity for effective and efficient use because they are data intensive services or applications.

b) Podcasts and vodcasts

The word “podcast” is a combination of the words “iPod” and “broadcast”. Podcasts are a series of audio files made available over the Internet through various applications and programs. Podcasts differ from other downloadable audio files on the Internet in a way that their distribution is automatically done through RSS (really simple syndication/rich site summary). Unlike blogs, podcasts and vodcasts require subscription to be accessed (Kajewski, 2007). Podcasting, as defined by Adam *et al.* (2011: 44) involves a combination of hardware, software, applications and Internet connectivity to allow the downloading of audio and video files to a computer, a smartphone or a MP3/MP4 player in order to listen or watch it whenever it is convenient to do so (Adam *et al.*, 2011:44; Kajewski, 2007). Most libraries use podcasts as training tools for electronic resources. Podcasts are provided in short informational episodes, such as new product introduction, new functionalities on vendor platforms or on-demand tutorials (Kajewski, 2007).

2.6.3 Live streaming

Even though the potential of online learning and Web-based training seems infinite, librarians need to find ways to balance the delivery of service with the challenge to maintain and enhance their professional development skills (Ecclestone, 2013). Various available online courses, virtual classes, webinars and conferences, not necessarily in librarianship, can have a tremendous impact on the knowledge, understanding, expertise, productivity and quality of service rendered by librarians in the specific subject fields they serve (Ecclestone, 2013). According to Ecclestone (2013) librarians have a choice of a wide range of course offerings to choose from to enhance their knowledge to encourage leadership and to enhance managerial skills and strategic thinking.

An online course is a series of lessons that can be accessed from the Internet with the use of a Web browser, or applications that use a mobile device anywhere and anytime at the convenience of learners (IDEA, 2012; Ecclestone, 2013). Most of the times these sessions are conducted with live streaming of audio and/or video which enable learners to interact directly with trainees. An online course comprise of educational information, communication and evaluation of the student, course and instructors (IDEA, 2012). Communication or interaction among the various stakeholders of online courses can be applied using

messaging tools and applications such as electronic mail, chat services and discussion forums (IDEA, 2012). Although a number of universities offer formal online courses called massive open online courses (MOOCs) (Ecclestone, 2013), most online courses are designed to offer personal knowledge for the purpose of lifelong learning. They are therefore designed to continue learning and to build new skills once formal education has been completed (IDEA, 2012).

Rouse (2010) describes the virtual classroom as an online learning environment where classes are conducted with the use of the Web and specific software and applications. There are two types of virtual learning environments, namely synchronous and asynchronous learning environments. In synchronous learning environments students participate simultaneously in virtual classrooms. The software allows for real-time collaboration and is also used for Web or online conferencing, video conferencing, live-streaming, and Web-based voice over Internet protocol (VoIP) used for teleconferencing. Asynchronous learning environments, and the software used, allow for added communication functionalities such as message boards and chat capabilities (Rouse, 2010).

A webinar, also known as a “webcast”, an “online event”, a “Web seminar” or according to Kajewski (2007) a “Web conference”, is usually hosted by an organisation or a company which broadcasts messages to a select group through the Internet (FSCO, 2013). It allows the speaker from the hosting organisation or company to share information such as presentations, videos, websites, multimedia and other content with his or her audience across geographical boundaries. Kajewski (2007) adds that these conferences, seminars or meetings are interactive in nature (FSCO, 2013).

An online conference uses the Internet to host a conference, and to reduce cross-border geographical limitations and expensive travel, accommodation and venue expenses for participants. Participants are able to logon and attend as many sessions as possible or to attend only selected sessions. Just like online courses or classes, online conferences can either be synchronous, asynchronous or both (Online Conferencing, 2013; Kajewski, 2007). Participants who attend live sessions can either respond by using text messaging capabilities or via a microphone talking to the presenter and other participants (Kajewski, 2007). Kajewski, (2007) suggests that librarians could use broadband tools such as

webinars, online courses and Web conferencing to enhance their services to their communities, and thereby saving travelling expenses while bringing libraries and library staff together in order to find ways of sharing ideas and keeping staff up-to-date with the latest technologies and their implementation.

2.6.4 Video

Streaming video can be defined as video content that are sent over the Internet in a compressed format and viewed in either real-time or recorded form (Rouse, 2008). The video files are therefore not downloaded but sent in a continued stream while data is displayed as it arrives (Rouse, 2008). A user needs special software to view and listen to the videos, which is simultaneously uncompressed as data is received (Rouse, 2008). Most users will need a high speed Internet connection in order to view these videos (Rouse, 2008). YouTube is the most commonly known tool available although most companies that distribute electronic resources supply video streaming as a training facility to enable users to use their platforms more effectively and efficiently.

Most of these tools, whether it is used for live streaming or not, are bandwidth intensive and are therefore not suitable for most African countries with low bandwidth capabilities.

In order to determine the effect of the use of these Web-based training tools and technologies, it is important to discuss the development and various aspects thereof.

2.7 Aspects of development

Since in-service training is about skills and personal development, it is therefore important to discuss the terms ”development” and “skills development” because this study is about training and the skills that are developed to enhance services delivery and institutional and community development.

2.7.1 Development and staff development

The term development, as discussed under the heading “Concept clarification”, is a complex, term because it touches on various levels and stages of our lives and the environment where we live and function (Volunteering Options, 2008). It therefore serves to empower people and organisations (Volunteering Options, 2008; Wheeler, 2013). In the context of staff development it is a long term process designed to improve the effectiveness and efficiency of employees (Masadeh, 2003: 65).

2.7.1.1 Professional development

To define professional development one needs to first define the term “profession” in order to conceptualise the term. A profession is a discipline that is actively expanding and developing with continuous independent and disciplined education, training and learning activities (Pamment, 2008).

Pamment (2008) suggests that although librarianship is a profession, it is diverse by nature as most librarians specialise in certain fields of the profession. This is referred to as a federated profession. Librarians, therefore, need to adapt and acquire new knowledge to develop them, because their profession changes and develops its various subfields and environments, especially in terms information technology development (Pamment, 2008; Corcoran & McGuinness, 2014).

Garavan, Morley and Gunnigle (2001) declare that institutions invest in professional development for human resource development (HRD) purposes in order to build current capacity, but also to maintain human resource capacity for future development and competitiveness. This conceptualises institutions as an assortment of competencies where learning, education and training, together with experience, becomes critical factors towards the accumulation of knowledge for HRD. Human capital development is therefore a key outcome of HRD (Garavan, Morley and Gunnigle, 2001).

2.7.1.2 Human capital development

Blundell, Dearden and Meghir (1999: 2) state that human capital is the result of a decision to invest into human resources to the point where the investment in earnings and training will

gain future returns. According to Blundell, Dearden and Meghir (1999: 2) the term "human capital" consists of three components namely:

- Early ability, meaning skills and expertise that were either taught and/or instinctively learned. In other words, an individual is born with a set of inborn capabilities or talents;
- Qualifications, meaning that knowledge, competencies, skills are gained through formal educational; and
- Expertise, meaning that knowledge, competencies, skills are gained through on-the-job experience and training.

Blundell, Dearden and Meghir (1999: 17) make a connection between human capital development and economic growth. They state that education and training have an important indirect influence on economic growth, and therefore investment into human resources and equipment that assist the process are to be encouraged because it leads to a highly educated, skilled workforce.

2.7.1.3 Capacity building

In order to understand the term "capacity building" one should clarify the term "capacity". Capacity can be defined as the ability of people, organisations or systems to effectively, efficiently and sustainably perform appropriate roles. (UNESCO: IIEP, 2006: 1).

The International Institute for Educational Planning (UNESCO: IIEP, 2006: 1) concur that there are no single definition for capacity building because its meaning does not focus only on individual training anymore but it focuses more on the individual capacities linked to institutional or system performance at large. It therefore emphasises capabilities to perform core functions and effective and efficient problem solving in order to achieve the goals and objectives of the institution for further development (UNESCO: IIEP, 2006: 1).

2.7.1.4 Skills development

Skills development can be explained as individual development or self-development that adds value to both institutional and personal career development. Skills development, therefore, fosters an appreciation for lifelong learning that leads to career success through

the identification of training and on-the-job learning opportunities to develop needed skills. (University of California, Berkerley, 2014).

Since broadband can play an important role in corporate training and in delivering training material and/or training via video or live streaming, it is important to clarify technical concepts such as broadband. In the next paragraph broadband and its effect on development will be discussed.

2.8 Broadband as a tool for development

Recent developments emphasised the rapid growth in the availability of broadband and opened up possibilities concerning scope and methods to transfer knowledge (Bacsich & Brown, 2002: 3). Due to the growth in broadband availability, the OECD (2012: 153) states that the world economy grew exponentially based on productivity due to the use of broadband tools and technologies and the creative ways in which information is shared. Increased broadband penetration rates, therefore, lead to the realisation of the importance of broadband across the globe as confirmed by the OECD (Broadband Commission for Digital Development, 2013; Chiware, 2010; OECD, 2003: 2).

According to UNESCO (2012) the World Bank indicated in 2009 that there is a direct correlation between broadband penetration rates and GDP growth. A 10% increase in broadband penetration will respectively yield a 1.21% and 1.38% increase in the GDP growth for high and low/middle income countries, which implies that broadband is critical for the development and improvement of lives in all sectors, including education, as it will enable the sharing of information via the cloud, using video, text and voice.

For the eradication of inequality, faster progress is needed towards broadband accessibility, its tools and technologies. Web-based training tools and technologies could therefore be utilised to develop and access training programmes that will be accessible by everyone around the globe (UNESCO, 2012).

Hansson's (2008) perspective concerning general development of individuals, firms, organisations, regions and communities at large deals with the development of human capital. Hansson (2008) states that although initial primary and secondary education can be seen as a vehicle for the improvement of human capital, the real investment in overall development is made in the labour market. This is evident from labour statistics where 2.3% of the total labour costs are spent on training in comparison with the European Union's percentage of 15% to 40% in 1999 (Hansson, 2008). This points to a considerable amount of money spent on on-the-job training in developed countries (Hansson, 2008). Although some governments, like South Africa – as is evident in the Skills Development Act (Adam *et al.*, 2011: 50) - consider employee development important, only a few organisations have attempted to promote the scope and importance of training. This situation provides no incentive for individuals to attend training (Hansson, 2008).

To emphasise Hansson's (2008) viewpoint concerning the role of education and training, the OECD (2013b: 3) states: "The main assets for any firm, especially small and medium sized enterprises (SMEs) are their human capital." This, according to the OECD (2013b: 3), is more important for the development of a knowledge-based economy, where knowledge and experience become more and more important. The OECD acknowledges that it is difficult to engage staff to gain new knowledge or to upgrade lifelong skills (OECD, 2013b: 3). Adam *et al.* (2011: 20) take this one step further by stating that if educators and organisations cannot use the available infrastructure effectively and efficiently, they will not be able to incorporate and integrate technology into the learning process.

Businesses across the globe spend millions of dollars to recruit skilled employees or to develop training programs to raise the skills levels of their employees. Due to decreasing budgets and economic challenges, the development of expensive training programs will soon diminish if the use of technology cannot bridge the gap between the "knowledge have and have not's" (Trilling & Fadel, 2009: 7). In the knowledge economy, the competitiveness of a well-educated workforce is seen as a critical success factor. With this fact in mind countries realise that by only improving their literacy skills by a fraction, they could improve their economies and cause people to uplift their standards of living significantly (Trilling & Fadel, 2009: 8; UNESCO, 2013: 4).

The importance of technology on professional and human capital development through education, training and learning emphasises its role in the overall economic development (Oshikoya and Hussain, [2000]: 7). Education and training can therefore not be separated from technology as the advances in connectivity transformed the world into a complex and interconnected knowledge driven society (UNESCO, 2013: 6). Technology is therefore seen as the key to building participatory knowledge societies, despite the disparity among rich and poor. Knowledge-based societies suggest that human capital or professional development serves as a success factor for organisations at large to provide a competitive advantage. Good connectivity is therefore critical for the process of lifelong learning, especially to develop appropriate formal and informal skills to maintain a competitive edge (Mason & Rennie, 2004: 2). Although countries around the globe is under pressure to bridge the digital and knowledge divide by providing Internet, and especially broadband connectivity, to all, much is still required to enable the full potential of technology in the digital age (UNESCO, 2013: 6). Mason and Rennie (2004: 1) add to this by stating that although broadband connectivity has its challenges in developing economies, it has the potential to overcome challenges by looking at the advantages and disadvantages thereof.

Knowledge societies are seen as critical sources for the development of domestic and socio economies by laying a foundation for basic skills development (Adam *et al.*, 2011: 16). This basic knowledge expanded in the 21st century, including not only creative thinking, problem solving, effective communication, information identification and analysis, and the creation of new knowledge, but also include the use of broadband tools and technologies to enhance skills for overall development - not just for the institutional community but also for the general community at large (Adam *et al.*, 2011: 16).

2.9 The role of broadband tools and technologies for professional development

By using broadband tools and technologies the human limitations of time, space and knowledge continue to break boundaries, thereby expanding our horizons in the process of developing and improving learning opportunities at large (UNESCO, 2013: 4). To foster knowledge and skills necessary for lifelong learning, together with the effective use of broadband tools and technologies, governments across the world acknowledge the fact that

technology has not been effectively used for professional development purposes (UNESCO, 2013: 15).

UNESCO (2013: 8) acknowledges teaching in the twenty-first century in a globalised economy where the success of countries depends on the skills of their workforce. The rapid development of technology drives the world's economy, and that is why it becomes so important for people to stay abreast with the advances and changes in their various professional fields, and to take part in the knowledge economy (UNESCO, 2013: 14). UNESCO (2013: 9) indicates that the use of broadband tools and technologies not only eliminates inequalities, but it also improves the quality of teaching and learning, which in turn, will increase the possibilities to access education and learning opportunities and to provide learners with technological experience to participate in the global economy.

Constant technological developments (Trilling & Fadel, 2009: 23) and changes force employees to acquire the ability to adapt quickly by applying new knowledge and applicable required skills for possible problem solving, communication and teamwork to innovate and increase productivity (Trilling & Fadel, 2009: 11; Adam *et al.*, 2011: 16). Broadband equalises opportunities between developed and developing countries by providing the same quality resources to all and where information can be shared among professionals who obtain experience from across the globe. This will provide opportunities for intellectual gain, and especially workplace performance, in the form of voice, video and data over high speed connectivity (UNESCO, 2013: 4; Adam *et al.*, 2011: 46).

UNESCO (2013: 14) and Trilling and Fadel (2009: xxvi) constituted a set of skills that, in today's knowledge economy, are required to be incorporated in everyday work activities leading towards advanced job performance. Included in this set of skills are learning and innovation skills such as communication and lifelong learning skills and digital literacy skills.

Oshikoya and Hussain ([2000]:1) identify the promotion of human capital development as one of the sectors where technology can alleviate poverty and accelerate the pace of economic growth. Adam *et al.* (2011: 10) identify five key technological areas where ICT

and broadband technologies could improve and enhance the transformation of education and training in Africa. The applicable areas are as follows:

- Professional development. The challenges comprise mostly of a lack of funding and access to broadband and its tools and technologies. Further to this is the lack of knowledge, resulting in an uncertainty to use the technology – specifically new technologies and digital learning resources (Adam *et al.*, 2011: 46).
- Digital learning resources include applications and specialists such as human experts, e-learning platforms, management information systems, video-conferencing tools and technologies, social media, live streaming, Internet and mobile applications. These resources facilitate advanced capacity on demand across multiple disciplines. The notion of using sharable expertise with the assistance of broadband, opened up opportunities for professional development by large, and therefore opened up an array of prospects to collaborate sharing concepts (Adam *et al*, 2011: 46).
- Affordable technologies. Technologies such as Web-based tools and technologies should be affordable in the sense that their use have to show prove of return on investment. According to Adam *et al.* (2011: 27) in many instances, especially in developing countries, this proves to be challenging because broadband appears to be unaffordable. Infrastructure and compatibility between devices and networks, especially in developing countries, seem to be a challenge, although developing countries have made efforts towards improvement (Adam *et al.*, 2011: 27).

Libraries are trying to cope with all these changes by focussing on the benefits that these technological changes can offer to their profession. Ameen (2011) suggests that no professional program is sufficient, especially concerning future changes and developments, and that learning needs to be continuous. Continuous professional development is therefore the responsibility of both employers and employees. Although employers expect initial librarian training to be sufficient, and therefore do not invest or facilitate additional training for these professionals, the most common forms of continuous professional development for librarians are seminars and workshops which, in most cases, introduce new technologies (Ameen, 2011). Although extensive ICT training is needed, Ameen (2011) states that the most common training opportunities requested by librarians, for professional development, are:

- Training in library software;
- Training in electronic tools such as RDA and other thesauruses; and

- Training in searching techniques to use databases and open access resources.

2.10 Broadband as a tool for development in libraries

Libraries, according to the American Library Association (2013), have developed services and products that rely on broadband. These developments initiated a constant dependence on broadband telecommunications, especially to access products and services such as databases, electronic journals, electronic books and discovery tools. Many services and products have been provided using broadband technologies at reduced costs due to the fact that it is available over the cloud or due to their accessibility and manageability over the Internet (ALA, 2013). Services such as discovery tools, document delivery and even training of e-resources depend on broadband as large amounts of data can either be downloaded or viewed using browsers and other web or mobile services and applications (ALA, 2013).

Although access to information has been increased to include developing and poor nations to a wealth of information, Denison (2011) states that broadband, in itself, also caused a consciousness of digital exclusion because poor nations do not necessarily have the funds to access information that are sometimes desperately needed. Although broadband opened up opportunities to access information, many people can still not afford to access information (Denison, 2011; Chiware, 2010). Apart from having funds to access information, skills are also needed to use electronic resources effectively and efficiently. Denison (2011) claims that the opportunities for libraries that have broadband connectivity have to focus on access, content and services, and especially education and training.

At a conference on “Broadband and Libraries” Gibbs and Casey (2011) gave an overview of the future of libraries and broadband, and encouraged librarians to transform. They also provided some trends that libraries need to consider. Some of these encouragements include the embracement of new technology and to change existing library systems and services to incorporate new technologies. They also emphasised and encouraged lifelong learning and to incorporate complicated technologies for the benefit of users; to embrace a verbal society by using various applications; to keep up with the increasing demand for information; to integrate systems and new innovations; and to embrace the knowledge economy with experience and culture (Chiware, 2010; Li, 2006).

Training, with the use of broadband tools and technologies, has become an integrated part of a librarian's daily activities and it will therefore be critical to establish advantages, disadvantages and challenges by using Web-based training tools and technologies with the aim of promoting lifelong learning.

2.11 Web-based training opportunities for librarians

The central role of an academic library is to support teaching, learning and research within their specific environment. University staff and students, therefore, depend on the library for the provision of quality and scholarly information. Libraries, in particular, have to provide services with the necessary equipment and have to give access to online information resources (Chiware, 2010; Corcoran & McGuinness, 2014). Other roles of libraries include the training of staff and students about the library and its services, and ensuring that the information needs of its patrons are successfully addressed. The latter could be accomplished by strategic directions and proactive activities (Chiware, 2010).

Although the priority of librarians still lies with fulfilling the information needs of their users, the increased number of electronic resources compel librarians to develop systems and software to make the selection process easier and more effective (Chiware, 2010). It is, however, important to note that these tools and platforms will continue to change and that more bandwidth and broadband capacity will be necessary in order to deliver these services (Chiware, 2010). Although many African countries and universities of technology are challenged with limited broadband capacities, some, like the TUT, has overcome this challenge.

Quality information resources are critical to the quality of a library's service delivery (Li, 2006). These services include bibliographic instructions via the online catalogue, digital repositories, distance learning and training services, electronic resources, governmental and research documentation, document delivery, instant messaging, social networking and virtual classrooms (Li, 2006). In many instances skills to deliver these services are expected to be learned on-the-job and therefore librarians have to sink-or-swim to keep abreast with new developments in the absence of induction programmes. In most cases librarians learn

new skills from colleagues in order to solve problems and to learn how to use new technologies that are continuously being developed (Corcoran and McGuinness, 2014).

A study conducted by Corcoran and McGuinness (2014) showed that librarians attend mostly professional and formal educational programmes and conferences, use online tools, and to a limited extend use professional literature to stay up-to-date with the latest technologies. It is agreed that it is not only the databases they use or the subject areas they serve that influence the quality of their service, but developments in the library environment also seem to influence the quality of services that librarians deliver (Corcoran & McGuinness, 2014).

A Delphi study by Feret and Marcinek(1999) identified important innovations and trends in academic libraries, including how technology will impact on libraries, the role on which academic libraries need to focus, and the skills needed by new librarians (Feret & Marcinek, 1999). Library staff will be expected to have the necessary knowledge in order to guide and train users. Feret and Marcinek (1999), therefore, suggest that continuous training for professional development needs to be part of the librarian's everyday routine.

Most studies focus on e-learning and the library's support for the academic environment, or they focus on formal education in the e-learning environment. No research has been conducted that uses the e-learning environment for the enhancement of skills for the librarian (Ollé & Borrego, 2010; Sun, Chen &Tseng, 2011; Cheng 2009: 2). Cheng (2009: 2) recognises that librarians realise the importance of Web-based training for professional development, especially in their own field of study. According to librarians they have been forced to take responsibility for continued lifelong learning on their own. Because it has been a challenging process for librarians they had to make use of service providers, vendors and publishers to train them to stay abreast with available technology. With all the new innovations, tools and technologies available, librarianship is undergoing a huge transformation and according to Horvat (2004) basic tertiary education for librarians is not appropriate to equip librarians for life.

Most publishers are making use of Web-based tools and technologies, not only to promote the use of their electronic resources but also to ensure that databases are used effectively and efficiently. This is evident from the website of one of the most prominent databases for librarians and other management sciences which states: "[It]is designed to provide you with information on Emerald's database, both content and surround and the knowledge to help fully understand the functionality and gain maximum benefit from Emerald Management e-Journals" (Emerald, 2013). Many publishers and online information providers such as Springer (Springer, 2012), Elsevier (Elsevier, 2013), Emerald (Emerald, 2013), EbscoHost (Ebsco, 2013), ProQuest (ProQuest, 2013) and many others provide online tutorials on their websites or on YouTube as online video streaming. They also provide live tutorials where one can make online bookings.

2.12 Web-based training in TUT

Training in TUT has been exclusively preserved for formal training programmes and conferences. Although Web-based training for databases has been introduced - based on geographical considerations and opportunities presented by vendors - it is doubtful whether Web-based training programmes has been incorporated into the day-to-day activities of librarians for them to keep up-to-date with the latest technologies, as suggested in the literature. To prepare the TUT library community for the future, it will be necessary to incorporate and enforce web-based training programmes into their day-to-day activities. This will ensure service delivery to be more effective and efficient for all staff and students.

Considering the advantages of Web-based training and what vendors are able to offer, and also considering that TUT has the broadband capacity to access these web-based training sessions, very few librarians can say that such training sessions cannot be conducted - unless some of the disadvantages of Web-based training hinder the opportunities presented. Since TUT librarians have the same access opportunities to Web-based training sessions as other librarians in South Africa and abroad, it will assists in answering the sub-problem statements, namely:

a) Establish if the Tshwane University of Technology (TUT) has the broadband capacity to use data intensive Web-based training tools and technologies;
b) Establish if librarians of TUT use data intensive Web-based training tools and technologies offered by vendors;

c) Establish what Web-based training tools and technologies are used and why they are used;
d) Establish the advantages and disadvantages of using Web-based training tools and technologies; and
e) Determine if the use of these Web-based training facilities will ensure the development of staff in order to deliver better service and to improve the community

2.13 Conclusion

According to UNESCO (2013: 12) broadband, due to better capacity and higher speeds at which data can be transported, opened up opportunities for training in the library environment. This can lead to better service delivery and the implementation of better tools, technologies, systems and services. The question of whether librarians make use of Web-based training in order to expand their knowledge and to keep up-to-date with the latest tools, technologies, services and systems, is answered in Chapter 4. This question also forms the basis of the research methods discussed in Chapter 3.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Chapters 2 and 3 of this mini-dissertation provide a theoretical discussion of the advantages and disadvantages of using broadband tools and technologies by TUT librarians. Chapter 2 provide a literature review of broadband in general, broadband as a tool for development, broadband as a tool for educational development, broadband tools and technologies for Web-based training opportunities for librarians, and broadband as a tool for the development of libraries.

The purpose of this study is to establish the value of using broadband Web-based training technologies, by determining the advantages and disadvantages of using it. As outlined in Chapter 2, vendors of library products and services already supply Web-based training opportunities and facilities. Although the literature review indicated that advantages and disadvantages of Web-based training have been established, the review did not indicate what facilities librarians use and what impact the use of those facilities has on their personal development and on the level of service delivery and on the community at large.

Research is a structured plan where data is collected, analysed and interpreted in order to answer a specific research question (Neuman, 2000: 2). Neuman (2000:2) is also of the opinion that in answering a research question scientists should be neutral and impartial and acknowledge any possible biases. In order to do so Chapter 3 focuses on the research design, the population, sampling and research instruments used in this study.

3.2 Research approach and design

3.2.1 Research approach

This study is mainly a qualitative study and focuses on librarians' perspectives of using broadband tools and technologies for Web-based training. It describes people and their experiences in a specific context where little knowledge of the subject is known. In view of this, a number of research assumptions were made in order to describe the two paradigms applicable. These relate to theoretical propositions, namely positivism and anti-positivism (Dash, 2005).

Positivism is an objectivist approach that focuses on quantitative research methods such as analysis, experiments and surveys (Dash, 2005). This study used two questionnaires, and because the majority of questions were open-ended and less quantitative of nature, a positivism paradigm was not suitable for this study.

Anti-positivism lean more towards a subjectivist approach and is used in a social phenomenon (Dash, 2005). The anti-positivism approach incorporates qualitative research approaches such as interviews, observation and personal communication such as questionnaires. Anti-positivism, according to Dash (2005), focuses on social reality in view of the participant's knowledge, experiences and opinions which is a complex approach with multiple interpretations. Anti-positivists identified three schools of anti-positivism that emphasise human interaction with a phenomena that impact on the social being of the human race namely, phenomenology, ethnomethodology and symbolic interactionism (Dash, 2005). According to Dash (2005) "Phenomenology is a theoretical viewpoint which believes that individual behaviour is determined by the experience gained out of one's direct interaction with the phenomena."

This study is about determining the advantages and challenges of skills development when using broadband tools and technologies. The study was conducted to inform libraries about the importance of broadband for the development of their staff, to enhance services delivery and the providing of equal opportunities, and to enhance librarians' knowledge of critical changes in their work environment. An understanding, from a librarian's point of view, of the advantages and the challenges concerning the use of these tools and technologies, together with the analysis of their responses, can lead to an understanding of why these technologies are not fully used. An understanding of how the tools and technologies are used can also

influence the work environment in general. The use of broadband, as a new phenomenon in the development of librarian skills and the gaining of knowledge, serves as a social investigation to the development of the library society.

An anti-positivism approach was preferred for this study because the study used mostly a qualitative method (using phenomena integrated in society), and used questionnaires for data collection purposes.

3.2.2 Research design

The research design is a comprehensive plan that entails the empirical research process to make decisions about data sampling, data collection and the analysis of data (Terre Blanche *et al*. 2006: 48-49; 57; Bhattacherjee, 2012: 35). It provides a framework for the way in which data will be gathered, analysed and how conclusions will be structured and presented (Leedy, 1993:127).

After consulting Gabriel (2014) and Bhattacherjee (2012: 35) this mini-dissertation focused mainly on data based on human experiences, derived from the qualitative method - although a mixed method approach was followed, the approach to this study was more qualitative than quantitative because the researcher was actively involved in the research. This study, therefore, combined qualitative with quantitative methods as described by Bhattacherjee (2012: 35). This study used two questionnaires with open ended and closed questions and the answers were scrutinised for the analyses of the research project.

Various authors view a mixed approach positively, for various reasons. Bhattacherjee (2012: 35) argues that a mixed approach could provide a unique insight and it is therefore often desirable. Denscombe (2001: 173) and De Vos (2002: 369) state that especially social researchers should not rely on one method alone, and that using only one method can be seen as superficial. De Vos (2002: 369) further states that a quantitative method requires the knowledge gained from a qualitative method.

The quantitative data gathered in this study determined how many Web-based tools and technologies were used by how many librarians, while the qualitative data collected determined why certain facilities are preferred, while focussing on the advantages and disadvantages of these tools and technologies in general.

3.2.2.1 The qualitative method

Cresswell and Clark (2011: 8), Patton (2002, 14) and Denscombe (2001: 175) declare that a qualitative method offers a deep and detailed understanding of a problem because qualitative researchers rely on detailed descriptions to elaborate on the complexity of the research conducted.

A qualitative research method is seen as an unstructured approach that allows for flexibility of research objectives, the design and the questions being asked (Kumar, 2005: 12). A qualitative method describes the data collected in words rather than in numbers, and the purpose is to inspire a more in-depth understanding of the problem by using the questionnaires (Denscombe, 2001: 174).

3.2.2.2 The quantitative method

Quantitative research, according to Denscombe (2001: 174), is associated with numbers as the basis of analysis. The purpose is to quantify the phenomenon and to analyse the results by means of statistics and follows a structured approach. Kumar (2005: 12); Terre Blanch *et al.*, (2006: 132) and Cresswell and Clark (2011: 8) state that quantitative research provide a more generalised understanding of a problem because results can be applied to a broader population.

In the following section attention is given to the research design of the study. This will include a description of the population, sampling, research instruments, analysis, interpretation and reporting.

3.3 Population and sampling

3.3.1 Selection of participants

The data collection design includes the sources of the data collection, the population used for data sampling, and the sampling techniques. Primary data sources are the raw data provided by the original party who answer the research questions (Cooper & Schindler, 2001: 260; Mouton, 2001: 71, Struwig & Stead, 2001: 86, 98). In this study primary data sources were mostly used for the purposes of answering the research questions via online questionnaires.

Cooper and Schindler (2001:769) differentiate between defining the population and the population element. The population and population element in this study can be defined as information librarians and information literacy trainers, and in rare cases, the head of the library at various campuses of the Tshwane University of Technology, Library and Information Services. E-resource vendors in South Africa were also included in the population.

Since it is still impossible to include all the librarians in the world, this study focused specifically on academic librarians and the status of Web-based training by librarians of TUT.

Since this study focuses specifically on groups of people that meet certain criteria, the sampling technique was criterion sampling. The first set of criteria for the first group was that they must be librarians and the second set of criteria was that they must use databases as part of their work. The third set of criteria was that they have to use Web-based training in order to enhance the service that they deliver. Since the study focuses specifically on TUT librarians, the last criterion was that participants have to be employed as a librarian at TUT.

The vendors that were included in the sample were purposefully selected. They were South African based vendors who provide Web-based training to librarians and end-users. The criteria that applied for vendors were that they have to provide e-resources to the TUT Library and Information Services and they must be based in South Africa. Considerations

regarding sample selection were based on Struwig and Stead (2001:109), Chadwick, Bahr & Albrecht (1984:100) and Mouton (2001:105).

This study deals specifically with e-resource training for librarians. The information librarians and information literacy trainers were identified as the population because they use Web-based training to enhance their knowledge about the various e-resources at their disposal. Since the study focuses on using broadband for Web-based training at the Tshwane University of Technology, the population element can be defined as South Africa in the context of academic institutions with specific reference of the Tshwane University of Technology. The study focuses on librarians, and on the Library and Information Services.

Since the focus of this study is on the use of broadband for Web-based training to provide e-resources, the population of the study was enhanced to include e-resource vendors based in South Africa because they know the country's geography, broadband capacity and library environment.

3.3.2 Challenges encountered

3.3.2.1 Questionnaire participation

Survey A:

Questionnaires in Survey A were sent to 32 participants. One questionnaire was sent to the researcher for control purposes, one librarian passed away during the runtime of the survey and another was sent to a librarian who is no longer employed by TUT. Those three questionnaires were not taken into account and for all practical purposes only 29 questionnaires were sent to TUT librarians across all 12 campuses. Twelve (41.4%) of the 29 possible participants completed the survey. Since no feedback was received as to why the librarians did not complete the survey, one can only assume possible reasons why they did not participate. The possible reasons are:

a) Some librarians might have been absent from work during the runtime of the survey, either on leave or on sick leave;

b) Some librarians might have ignored the request to complete the survey because they were under no obligation to complete the questionnaire, as stated in the cover letter;
c) Some librarians might have been too busy to take the survey; and
d) Not all librarians have made use of opportunities before to use broadband tools and technologies for Web-based training and therefore might have decided not to complete the survey.

Survey B:

Questionnaires in Survey B were sent to 11 participants. One questionnaire was sent to the researcher for control purposes only. For all practical purposes only 10 questionnaires were been sent to TUT online service and product suppliers based in South Africa. Five of the 10 possible participants completed the survey. Since no feedback was received as to why these vendors did not complete the survey, one can only make assumptions as to why they did not participate. The possible reasons are:

a) Some vendors might have been absent from work during the runtime of the survey, either on leave, on sick leave or on the road busy with clients;
b) Some vendors might have ignored the request for completing the survey as they were under no obligation to do so, as stated in the cover letter;
c) Some vendors might have been too busy to complete the survey;
d) Some vendors did not complete the survey since not all of them made use of the opportunities to use broadband tools and technologies for Web-based training purposes;
e) Some vendors might have decided not to take the survey based on the uncertainty of revealing possible competitive information, in spite of the assurance in the covering letter that no company names would be revealed and that confidentiality of data will be assured.

3.3.2.2 Distribution of questionnaires

The researcher liaised with two separate departments of the Tshwane University of Technology's (TUT) Library and Information Services (LIS).

Survey A:

For survey A, the TUT LIS Director was contacted to provide a list of all relevant librarians. A list of 32 librarians was provided to the researcher. No sample was taken because the number of librarians was small enough to be managed and therefore questionnaires were sent to all of them.

Survey B:

For Survey B, the Head of the Information Resources Management Department of the TUT LIS was contacted to provide a list of all the electronic resource vendors in South Africa. The names of 11 vendors of electronic resource suppliers, based in South Africa, were supplied and therefore no sampling technique was used as the number was small enough to be managed and the survey was therefore sent to all of them.

3.3.2.3 Timing

Both surveys were distributed on November 9th, 2015 and reminders were sent weekly. Participants were requested to complete the surveys by December 9th. A low response rate could be due to timing and the possibilities listed in section 3.3.2.1. Since the questionnaires were distributed at a time when subscriptions to electronic resources had to be renewed, librarians and vendors could have been too busy to complete the questionnaires. It was also close to the time when librarians go on holiday. Some of them prepared for exams and they could have been on examination leave. The questionnaires were distributed quite late in the year due to the fact that the researcher had been hospitalised on several occasions since August 2015. The reasons given above could have impacted negatively on the results.

3.4 Research Instruments

3.4.1 Introduction

A variety of research strategies can be used to collect research data. The research strategy in this study used a survey in the form of online questionnaires. The reasons for using questionnaires was adapted from Botha (2008: 155), Chadwick, Bahr & Albrecht (1984:100) and Mouton (2001:105), and are listed below

- Questions are highly structured when specific questions are asked, although some questions may be open-ended to give opportunity for unstructured responses;
- Questionnaires can be sent to a large number of people at a time.
- Online questionnaires can be e-mailed to respondents, which is a quick and easy process, considering time constraints for the completion of the study; and
- Respondents can respond in their own time and pace and return it online or via e-mail.

The development of the questionnaires should address issues such as question content, phrasing, sequence and format (Botha, 2008:155). When preparing a questionnaire issues such as content and phrasing are important to assure that questions are adequately answered, properly understood, and willingly answered (Cooper & Schindler, 2001: 337; Botha, 2008: 155). Questions should therefore not be too ambiguous, too vague or too complex and should have a shared vocabulary.

The sequence of questions is important to keep the data collected relevant. This can be done by (a) triggering interest and motivate response, (b) by asking target questions at the beginning of the questionnaire, (c) by not including personal or threatening questions in the beginning of the questionnaire where continuation could be threatened, (d) by starting with elementary questions and targeting more complex questions later in the questionnaire, and (e) by keeping the frame of reference clear and organised (Cooper and Schindler, 2001: 356).

The questionnaires in this study were therefore introduced by asking general types of questions such as “Are you an information librarian or an information literacy librarian?” and “Have you ever used Web-based training before?” The questions that followed were of a more strategic nature such as “What tools and technologies have you used for Web-based training, and for what purpose?” After that, the questions were more complex and personal.

The formats of the questions were both structured (closed) and unstructured (open-ended) and comply with guidelines regarding question sequence. Usually open-ended questions can be answered in depth or be restricted. In this study some questions were restricted

although it was important to gather a complete view or opinion of the respondents to determine why some tools are used and others not, and to determine the reasons for using Web-based training, and the advantages and disadvantages of Web-based training. Information regarding questionnaire design was obtained from Chadwick, Bahr and Albrecht (1984:118).

Apart from doing a pilot study, the questionnaire was submitted to the ethics committees of both the Tshwane University of Technology and the University of Pretoria. The aim was to determine if the questionnaires would not infringe on the privacy and confidentiality of the respondents. The two questionnaires were also scrutinised by the supervisor of this mini-dissertation.

Data was collected by means of two questionnaires that were distributed to:

a) Librarians of the TUT LIS
b) Vendors and suppliers in South Africa who provide electronic resources to the TUT LIS.

The two surveys obtained quantitative data, but mainly qualitative data, by means of closed and open-ended questions. Survey A collected responses from librarians about Web-based training tools and technologies that they use, the reasons why they use it, and the advantages and disadvantages of using Web-based training facilities, and to what effect. Survey B gathered data from vendors and suppliers of electronic resources who offer Web-based training facilities by using broadband tools and technologies. This survey was mainly used to correlate data provided by librarians and also to provide another viewpoint regarding the advantages and disadvantages of using Web-based training facilities.

3.4.2 The questionnaires

Primary data sources are known as raw data provided by the original party, to answer research questions and to address the research problem. Raw data can be collected with questionnaires and the data can be qualitative and quantitative. The majority of questions in the questionnaires used in this study were open-ended questions, although some were

closed-ended. Information on questionnaire design was obtained from Cooper and Schindler (2001: 260), Mouton (2001: 71) and Struwig and Stead (2001: 86, 98).

A questionnaire was chosen as the primary research instrument for this study as timing was a main concern. The researcher used SurveyMonkey (http://www.surveymonkey.com) to create the questionnaires and to distribute invitations by e-mail to participate in the survey.

3.4.2.1 Advantages of questionnaires

Questionnaires require no personal interaction with participants and can be sent simultaneously to a number of people (Denscombe, 2001: 7). Questionnaires save time and since time was an important consideration in this research, it was considered and important reason to use this research instrument. Furthermore, a questionnaire had to be used because the researcher could not be personally involved in the study due to illness. An additional advantage of using a questionnaire is that it allows a wide coverage when a large sample has been reached simultaneously (Denscombe, 2001: 7). Using a questionnaire also proves to be inexpensive as free software, like SurveyMonkey (www.surveymonkey.com) and Google Forms (drive.google.com), can be used for distribution purposes, and questionnaires can be distributed anonymously (Kumar, 2005: 130).

3.4.2.2 Disadvantages of the questionnaire

Kumar (2005) states that there are a number of disadvantages of using questionnaires. One of the disadvantages is getting is a low response rate, which was also applicable to this study. This, according to Kumar (2005), can be avoided when improving the quality of the cover letter and the layout and length of the questionnaire. The questionnaires in this study (See Appendix A & B) were short and the estimated completion time was a maximum of 15 - 20 minutes. The cover letter is included as Appendix C.

There are a number of disadvantages of using questionnaires. A disadvantage that also applies to the current study is that questionnaires often elicit a low response rate. Kumar (2005) deems a 50% response rate good and warns that a response rate of as low as 20% may be expected. A low response rate can be avoided by improving the quality of the cover

letter to increase interest in the research topic. Another tactic is to ensure that the layout and length of the questionnaire is ideal. Respondents will also be less inclined to return a questionnaire that is complex and overly lengthy. The questionnaires (See Appendix A and B) that were used in this mini-dissertation were short and completion time was estimated at less than 15 minutes. The cover letters, (See Appendix C and D) introduced the study and covered the purpose of the research. Participants were informed of how many questions to anticipate as well as the estimated time it would take to complete the survey.

3.4.2.3 Content of the questionnaires

A demographic section was included in the questionnaires to ensure that the criteria for participation in the survey are met.

The content of the questionnaires is divided into 4 themes, namely:

a) The first theme deals with the broadband capacity of TUT to determine whether librarians of TUT can use data intensive Web-based training tools and technologies offered by vendors.
b) The second theme covers Web-based training tools and technologies. The questionnaires include questions to determine whether Web-based training tools and technologies have been used by librarians before and whether it is offered by vendors. If the answer to this question is negative, reasons had to be provided, and if the answer is positive, the respondent had to state what was used and why.
c) The third theme deals with the advantages and disadvantages of using web-based training tools and technologies.
d) The fourth theme deals with questions whether the use of Web-based training facilities will ensure the development of staff for better service delivery and an improved community.

3.5 Conclusion

Chapter 3 outlined the research methodology. The study used a mixed method approach by using two questionnaires complimenting one another. One questionnaire had to be answered by librarians of the TUT Library and Information Services, and the other

questionnaire was aimed at vendors or suppliers of online products and services situated in South Africa. The results of the research are discussed and analysed in Chapter 4.

CHAPTER 4: DATA ANALYSIS AND FINDINGS

4.1 Introduction

The purpose of this chapter is to describe the data collected with the two online surveys, and to establish interpretation and meaning. The surveys discussed in Chapter 3 focussed on a) broadband tools and technologies for Web-based training for TUT librarians and on b) broadband tools and technologies for Web-based training used by TUT vendors. This chapter aims to interpret and organise the data in terms of the central research question and sub-questions posed in Chapter 1. The data analysis was mainly done by the grouping data into themes which were subsequently analysed accordingly.

The first theme covers a brief discussion of the broadband capacity of TUT ensuring that TUT librarians can utilise data-intensive Web-based training facilities offered by vendors. The second theme covers Web-based training tools and technologies, whether they are used or not, and the reasons given by respondents. The third theme covers the advantages and disadvantages of using Web-based training tools and technologies, and the fourth theme covers the use of these Web-based training facilities and whether their use will ensure the development of staff for better service delivery and an improved community.

4.2 Background to the data collection

This study used the criterion sampling technique discussed in Chapter 3. Two online surveys were used to gather data and participants had to meet certain criteria. The paragraphs below contain some detail concerning the sampling criteria and the surveys in particular:

4.2.1 Survey A: Broadband tools and technologies for Web-based training for TUT librarians

4.2.1.1 Criteria used for sampling

- Participants must be employed by the Tshwane University of Technology.
- Participants must be trained librarians.

4.2.1.2 Demographic information

4.2.1.2.1 Consent

All participants had to sign consent upon the completion of the surveys, in which they:

a) Grant permission that they participate voluntarily in the survey, as explained in the cover letter;
b) Agree to the nature, objective, and possible safety and health implications as indicated in the cover letter, and that they understand it;
c) Indicate that they have the right to choose whether to participate in the project and understand that the information furnished will be handled confidentially;
d) Indicate that they are aware that the results of the investigation may be published.

4.2.1.2.2 TUT Librarians

Participants in the study had to be employed by the Tshwane University of Technology and had to be trained librarians. All the participants taking part in this survey were employees from TUT and were trained librarians.

4.2.1.3 Details concerning Survey A

Questionnaires in Survey A were sent to 32 participants. One questionnaire was sent to the researcher for control purposes, one librarian passed away during the runtime of the survey and another was sent to a librarian who is no longer employed by TUT. Those three questionnaires were not taken into account and for all practical purposes only 29 questionnaires were sent to TUT librarians across all 12 campuses. Twelve (41.4%) of the 29 possible participants completed the survey. Since no feedback was received as to why the librarians did not complete the survey, one can only assume possible reasons why they did not participate. The possible reasons are:

a) Some librarians might have been absent from work during the runtime of the survey, either on leave or on sick leave;
b) Some librarians might have ignored the request for completing the survey as they were under no obligation to complete the questionnaire, as stated in the cover letter;
c) Some librarians might have been too busy to take the survey; and
d) Not all librarians have made use of opportunities before to use broadband tools and technologies for Web-based training and therefore might have decided not to complete the survey.

4.2.2 Survey B: Broadband tools and technologies for Web-based training provided by vendors

4.2.2.1 Criteria used for sampling

- Vendors must render online library products and services to TUT.
- Vendors must have offices in South Africa.
- Vendors must provide Web-based training opportunities.

4.2.2.2 Demographic Information

4.2.2.2.1 Consent

All participants had to sign consent upon the completion of the surveys, in which they:

a) Grant permission that they participate voluntarily in the survey as explained in the cover letter;
b) Agree to the nature, objective, and possible safety and health implications as indicated in the cover letter, and that they understand it;
c) Indicate that they have the right to choose whether to participate in the project and understand that the information furnished will be handled confidentially;
d) Indicate that they are aware that the results of the investigation may be published.

4.2.2.2.2 TUT online service and/or product suppliers

The criteria to be selected a participant for Survey B were: (a) Participants had to be online product or service providers of the Tshwane University of Technology's Library and Information Services; (b) Vendors must occupy offices in South Africa or their permanent

employees must be stationed in South Africa; (c) Vendors must provide Web-based training opportunities. The criteria were met by all five participants who took part in the survey.

4.2.2.3 Details concerning Survey B

Questionnaires in Survey B were sent to 11 participants. One questionnaire was sent to the researcher for control purposes only. For all practical purposes only 10 questionnaires were been sent to TUT online service and product suppliers based in South Africa. Five (50%) of the 10 possible participants completed the survey. Since no feedback was received as to why these vendors did not complete the survey, one can only make assumptions as to why they did not participate. The possible reasons are:

a) Some vendors might have been absent from work during the runtime of the survey, either on leave, on sick leave or on the road busy with clients;
b) Some vendors might have ignored the request for completing the survey as they were under no obligation to do so, as stated in the cover letter;
c) Some vendors might have been too busy to complete the survey;
d) Some vendors did not complete the survey since not all of them made use of the opportunities to offer broadband tools and technologies for the purposes Web-based training; and
e) Some vendors might have decided not to take the survey based on the uncertainty of revealing possible competitive information, in spite of the assurance in the covering letter that no company names would be revealed and that confidentiality of data will be assured.

The following sections and paragraphs describe the themes used for data analysis.

4.3 Themes for data analysis

4.3.1 Broadband capacity of TUT

Based on data concerning the network speed of TUT and the international standard of minimum 2 Mbps (ITU, 2011; Mason & Rennie, 2004: 6), it was determined that TUT has the

broadband capacity to transmit data intensive services for Web-based training. This enables librarians, employed by TUT, to conduct Web-based training that use broadband tools and technologies. This finding was important for the continuation of the study that investigated the use of Web-based training tools and technologies, the reasons for using it, and to determine the advantages and disadvantages of using these facilities in order to establish whether service delivery could be improved.

4.3.2 Web-based training tools and technologies

Broadband tools and technologies for Web-based training were defined and identified in Chapter 2. Web-based training tools and technologies, as discussed in Chapter 2 were identified as Web 2.0 technologies such as blogs, vlogs, podcasts and vodcasts, live streaming, virtual classes, webinars and online conferencing, and video. The list of Web-based training tools and technologies that was included in Survey A was compiled from sources in the literature review. However, the researcher added online gaming to the list. Since none of the participants indicated that they use online gaming, and none of the participants used other tools and technologies, the literature review has been validated.

The questionnaires listed all of the following technologies with examples: Live online training sessions (Webinars, virtual classes, online conferences, video streaming), online user guides/manuals, online video tutorials, Web 2.0 tools (Facebook, chatrooms, etc.), teleconferencing, online courses, online blogs and vlogs, online gaming, podcasts and vodcasts.

4.3.2.1 Survey A: The use of Web-based training tools and technologies for personal purposes

All twelve librarians who participated in Survey A use broadband tools and technologies for Web-based training, for their own personal benefits. This indicates that all twelve librarians are familiar with Web-based training and that they use these technologies for personal development and growth. Therefore, none of the librarians who completed the survey indicated that they have not utilised these tools and technologies.

The reasons why these tools and technologies were used for personal development seems to be more work related and correlates with findings in the literature. The reasons are:

a) To make effective and efficient use of technologies, such as WebDewey;
b) To become up-to-date with the latest technological developments, such as database platform changes and enhancements;
c) To read about new technical developments and trends, such as new social networking tools and the development of webinars, for example “Softchalk”
d) To learn about technologies and functionalities that are developed but not yet implemented, such as functionalities on MS Office.

4.3.2.2 Survey A: The effective and efficient utilisation of Web-based training tools and technologies for work purposes

Only five librarians answered the question concerning the effective and efficient use of broadband tools and technologies for Web-based training, specifically for the e-resources. All the librarians indicated that they use mostly live online training, such as webinars, virtual classes, online conferences and live video streaming. Online gaming is not used at all. Online user manuals and online downloadable video tutorials proved to be more popular than Web 2.0 tools, teleconferencing, online courses, blogs and vlogs. Table 1 lists the broadband tools and technologies that are used by the librarians for the purposes of e-resource platform training:

Table 1: Broadband tools and technologies used by librarians for Web-based training

Broadband tools and technologies used for Web-based training	**Percentage**
Live online training sessions (Webinars, virtual classes, online conferences and video streaming)	100,0%
Online user guides/manuals	80,0%
Online video tutorials	80,0%
Web 2.0 tools (Facebook, chatrooms, etc.)	40,0%
Teleconferencing	40,0%
Online courses	20,0%
Online blogs and vlogs	20,0%
Online gaming	0,0%
Podcasts and vodcasts	0,0%
Other	0,0%

Although live online training sessions are used most, librarians indicated that online video tutorials are the most important tool, followed by live online training sessions, online user guides, Web 2.0 tools, teleconferencing, blogs and vlogs, online courses, online gaming and podcasts and vodcasts.

Table 2: Broadband tools and technologies used for Web-based training ranked according to importance

Answer Options	1	2	3	4	5	6	7	8	9	10	N/A	Rating Average	Response Count
Online User Guides/Manuals	1	1	1	0	0	0	0	0	0	0	0	2,00	3
Web 2.0 tools (Facebook, Chatrooms etc.)	2	0	0	0	0	0	0	0	0	0	1	1,00	3
Online Video Tutorials	2	1	1	1	0	0	0	0	0	0	0	2,20	5
Live online training sessions (Webinars, Virtual	1	1	0	0	2	0	0	0	0	0	0	3,25	4
Online Courses	0	0	0	0	0	1	0	0	0	0	0	6,00	1
Online Gaming	0	0	0	0	0	0	0	0	0	0	1	0,00	1
Teleconferencing	0	0	0	1	0	0	0	0	0	0	1	4,00	2
Online Blogs or Vlogs	0	1	0	1	0	0	0	0	0	0	0	3,00	2
Podcasts or Vodcasts	0	0	1	0	0	0	0	0	0	0	0	3,00	1
Other as specified in question 6	0	0	0	0	0	0	0	0	0	0	1	0,00	1
												answered question	6
												skipped question	6

The reasons why librarians regard the use of these technologies important, are as follow:

a) Ease of use
b) Available whenever necessary
c) Accessible
d) Web 2.0 tools provide the latest solutions to problems
e) Accommodates any geographic location
f) Learning at your own pace
g) You can repeat the training whenever necessary
h) Video provide guidance and you can proceed to the specific parts of a video in which you are interested
i) Learn by self-taught

4.3.2.3 Survey B: Web-based training opportunities offered by e-resource vendors

All five vendors (100%) who took part in the survey offer broadband tools and technologies for Web-based training. This fact is supported by the results of Survey A that found that

vendors do offer Web-based training facilities and that librarians, although the uptake is low, do use them. These companies offer the following tools and technologies for Web-based training opportunities:

Table 3: TUT Vendors offering the following tools and technologies for Web-based training

Online User Guides/Manuals	100,0%
Web 2.0 tools (Facebook, Chatrooms etc.)	60,0%
Online Video Tutorials	100,0%
Live online training sessions (Webinars, Virtual Classes, Online Conferences, Video Streaming)	100,0%
Online Courses	40,0%
Online Gaming	0,0%
Teleconferencing	60,0%
Online Blogs or Vlogs	20,0%
Podcasts or Vodcasts	20,0%
Other (please specify)	

4.3.3 The advantages and disadvantages using Web-based training tools and technologies

The results indicate that the use of Web-based training does have certain advantages, but also disadvantages. This fact is supported by the literature review.

4.3.3.1 Advantages of using Web-based training tools and technologies

Mason and Rennie (2004: 2), Ellis, Wagner and Longmire (1999: 20), WBTIC (2009) and Khan (2001:13) identified several advantages of using Web-based training tools and technologies. These advantages are discussed in Chapter 2 and can be divided in three categories, namely:

a) Generalised and logistical advantages;

- Flexible opportunities concerning time and place;
- Courses adaptable for individual learning style and pace as time become available;
- Providing equal access to all, irrespective of location;
- Resources and courses are easily accessible and can be downloaded on any device;
- Training material is compatible with most computers and devices.

b) Instructional advantages

- Learners, in most cases, have control over lessons as they can redo or revise sections or modules as they please;
- Learner collaboration with chat rooms or live sessions is also a possibility, regardless of the geographical location;
- Web-based training can be conducted on-demand when needs for performance are immediately required.

c) Economic and financial advantages

- Incorporate technology that is already owned and already in use;
- Flexibility in scheduling training;
- Eliminates or reduces travel expenses;
- Eliminates unproductive hours while traveling;
- Reduce the amount of time trainees spent away from work.

Not all advantages of using Web-based training were included in Survey A as options to select, but participants had the opportunity to add additional advantages and disadvantages. This was done to limit the length of the questionnaire and to make it less complicated. The list of advantages (taken from Appendix A) from which participants had to select options which apply to them, is given verbatim below:

- Most of the time I can do the training at my own time
- I can redo the training should I think it is necessary
- Because I am situated in a remote location I do not have to travel and waste time and money to attend training sessions
- Because the training is conducted over the Internet, I can do it anywhere Because the training is conducted over the Internet, I can do it anywhere
- I do not need special equipment to attend (to) the training
- I do not need any special software to attend the training sessions
- The Internet is fast enough for me to download or use online Technologies in order to attend (to) the training
- Ease of use
- Training courses are standardized
- Problem solving has been easy to solve

- Training and training material has been compatible my current equipment
- I could see who of my colleagues at other locations has been conducting the same training and it helped with further interaction
- Allowed for more flexible scheduling times to conduct in training sessions

4.3.3.1.1 Survey A: Advantages of using Web-based training tools and technologies

The results regarding the advantages of using Web-based tools and technologies are divided into three main categories, namely logistical, economical and instructional advantages. Participants did not include additional advantages but they selected the following advantages as applicable:

Five librarians (83,3%) selected the following advantages as applicable: Training can be conducted at any time, (b) Web-based training can be re-taken and (c) ease of use.

Four librarians (66.7%) concurred that it is an advantage that Web-based training can be conducted from anywhere in the world. They also admitted that the Internet was fast enough to download or stream training material with the necessary ease, and that live training session times was flexible enough.

Three librarians (50%) stated that they do not need special equipment to conduct or attend Web-based training sessions and that training material is compatible with the existing equipment. Two (33.3%) of the librarians indicated that (a) problem solving is easy, (b) no special software is necessary, and (c) training courses are standardised worldwide.

One librarian (16.7%) indicated (a) that Web-based training saves time and money since it is not necessary to travel to another location to do the training, and (b) trainers can recognise other librarians from TUT in live training sessions which encourage interaction with one other.

Respondents did not add other advantages to the list provided.

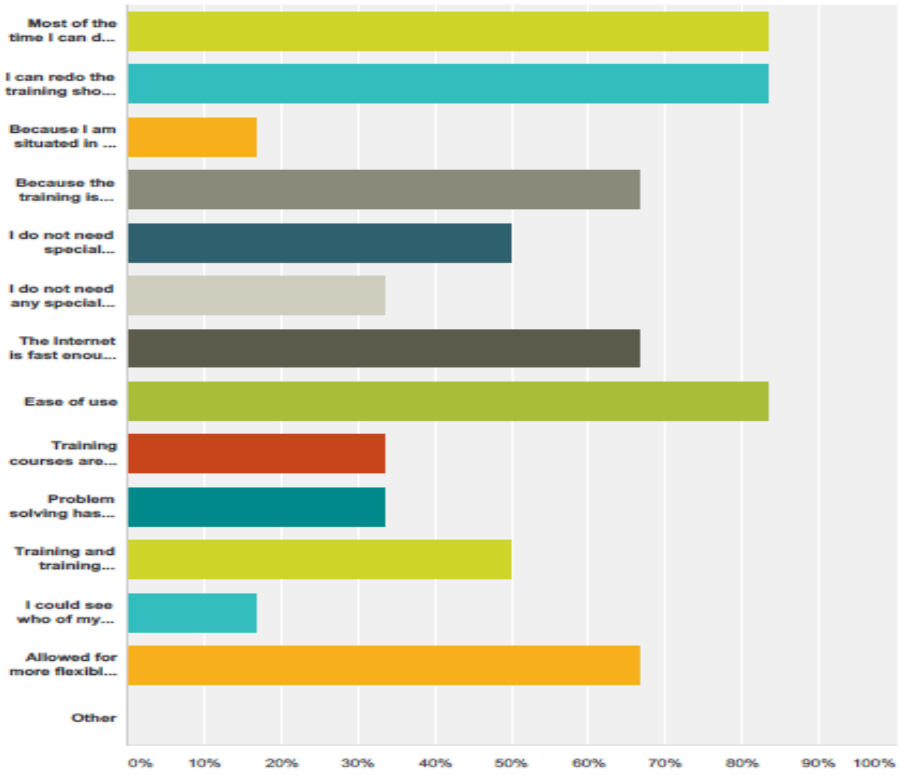


Figure 5: Advantages, identified by librarians, of using broadband tools and technologies for Web-based training

4.3.3.1.2 Survey B: Advantages of using Web-based training tools and technologies

As indicated before, the results of Survey B were divided into the three main categories, namely logistical, economical and instructional advantages. Although participants did not identify additional advantages, they selected the following advantages from the list provided:

Two vendor representatives (50%) indicated that Web-based training opportunities presented by vendors are easy to use, although it depends on the equipment available and on Internet connectivity. They selected the following advantages as applicable: (a) flexible time tables and (b) the fact that training was not geographically fixed. One respondent indicated that Web-based training presented equal opportunities.

4.3.3.2 Disadvantages of using Web-based training tools and technologies

Mason and Rennie (2004: 2), Ellis, Wagner and Longmire (1999: 20), WBTIC (2009); Adam *et al.* (2011: 108) and Khan (2001:13) identified several disadvantages of using Web-based training tools and technologies. These advantages are discussed in Chapter 2 and can be divided in three categories, namely:

a) Infrastructure disadvantages

- Poor bandwidth or network limitations;
- Unreliable networks;
- Technical difficulties and poor or limited knowledge of technology;
- Unavailability of technology, especially in rural communities;
- Data-intensive content could take time to download, regardless of speed. Users that use dial-up connections could be restricted when downloading audio, video and graphics;
- If links to resources are not maintained, dead links could lead to additional frustrations;
- High costs of broadband connectivity can make access to high speed connections challenging;
- Online activities could be time consuming;
- Additional software might be needed;
- Initial implementation might be costly; and
- It might be difficult for learners and instructors to accomplish optimal functionality.

b) Instructor-related disadvantages or limitations

- Web-based training provide limited access to instructors if certain concepts are unclear;
- Web-based-training still does not replace face-to-face training opportunities;
- Self-motivation is not suitable for everybody;
- Re-joining training modules for various reasons is not always preferred;
- Technology unknown or complicated;
- Software applications are sometimes specialised or not available;
- The quality of instruction can be jeopardised as screens and hardware vary in size and quality;
- If Web-based training programmes are poorly designed they influence the medium used to deliver the message.

c) Economic disadvantages

- High developing costs
- High initial investment costs
- Less suitable for the training of smaller groups

Not all the disadvantages of Web-based training were included in the list of disadvantages in Survey A. However, participants had the opportunity to add additional disadvantages that they could identify. This was done to limit the length of the questionnaire and to make it less complicated. The list in Survey A, from which participants had to select applicable disadvantages, is repeated below:

- Except in the case of live online training, interactive communication is not readily available when trainees want to ask questions during training sessions;
- When unforeseen interruptions occur I normally do not restart the session;
- Our Internet connection does not allow us to use Web-based training tools and technologies;
- It is too complicated to use Web-based tools and technologies;
- I do not have the correct software to conduct online training;
- I do not have the correct equipment to benefit from online training;
- I have not receive any training in the use of these technologies to benefit from online training;
- The workstation used is not in the right location to reap the full benefits of online training;
- I am too busy to invest time in Web-based training;
- I find it difficult to access Web-based training sessions that accommodate South African time slots; most sessions are either in the middle of the night or too early in the day;
- I was restricted by our IT staff to use available Web-based training opportunities;
- It is time consuming to get help when needed during training sessions;
- The Internet connection was not stable enough to keep me logged in for the whole session, and therefore I lost interest.

4.3.3.2.1 Disadvantages of Web-based training tools and technologies, according to findings of Survey A

Librarians indicated the following important challenges concerning broadband tools and technologies for Web-based training. Three librarians (60%) indicated that, except for live online training sessions, no one was readily available during the training to answer any of their questions. They also indicated that when interrupted they normally do not complete the training at another time. They also seemed to lost interest if the Internet connectivity is unstable, despite the fact that TUT has sufficient broadband capability for data-intensive downloading or streaming.

Two librarians (40%) indicated that their workstations are not conveniently placed to reap the full benefits of online training. Librarians also stated that they struggle to get time slots suitable for South Africans to attend live training sessions.

One librarian (20%) indicated that the Internet connection does not allow access to use Web-based training tools and technologies. She also stated that she was restricted by the IT staff to make use of Web-based training opportunities. She also indicated that the session was time consuming, especially the part that required much assistance.

One participant selected the option for "Other" and specified it as follows:

- "The Java version I need for our financial system is not always compatible with the latest ones I need to attend webex sessions so it become time consuming to always phone IT services to re-load the older or latest versions".
- "IT services control what is loaded onto PCs and sometimes you book an online session just to realise you need additional software which you cannot load yourself. It makes the process slow to and extend that you do not want to attend the training".
- "Sometimes the sessions are too long, shorter sessions will be more helpful".

With regard to the question "Do you think using any web-based training tools and technologies have any of the following disadvantages?" none of the librarians selected any of the following statements as an option:

- Using these tools and technologies are too complicated.

- I do not have the right software to conduct the online training.
- I do not have the right equipment to benefit from online training.
- I did not receive any training in the use of these technologies to benefit from the online training.
- I am too busy to invest time in Web-based training.

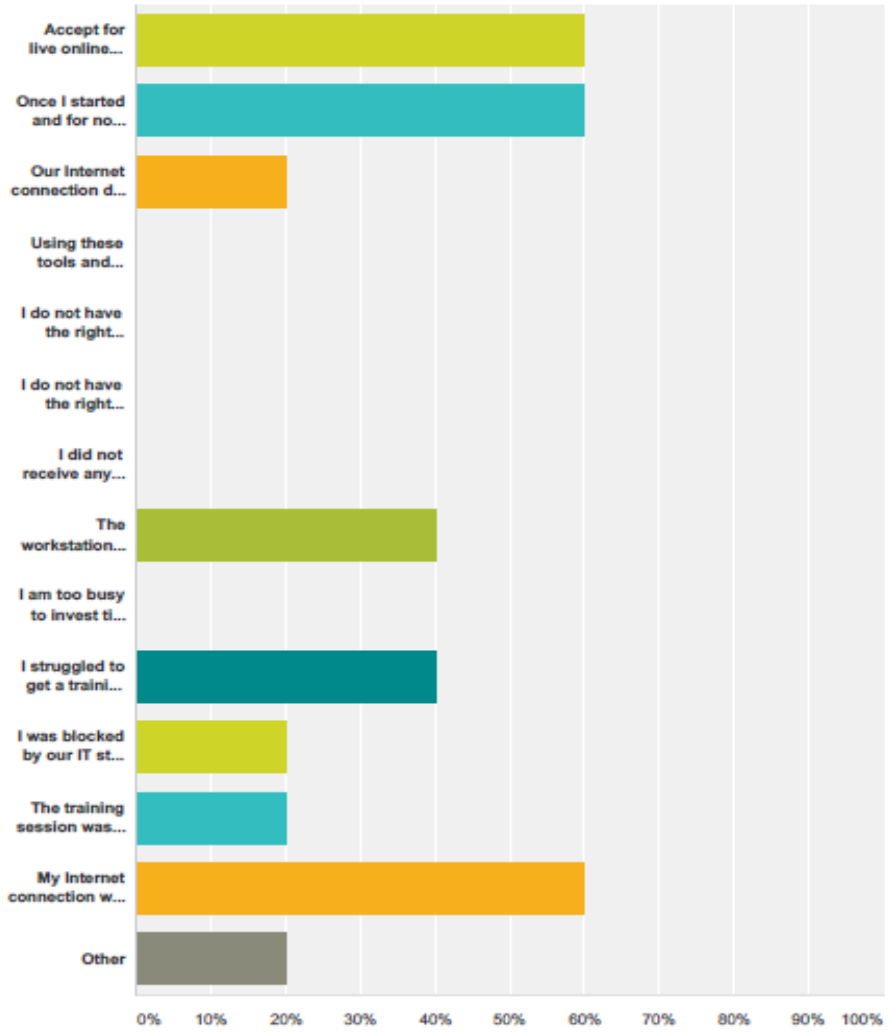


Figure 6: Disadvantages, according to librarians, of using broadband tools and technologies for Web-based training

4.3.3.2.2 Disadvantages of Web-based tools and technologies, according to findings of Survey B

Four vendor representatives (80%) indicated that librarians are too busy to use Web-based training tools and technologies, while three (60%) indicated that Internet connections might

inhibit librarians to use Web-based training tools and technologies. Two participants (40%) indicated that, except for live online training sessions, nobody is readily available should librarians have questions while watching offline videos or reading online manuals. They also indicated that institutional IT departments restrict the use of Web-based tools and technologies and that their Internet connections might be too unstable to complete training sessions. They also indicated that Web-based training sessions might be too time consuming, especially parts that require assistance. One participant indicated that if librarians started with training and get interrupted, they do not return to complete the training. The one respondent also stated that librarians might not have the right software or equipment to conduct online training. Furthermore, he was also of the opinion that it might be a struggle to find a time slot suitable for librarians in South Africa to attend live training sessions.

The following statements in Survey B, were not considered to be a disadvantage of using Web-based training tools and technologies:

- The tools and technologies for Web-based training are too complicated.
- Workstations might not be in the right location.

Vendor representatives also indicated the following disadvantages of using Web-based training tools and technologies:

Table 4: Disadvantages of using Web-based tools and technologies for training

Disadvantages	**Percentage**	**Respondents**
Librarians have limited access to instructors if certain concepts are unclear	25,0%	1
Although Web-based training fill a lot gaps it still does not replace valuable face-to-face training	75,0%	3
Librarians might not have the right software or equipment to conduct in training opportunities	50,0%	2
Librarians might not have access to sufficient	50,0%	2

broadband to conduct training		
IT staff might block certain aspects which jeopardise the quality	50,0%	2
Loss in network accessibility could influence training accessibility and completion of sessions	50,0%	2
Other:	25,0%	1

4.3.3.3 Remarks concerning the advantages and disadvantages using Web-based training in South Africa

Vendors also provided the following responses regarding the disadvantages of Web-based training:

- Internet connectivity is seen as an issue of concern.
- The problem concerning suitable time slots can be solved by providing persons in South Africa with facilities to conduct Web-based training.
- Remote geographic locations are not a problem anymore due to Web-based training opportunities.

4.3.4 The effect of Web-based training tools and technologies on staff development

Training, especially in-service training, and the use of Web-based tools and technologies, is seen as an instrument that can contribute to staff development (Halim & Ali, 1997; Jain, 1999). This, in turn, can lead to:

- Better quality in work performance;
- Increased productivity;
- Less need for supervision;
- Confident and flexible staff with low job turnover;
- Increased staff morale; and
- Overall job satisfaction.

The two surveys did not offer respondents the option to add additional improvements or effects.

4.3.4.1 Training as an instrument for staff development: Answers from Survey A

All six librarians who completed the question on training as an instrument for staff development felt that time and energy invested in Web-based training and on e-resource or work related platforms will lead to personal development. It will therefore empower them by finding solutions to problems and enriching their own personal lives.

The reasons why respondents of Survey A regard Web-based training as an instrument for staff development are:

- It brings you up to date with the latest technological developments on Web-based platforms.
- It provides knowledge about changes in Cataloguing standards.
- It enables libraries to evolve and enforce quicker implementation of Cataloguing standards.
- It increases efficiency.
- It increases productivity.

4.3.4.2 Training as an instrument for staff development: Answers from Survey B

All vendor representatives declared that librarians who spend time and energy to attend and conduct their Web-based training, will benefit and enhance service delivery to their users. Vendor representatives also provided the following remarks:

- “If the material is used, then the material is very informative and easy to follow, communication to what is available becomes quite important.”
- “The material can better serve librarian patrons knowing features and benefits of the products.”
- “Knowing the products available for librarian end-users enables them to make better buying decisions.”

- "Continued training can always assist."
- "Using the training created by a vendor saves the librarian having to prepare presentations about each different platform."

4.3.4.3 Improvement of service delivery as a result of conducting and/or attending e-resource or related Web-based training

All five librarians who answered the question regarding the improvement of service delivery felt that the level of service provided to users will improve when time and energy are invested in attending or conducting Web-based training in e-resources or other work related matters.

The reasons given by the five librarians are:

- Based on the fact that librarians will be up-to-date with the latest technologies, it will provide them with the knowledge to deliver a better service.
- The added knowledge will provide librarians with confidence to provide a better service.
- Librarians will have the knowledge to do work faster and be more effective and efficient.
- Librarians will provide more relevant information to users.
- Librarians will become aware of new technologies to be implemented to render a more enhanced service.

4.3.4.4 Improvement of the TUT community based on enhanced service delivery as a result of attending and/or conducting e-resource or related Web-based training

All five librarians (100%) who answered the question relating to the improvement of the TUT community felt that the TUT community will benefit when librarians attend or conduct e-resource or other work related Web-based training. The reasons given by them are:

- When librarians render an improved service, they also increase the productivity of their users, and thereby indirectly improving the TUT community.
- When librarians render a better service to users, they also deliver more efficient and effective work which leads to increased productivity which ensures that the community at large improves.

- Improved service delivery will empower the TUT community.
- "There would be an improvement as we would then cover more training and hopefully the needs of our users will be fulfilled as more students/staff have gadgets that they can use to search for information".
- Improved service delivery will lead to technological advanced staff which, in turn, will lead to technological advanced users.

4.3.4.5 Improving service delivery through the use of Web-based training tools and technologies

On the question "Do you think librarians who utilize your web-based training tools and technologies will benefit, enhancing their level of service delivery?" the five vendors answered the following:

a) Two stated: "Yes it will improve service delivery"
b) Two stated: "We are not sure if the use of these tools and technologies will improve service delivery"
c) One stated that he does not think that these tools and technologies will improve services rendered to library users.

The explanations for their answers are as follows:

- Some vendors indicated that they have not receive feedback from librarians on improved service delivery.
- Some indicated that more awareness of the tools and technologies that they offer, is necessary.
- Librarians who are familiar with the products and services rendered are more capable to promote and support those products and services to their users.
- Web-based tools and technologies are designed to assist librarians to provide better services.
- Training material is designed to be brief and concise and to deal with one topic at a time. It is not designed to overwhelm users.
- Some indicated that they are not sure if librarians use these tools and technologies.
- Some indicated that librarians do not make much use of Web-based training tools and technologies because they are pressed for time.

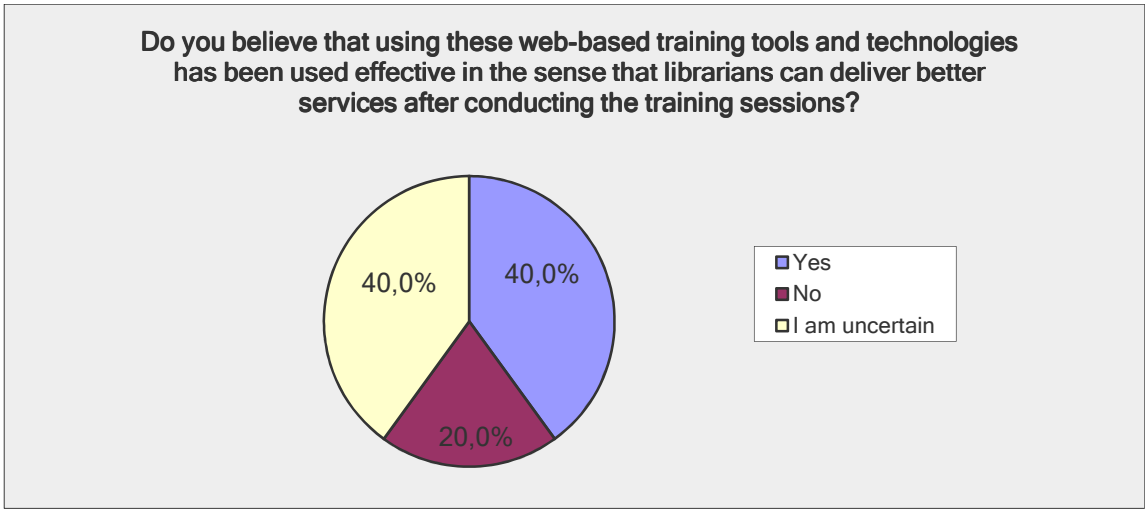


Figure 7: Vendors' opinions regarding the use of Web-based training tools and technologies to improve service delivery

4.4 Conclusion

Based on a literature review it was determined that TUT has the broadband capacity to use data-intensive Web-based training tools and technologies. It was further established that TUT librarians use these tools and technologies for personal development. In this chapter, the findings of two surveys have been analysed and discussed. Survey A was sent to TUT librarians and another survey to correlate the results (Survey B), was sent to vendors who are based in South Africa and who offer Web-based training tools and technologies to the TUT Library and Information services.

Web-based training tools and technologies are: a) live streaming such as Webinars, virtual classes and online user guides/manuals, b) video such as online video tutorials, c) Web 2.0 tools such as Facebook, blogs and vlogs. Although Web-based tools such as podcasts and vodcasts are available to librarians in this study, they are not necessarily used.

Based on the results of the two surveys, it was determined that, from the perspective of vendors and TUT librarians, there are a number of advantages and disadvantages, of using Web-based training tools and technologies. Advantages entail (a) anytime, anywhere training opportunities, (b) saving time and money, (c) the fact that training could be re-taken anytime, (d) the ease of using these facilities if the Internet capacity permitted downloading

or streaming, and if computer equipment and software was compatible, (e) availability and ready to use. TUT librarians also recognised the fact that training courses and programmes are standardised across the globe and that they are therefore on par with the rest of the world, especially with developed countries.

Disadvantages include factors such as (a) workstations not being accommodating for Web-based training, (b) not finding timeslots suitable for South Africans to attend live sessions, (c) software that is not always compatible, (d) complicated equipment, (e) unreliable Internet access, (f) IT departments that restrict the use of data-intensive services, (f) training sessions that are sometimes too short or too long, and (g) a lack of time to conduct Web-based training.

The findings also indicated that librarians use broadband tools and technologies for Web-based training for personal and work related development. This will lead to improved quality of work performance and increased productivity.

CHAPTER 5: EXECUTIVE SUMMARY

5.1 Introduction

The purpose of this chapter is to summarise findings based on the research analysis reflected in Chapter 4. This chapter also provides recommendations based on the literature review, the data being collected and analysed, and then comes to a conclusion.

5.2 Findings

The objective of this was to establish whether librarians of the Tshwane University of Technology (TUT) made use of broadband tools and technologies for Web-based training. The objective was also to obtain answers to the following sub-questions, namely:

a) Which broadband tools and technologies are used for Web-based training?
b) What are the advantages and disadvantages of broadband tools and technologies for Web-based training?
c) How do use of these tools and technologies influence librarians in terms of their own personal development, and the level of service delivery they render, after attending or conducting Web-based training?
d) Which broadband tools and technologies for Web-based training are being offered to librarians by library vendors and service providers?
e) What are the advantages and disadvantages of using these tools and technologies for librarians and vendors, and, according to vendors, how will the use of these tools and technologies influence service delivery in the library?

The following paragraphs summarise the answers to these research sub-questions, taking into account the literature review in Chapter 2 and the analysis in Chapter 4.

5.2.1 Broadband tools and technologies for Web-based training being utilised by TUT librarians

TUT does have the broadband capacity to attend or conduct Web-based training using broadband tools and technologies. This was established by the literature review. It was also established that TUT has an Internet capacity of 10 Gbps. This is more than the broadband international standard of 2 Mbps. As indicated in Chapter 4, TUT librarians utilise this broadband capacity and Web-based tools and technologies for Web-based training. Based on this fact, it was established that TUT librarians use the following broadband tools and technologies to attend or conduct Web-based training:

- Webinars, virtual classes, online conferences and live video streaming
- Manuals and online downloadable material
- Video tutorials
- Web 2.0 tools
- Teleconferencing
- Blogs and vlogs

The use of the tools and technologies mentioned above supports findings in the literature, except for online gaming, which is not used by the TUT librarians.

5.2.2 The advantages and disadvantages of using broadband tools and technologies for Web-based training by librarians

The results of the surveys indicated that the use of Web-based training not only have certain advantages, but also have disadvantages. This was the view of librarians as well as vendors. This also supports findings that were mentioned in the literature review.

5.2.2.1 Advantages

Guided by the literature, this study categorised the advantages of using broadband tool and technologies for Web-based-training into generalised and logistical advantages, instructional advantages and economic and financial advantages. However, only some of the advantages obtained from the literature are repeated below:

a) Generalised and logistical advantages

- It offers flexible opportunities concerning time and place.

- Courses are adaptable for individual learning style and pace as time become available.
- It provides equal access to all, independent of location.
- Resources and courses are easily accessible and can be downloaded on any device.
- Training material is compatible with most computers and devices.

b) Instructional advantages

- In most cases learners have control over lessons as they can redo or revise sections or modules as they please.
- Learner collaboration with chat rooms or live sessions is also a possibility, regardless of geographical location.
- Web-based training can be conducted on-demand when the need for performance are immediately required.

c) Economic and financial advantages

- It incorporates technology that is already owned and already in use.
- It provides flexibility in scheduling training.
- It eliminates or reduces travel expenses.
- It eliminates unproductive hours while traveling.
- It reduces the amount of time trainees spent away from work.

5.2.2.2 Disadvantages

Guided by the literature, this study categorised the disadvantages of using broadband tools and technologies for Web-based-training into three separate parts namely, infrastructure disadvantages, instructor limitations and economic disadvantages. However, only some of the advantages obtained from the literature are repeated below.

a) Infrastructure

- Poor bandwidth or network limitations.
- Unreliable networks.
- Technical difficulties and/or poor or limited knowledge of technology.
- High costs of broadband connectivity.
- Online activities might be time consuming.
- Additional software might be needed.

b) Instructor limitations

Considering that learners can join and exit training at any time, learners might find it difficult to re-join or complete certain sections or modules when they later resume their training, and they might even have to redo the training in order to complete a section or module.

c) Economic Disadvantages

From the literature review it appeared that flexibility in scheduling Web-based training is an advantage. However, TUT librarians regard it as a disadvantage, considering that online Web-based training is not always scheduled to suit South African time.

5.2.2.3 Additional advantages and disadvantages

- Some of the librarians stated that they were prevented by their IT staff to make use of Web-based training opportunities.
- Librarians are too busy to really discover the advantages to Web-based training tools and technologies.

5.2.3 The improvement of service delivery as a result of using broadband tools and tools and technologies for Web-based training

This study indicated that the level of service provided by librarians will improve when time and energy are invested in using broadband tools and technology for Web-based training. Librarians indicated that the latest technologies will keep them up-to-date and it will provide them with the necessary knowledge and skills to provide more effective and efficient services.

5.2.4 Broadband tools and technologies for Web-based training offered by vendors

Broadband tools and technologies for Web-based training offered by vendors correlate with what librarians say that they use. Although vendors are of the opinion that these tools and

technologies are not highly used, and that effort is needed to market the availability of these tools and technologies, they all regard these tools and technologies as important. The broadband tools and technologies for Web-based training offered by vendors are as follows: Online user guides and manuals, Web 2.0 tools, online video tutorials, live online training sessions, online courses, teleconferencing, online blogs vlogs, and podcasts and vodcasts. It was established that vendors do not offer online games as a Web-based training tool and that is a reason why it not been used by librarians either.

5.2.5 The advantages and disadvantages of Web-based tools and technologies, according to vendors

Vendors indicated that they do not think that broadband tools and technologies for Web-based training are much used by librarians, and stated that it seems that librarians are too busy to familiarise themselves with what vendors have on offer in order to assist them to use their products and services more effectively and efficiently. They stated that, especially in South Africa, the Internet is too costly to efficiently and effectively make use of these products. Notwithstanding the fact that the TUT broadband facilities seem to be adequate for data-intensive products and services, vendors do feel that South African Internet connections are too slow or too unreliable for librarians to make use of their training facilities on offer. Vendors also feel that librarians do not have access to professional assistance, except in the case of live online training sessions. They also stated that IT departments seem to restrict access to their Web-based training facilities, which is a further reason why low usage of these training opportunities was recorded. They also indicated that Web-based training sessions, offered to librarians, might be too long and time consuming. Vendors were also of the opinion that when librarians start with a training session, and get interrupted, they do not return to complete the training. They further stated that librarians might not have the right software or the right equipment to conduct online training. Additionally, they admit that it might be difficult to find a time slot suitable for South Africans to attend live training sessions.

Vendors admitted that Web-based training is economically beneficial because they, as well as librarians, will save time and traveling costs. An added advantage is that suppliers of products and services can provide equal training opportunities worldwide, despite geographical location, provided that librarians have access to broadband and regardless whether librarians are situated in a developing country or not.

5.2.6 The use of broadband tools and technologies for Web-based training to address the quality of service delivery by librarians, from a vendor's perspective

Although vendor representatives felt that librarians do not spent enough time making use of Web-based training opportunities, they did declare that librarians will deliver an improved service to their users once they invested time and energy to attend or conduct Web-based training sessions using broadband tools and technologies. Vendors stated that if Web-based training opportunities were to be attended or conducted, the material would be informative and easy to follow. This will provide TUT librarians with the knowledge they need to provide library users with better information, and enhanced knowledge of their products and services to either use their product more effectively and efficiently and/or to assist in transferring that knowledge to their users. This will also assist librarians in making better decisions when buying information resources.

5.3 Recommendations for further study

Recommendations for further study include:

- Due to the fact that this study only involved TUT librarians, it only provided the views and perspectives of one institution. This study, therefore, provides an opportunity to broaden this study in future to include views and perspectives that apply countrywide or worldwide; or that focus on different types of libraries.
- This study also used only the views and perspectives of vendors and suppliers used by TUT, and who are only situated in South Africa This study, therefore, provides opportunities to expand this research in future to other institutions and countries with other experiences.
- This study also focused only on Web-based training of electronic information resources. Since there are many other applications within the library world that could make use of Web-based training, it provides the opportunity to expand the depth and breadth of this study in future.

5.4 Conclusion

This mini-dissertation reported on an investigation concerning the advantages and disadvantages of using broadband tools and technologies for Web-based training, used by

TUT librarians. Based on the results of the surveys conducted in this study, the perspectives of librarians and vendors are that Web-based tools and technologies are used and are necessary to provide an improved service to library users, and also to benefit the personal development of librarians.

To explore the advantages of broadband tools and technologies for Web-based training, TUT has to encourage the use of these facilities. This will enhance and improve knowledge about the products and services being rendered. The disadvantage of broadband tools and technologies for Web-based training are mainly related to infrastructure and once TUT invests time and money to make sure that librarians have access to the latest software and Web-based training solutions, TUT will take full advantage of these facilities. Some disadvantages are to be negotiated with vendors in order to deliver a service at times suitable to South African clients. Other disadvantages have to be dealt with by librarians and their supervisors in order to find the time to attend or conduct training sessions, and to ensure that they conduct it in an environment where they can complete the training without interruption, so that they do not have to re-do the training sessions. Supervisors also have to make sure that librarians have the IT support they need in order to conduct training sessions. By using these facilities librarians can gain the necessary knowledge to deliver a better service and, in return, empower their own users to improve the TUT community at large.

REFERENCES

Adam, L. *et al*. 2011. *Transformation-Ready: The strategic application of information and communication technologies in Africa*. Education Sector Study: The World Bank. [Online]. Available: http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/Education_Fullreport.pdf [Accessed 14 July 2013].

Almeida, R.W. 2011. Characteristics of broadband technologies. *Telecommunication Stuff Blog*, March 1st 2011. [Online]. Available: http://telecommstuff.blogspot.com/2011/03/characteristics-of-broadband.html [Accessed 22 January 2014].

Ameen, K. 2011. Changing scenario of librarianship in Pakistan: managing with the challenges and opportunities. *Library Management*, 32(3). [Online]. Available: http://0-www.emeraldinsight.com.innopac.up.ac.za/journals.htm?issn=0143-5124&volume=32&issue=3&articleid=1907195&show=html [Accessed 24 February 2014].

American Library Association (ALA). 2013. *Broadband & Libraries*. [Online]. Available: http://www.ala.org/advocacy/telecom/broadband [Accessed 8 August 2013].

Arbaugh, J. B. (2002). Managing the on-line classroom: a study of technological and behavioural characteristics of Web-based MBA courses. *Journal of High Technology Management Research*, 13(2), 203–223.

Bacsich, P. and Brown, S. 2002. Broadband Technologies for Learning and Teaching Off-Campus. *TechLearn: Technical briefing paper*, October. JISC. [Online]. Available: http://www.jisc.ac.uk/media/documents/publications/broadbandtechreport.pdf [Accessed 8 August 2013].

Bhattacherjee, A. 2012. *Social science research: principles, methods and practices*. Textbooks Collection: Book 3. [Online] Available: http://scholarcommons.usf.edu/oa_textbooks/3?utm_source=scholarcommons.usf.edu%2Foa_textbooks%2F3&utm_medium=PDF&utm_campaign=PDFCoverPages [Accessed 26 December 2015]

Berg, D. 2012. Definition of Education. *Tech-Kids-Attitude-1st.com Blog*. [Online]. Available: http://www.teach-kids-attitude-1st.com/definition-of-education.html [Accessed 28 July 2013].

Bilandzic, M. and Foth, M. 2014. Learning beyond books—strategies for ambient media to improve libraries and collaboration spaces as interfaces for social learning. *Multimedia Tools and Applications*, 71(1): 77-95. [Online]. Available: http://0-link.springer.com.tkplib01.tut.ac.za/article/10.1007/s11042-013-1432-x [Accessed 11 January, 2015].

Bill and Melinda Gates Foundation. 2014. *Global Libraries Strategy Overview*. [Online]. Available: http://www.gatesfoundation.org/What-We-Do/Global-Development/Global-Libraries [Accessed 8 January 2014].

Blumberg, B., Cooper, D.R. and Schindler, P.S. 2008. *Business Research Methods*. 2nd European Edition. McGraw-Hill Higher Education: Berkshire.

Blundell, R., Dearden, L. and Meghir, C. [et al.]. 1999. Human Capital Investment: The Returns from Education and Training to the Individual, the Firm and the Economy. *Fiscal Studies,* 20(1). [Online]. Available: http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1111/j.1475-5890.1999.tb00001.x/pdf [Accessed 22 February 2014].

Boisvert, L. 2000. Web-Based Learning: The Anytime Anywhere Classroom. *Information Systems Management*, 17(1): 1-6. [Online]. Available: http://dx.doi.org/10.1201/1078/43190.17.1.20000101/31212.5 [Accessed 5 August 2013].

Botha, D.F. 2008. *The strategic continuing training needs of executives and managers on a selection of large South African companies*. Doctoral Thesis: University of Pretoria. [Online]. Available: http://upetd.up.ac.za/thesis/available/etd-07282008-165801/ [Accessed 19 August 2013].

Broadband Commission for Digital Development. 2013. *Overview*. [Online]. Available: http://www.broadbandcommission.org/about/overview.aspx [Accessed 15 July 2013].

Burns, M. 2013. Technology closes the distance. *JSD: The Learning Forward Journal*, 34(3). [Online]. Available: http://www.learningforward.org/docs/default-source/jsd-june-2013/burns343.pdf [Accessed 26 July, 2013].

Cheng, B. 2009. E-Learning for the Librarians in Taiwan: the Experience at the National Central Library's E-Learning Campus. *World Library and Information Congress: 75th IFLA General Conference and Council*, 23-27 August 2009, Milan, Italy. [Online]. Available: http://conference.ifla.org/past/ifla75/214-cheng-en.pdf [Accessed 11 August 2013].

Chiware, E.R.T. 2010. Positioning the technological university library in higher education and human resources development in Africa. *Library Management*, 31(6). [Online]. Available: http://0-www.emeraldinsight.com.innopac.up.ac.za/journals.htm?issn=0143-5124&volume=31&issue=6&articleid=1864901&show=html [Accessed 24 February 2014].

Computer Science and Telecommunications Board, National Research Council. 2002. *Broadband: Bringing Home the Bits*. National Academic Press: Washington DC. [Online]. Available: http://books.google.co.za/books?id=m8PBLvOZ0wwC&pg=PA74&lpg=PA74&dq=broadband

+addressability&source=bl&ots=JEXoidbWVV&sig=YGwQQ876rEXDnzPdE6iffhV3GW4&hl=en&sa=X&ei=-Z7jUrzoE8r07Abb54Eg&ved=0CCcQ6AEwAA#v=onepage&q=broadband%20addressability&f=false [Accessed 25 January 2014].

Cooper, D.R. and Schindler, P.S. 2001. *Business research methods*. International ed.: Boston, Mass.: McGraw-Hill.

Corcoran, M. and McGuinness, C. 2014. Keeping ahead of the curve: academic librarians and continuing professional development in Ireland. *Library Management*, 35(3). [Online]. Available: http://0-www.emeraldinsight.com.innopac.up.ac.za/journals.htm?articleid=17105335&show=abstract [Accessed 16 February, 2014].

Creswell, J. W., and Clark, V. L. P. 2011. *Designing and conducting mixed methods research*. Los Angeles: Sage.

Dash, N.K. 2005. Module: Selection of the Research Paradigm and Methodology. *Online Research Methods Resource for Teachers and Trainers*. Indira Gandhi National Open University: New Delhi. [Online]. Available: http://www.celt.mmu.ac.uk/researchmethods/Modules/Selection_of_methodology/ [Accessed 13 August 2013].

Denscombe, M. 2001. *The good research guide for small-scale social research projects*. Buckinham: Open University Press.

De Villiers, R. 2014. TUT ICT department [*Personal communication*]. June 10th, 2014.

De Vos, A.S. (ed.) 2002. *Research at grass roots for the social sciences and human service professions*. Pretoria: van Schaik.

Du Plooy, E.C. 2013. [*Personal communication*]. June 8th, 2013.

Ebsco. 2013. *EbscoSupport: Training*. [Online]. Available: http://support.epnet.com/training/ [Accessed 12 August 2013].

Ecclestone, M. 2013. MOOCs as a Professional Development Tool for Librarians. *Partnership: the Canadian Journal of Library and Information Practice and Research*, 8(2). [Online]. Available: https://journal.lib.uoguelph.ca/index.php/perj/article/viewFile/2797/3096 [Accessed 17 March 2014].

Ellis, A., Wagner, E.D. and Longmire, W.R. 1999. *Managing Web-based training: how to keep your program on track and make it successful.* American Society for Training and Development: Alexandria. [Online]. Available: http://books.google.co.za/books?id=qt_piLxaNI4C&pg=PT22&lpg=PT22&dq=web-based+training+and+professional+development&source=bl&ots=r9B0u2-KV6&sig=CSOjCm4OeN2KSmHdoGlMQ9YMncQ&hl=en&sa=X&ei=pyb5UoeINajpywOi84KoCQ&ved=0CGcQ6AEwBTgK#v=onepage&q=web-based%20training%20and%20professional%20development&f=false [Accessed 10 February 2014].

Elsevier. 2013. *TrainingDesk*. [Online]. Available: http://trainingdesk.elsevier.com/ [Accessed 12 August 2013].

Emerald. 2013. *Emerald: Support resources*. [Online]. Available: http://www.emeraldinsight.com/help/index.htm [Accessed: 12 August 2013].

Emerald. 2013. *Emerald: Site Tutorials*. [Online]. Available: http://www.emeraldinsight.com/help/librarian/demos/index.htm [Accessed 12 August 2013].

Emerson, P. 2006. An Introduction To Broadband Internet. *EzineArticles.com*, May 26. [Online]. Available: http://ezinearticles.com/?An-Introduction-To-Broadband-Internet&id=206706 [Accessed: 21 May 2013].

Engeström, Y., Rantavuori, J. and Kerosuo, H. 2012. Expansive Learning in a Library: Actions, Cycles and Deviations from Instructional Intentions. *Vocations and Learning*, 6(1): 81-106. [Online]. Available: http://0-link.springer.com.tkplib01.tut.ac.za/article/10.1007/s12186-012-9089-6/fulltext.html [Accessed: 11 January 2015].

European Society of Association Executives (ESAE). 2013. *What is lifelong learning? The view from the European Commission*. [Online]. Available: http://www.dcalni.gov.uk/lifelong_learning_2.pdf [Accessed 16 February 2014].

Feret, B. and Marcinek, M. 1999. The future of the academic library and the academic librarian: a Delphi study. *Library Career Development*, 7 (10): 91-107. MCB University Press. [Online]. Available: http://0-www.emeraldinsight.com.innopac.up.ac.za/journals.htm?articleid=860338&show=abstract [Accessed 10 August 2013].

Gabriel, D. 2014. *Dr. Deborah Gabriel Blog*. [Online]. Available: http://deborahgabriel.com/2013/03/17/inductive-and-deductive-approaches-to-research/ [Accessed 23 August 2015].

Garavan, T.N. 1997. Training, development, education and learning: different or the same? *Journal of European Industrial Training*, 21 (2): 39-50. Available: http://0-

www.emeraldinsight.com.tkplib01.tut.ac.za/doi/full/10.1108/03090599710161711 [Accessed 22 December 2015].

Garavan, T.N., Morley, M. and Gunnigle, P. [et al.]. 2001. Human capital accumulation: the role of human resource development. *Journal of European Industrial Training*, 25 (2/3/4). [Online]. Available: http://www.emeraldinsight.com/journals.htm?issn=0309-0590&volume=25&issue=2/3/4&articleid=837040&show=html [Accessed 18 February 2014].

Gibbs, T. and Casey, S. 2011. Community Relations, NBN Co - National Broadband Network Co & Broadband Applications, NBN Co - National Broadband Network Co. (Slideshow). *Broadband and libraries*, 3rd Melbourne Unconference, Friday 18 March, 2011. Thomastown Library. [Online]. Available: http://yprl.stage.drupal.bibliocommons.com/about/organisation/unconference [Accessed 8 August 2013].

Halim, A. and Ali, M. 1997. *Improving agricultural extension. A reference manual. FAO: Natural Resources Management and Environment Department*. [Online]. Available: http://www.fao.org/docrep/w5830e/w5830e0h.htm [Accessed 31 July 2013].

Hansson, B. 2008. Job-Related Training and Benefits for Individuals: A Review of Evidence and Explanations. *OECD Education Working Papers*, No. 19, OECD Publishing. [Online]. Available: http://dx.doi.org/10.1787/237755412637 [Accessed 28 July 2013].

Horvat, A. 2004. Continuing education of librarians in Croatia: problems and prospects. *New Library World*, 105(9/10). [Online]. Available: http://www.emeraldinsight.com/journals.htm?issn=0307-4803&volume=105&issue=9/10&articleid=860201&show=html [Accessed 12 August 2013].

International Telecommunication Union (ITU). 2011. *The World in 2011: ICT Facts and Figures.* ICT Data and Statistics Division Telecommunication Development Bureau,

International Telecommunication Union: Geneva. [Online]. Available: http://www.itu.int/ITU-D/ict/facts/material/ICTFactsFigures2011.pdf [Accessed 23 May 2013].

Jackson, P.W. 2011. *What is education?* The University of Chicago Press Books: Chicago. [Online]. Available: http://press.uchicago.edu/ucp/books/book/chicago/W/bo12214939.html [Accessed 28 July 2013].

Jain, P. 1999. On-the-job training: a key to human resource development. *Library Management*, 20(5). [Online]. Available: http://www.emeraldinsight.com/journals.htm?issn=0143-5124&volume=20&issue=5&articleid=858933&show=html [Accessed 18 February 2014].

Kajewski, M. 2007. Emerging technologies changing our service delivery models. *The Electronic Library*, Vol. 25 Iss: 4. [Online]. Available: http://www.emeraldinsight.com/journals.htm?issn=0264-0473&volume=25&issue=4&articleid=1621416&show=html [Accessed 15 March 2014].

Khan, B.H. (ed.) 2001. *Web-based training. Educational Technology*. [Online]. Available: http://0-books.google.co.za.innopac.up.ac.za/books?hl=en&lr=&id=bfKmplYXrFIC&oi=fnd&pg=PA5&dq=web-based+training&ots=dAaeqHQ6mh&sig=YcZ6s60RxaeHxSUfgSEy7sCTjYQ#v=onepage&q=web-based%20training&f=false [Accessed 12 March 2014].

Kumar, R. 2005. *Research methodology: a step-by-step guide for beginners*. London: Sage.

Lee, T.B. 2015. *Broadband speeds around the world, in one map*. April 28 2015. [Online]. Available: http://www.vox.com/2015/1/31/7952321/world-broadband-speed-map [Accessed 28 April 2014].

Leedy, P. 1993. *Practical research: planning and design*. New Jersey: Prentice Hall.

Li, L. 2006. Leveraging quality web-based library user services in the digital age. *Library Management*, 27(6/7). [Online]. Available: http://0-www.emeraldinsight.com.innopac.up.ac.za/journals.htm?issn=0143-5124&volume=27&issue=6/7&articleid=1563534&show=html [Accessed 24 January 2014].

Lo, H.-C. 2009. Utilizing Computer-mediated Communication Tools for Problem-based Learning. *Educational Technology & Society*, 12(1): 205–213. [Online]. Available: http://www.ifets.info/journals/12_1/16.pdf [Accessed 5 March 2014].

Masadeh, M. 2003. Training, education, development and Learning: what is the difference? *European Scientific Journal*, 8 (10). [Online]. Available: http://eujournal.org/index.php/esj/article/viewFile/163/168 [Accessed 15 February 2014].

Mason, R. and Rennie, F. 2004. Broadband: A solution for rural e-Learning? *International Review of Research in Open and Distance Learning*. Volume 5, Number 1. [Online]. Available: http://0-www.irrodl.org.innopac.up.ac.za/index.php/irrodl/article/view/173/683 [Accessed 8 February 2014].

Mitchell, B. 2014. *Symmetric and asymmetric. About.com: Wireless / Networking Blog*. [Online]. Available: http://compnetworking.about.com/od/dsldigitalsubscriberline/g/bldef_symmetric.htm [Accessed 25 January 2014].

Mouton, J. 2001. *How to succeed in your master's and doctoral studies*. Pretoria: Van Schaik.

MyBroadband. 2014. *This is what South Africa's Internet actually looks like*, March 9. [Online]. Available: http://mybroadband.co.za/news/internet/98178-this-is-what-south-africas-internet-actually-looks-like.html [Accessed 3 June 2014].

OECD. 2003. Broadband Driving Growth: Policy Responses. *OECD Digital Economy Papers*, No. 75. OECD Publishing. [Online]. Available: http://dx.doi.org/10.1787/232838768555 [Accessed 17 July 2013].

OECD. 2004. The Development of Broadband Access in Rural and Remote Areas. *OECD Digital Economy Papers,* No. 80. [Online]. Available: http://www.oecd-ilibrary.org/docserver/download/5kz9lknqwc7k.pdf?expires=1425841578&id=id&accname=guest&checksum=BFF585C3DE67514889E43A4346E4002C [Accessed 8 March 2015].

OECD. 2006. Digital Broadband Content: Digital Content Strategies and Policies. *OECD Digital Economy Papers*, No. 119, OECD Publishing. Available: http://www.oecd-ilibrary.org [Accessed 11 February 2013].

OECD. 2012. *Developing Relevant Skills. Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies*. OECD Publishing. [Online]. Available: http://dx.doi.org/10.1787/9789264177338-3-en [Accessed 28 July 2013].

OECD. 2013a. *Trends Shaping Education 2013*. OECD Publishing. [Online]. Available: http://www.oecd-ilibrary.org [Accessed 11 February 2013].

OECD. 2013b. *Education Today 2013: The OECD Perspective*. [Online]. Available: http://0-www.oecd-ilibrary.org.innopac.up.ac.za/docserver/download/9612021e.pdf?expires=1375009485&id=id&accname=oid011488&checksum=0FBFA982D6F060E1F9FBF633715F8631 [Accessed 28 July 2013].

Ollé, C. and Borrego, Á. 2010. Librarians' perceptions on the use of electronic resources at Catalan academic libraries: Results of a focus group. *New Library World*, 111(1/2). [Online]. Available: http://www.emeraldinsight.com/journals.htm?issn=0307-4803&volume=111&issue=1&articleid=1829549&show=html [Accessed 12 August 2013].

Online Conferencing. [2013]. *What is online conferencing?* [Online]. Available: http://www.online-conference.net/what.htm [Accessed 7 August 2013].

Oshikoya, T.W. and Hussain, M.N. [2000]. Information Technology and the Challenge of Economic Development in Africa. *Economic Research Papers*, No. 36. African Development Bank. [Online]. Available: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/00157606-EN-ERP-36.PDF [Accessed 4 February 2014].

Pamment, T. 2008. Professional development in the South Australian library and information services sector: An examination of current trends, needs and opportunities. *Library Management*, 29(8/9). [Online]. Available: http://0-www.emeraldinsight.com.innopac.up.ac.za/journals.htm?issn=0143-5124&volume=29&issue=8/9&articleid=1751929&show=html [Accessed 16 February 2014].

Patton, M.Q. *Qualitative research & evaluation methods*. Thousand Oaks, Sage Publications, c2002.

Plosker, G. 2003. *The Information Industry Revolution: Implications for Librarians*. Information Today Inc. [Online]. Available: http://www.infotoday.com/online/nov03/plosker.shtml [Accessed 5 January 2014].

ProQuest. 2013. *ProQuest: Training Materials*. [Online]. Available: http://www.proquest.com/en-US/support/training/materials.shtml [Accessed 12 August 2013].

Razwiedani, M. 2012. *E-mail to B.E. Boucher*, 23 March 2012.

Rouse, M. 2005. Web-based training (e-learning). *TechTarget: SearchSOA Blog*, September. [Online]. Available: http://searchsoa.techtarget.com/definition/Web-based-training [Accessed 12 March 2014].

Rouse, M. 2008. Definition: Streaming video. *TechTarget: SearchMobileComputing Blog*, March. [Online]. Available: http://searchunifiedcommunications.techtarget.com/definition/streaming-video [Accessed 7 August, 2013].

Rouse, M. 2010. Definition: Virtual classroom. *TechTarget: WhatIs.com Blog*, October. [Online]. Available: http://whatis.techtarget.com/definition/virtual-classroom [Accessed 7 August 2013].

Saadi, H., Mirzayi, K. and Movahedi, R. 2014. Barriers of the development of web-based training in agricultural higher education system in Iran: A case study of Hamadan Bu Ali Sina University, Iran. *Education and Information Technologies*, February. [Online]. Available: http://0-link.springer.com.tkplib01.tut.ac.za/article/10.1007/s10639-014-9309-9 [Accessed 29 December, 2014].

Salvi, S.S. [2013]. What is Training and Development? *Amherst College Blog*. [Online]. Available: https://www.amherst.edu/offices/human_resources/training/whatistraining [Accessed 31 July 2013].

SANReN. 2013. *South African National Research Network*. [Online]. Available: http://www.sanren.ac.za [Accessed 10 June 2013].

Smith, B.D. 2011. *Telematic Composition*. Urbana, Illinois. [Online]. Available: https://www.ideals.illinois.edu/bitstream/handle/2142/29843/Smith_Benjamin.pdf?sequence=1 [Accessed 29 December 2014].

Springer. 2012. *SpringerLink Online Tutorial - Introduction to SpringerLink*. [Online]. Available: http://www.youtube.com/watch?v=u4GIS2DbPXQ [Accessed 13 August 2013].

Sun, H., Chen, K. and Tseng, C. [et al.]. 2011. Role changing for librarians in the new information technology era. *New Library World*, 112(7/8). [Online]. Available: http://www.emeraldinsight.com/journals.htm?issn=0307-4803&volume=112&issue=7/8&articleid=1939727&show=html [Accessed 12 August 2013].

TENET. 2014. *The Tertiary Education and Research Network of South Africa: The Network*. [Online]. Available: http://www.tenet.ac.za/ [Accessed 10 June 2013].

Terre Blanche, M. et al. 2006. *Research in practice*. UCT Press: Cape Town.

Tobin, T. and Kesselman, M. 2000. Evaluation of Web-Based Library Instruction Programs. *Inspel*, 34: 2 (67 – 75) [Online]. Available: http://forge.fh-potsdam.de/~IFLA/INSPEL/00-2tote.pdf [Accessed 8 January 2014].

Trilling, B. and Fadel, C. 2009. *21st Century Skills: Learning for life in our times*. John Wiley & Sons, Inc.: San Francisco. [Online]. Available: http://yasamboyuogrenme.wikispaces.com/file/view/21st+CENTURY+SKILLS.pdf [Accessed 3 February 2014].

Tripathia, M. and Kumarb, S. 2010. Use of Web 2.0 tools in academic libraries: A reconnaissance of the international landscape. *The International Information & Library Review*, 42 (3). [Online]. Available: http://0-

www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S1057231710000445 [Accessed 5 March 2014].

Tsai, S. and Machado, P. [2003]. *E-learning, Online Learning, Web-based Learning, or Distance Learning: Unveiling the Ambiguity in Current Terminology*. [Online]. Available: http://www.oktopusz.hu/domain9/files/modules/module15/2584862F837DBB7.pdf [Accessed 15 February 2014].

Tshwane University of Technology. 2013. *Tshwane University of Technology: About Us*. [Online]. Available: http://www.tut.ac.za/About%20Us/ [Accessed 11 February 2013].

UNESCO: International Institute for Educational Planning (IIEP). 2006. *Guidebook for planning education in emergencies and reconstruction*. Paris. [Online]. Available: http://www.iiep.unesco.org/fileadmin/user_upload/Research_Highlights_Emergencies/chapter3.pdf [Accessed 18 February 2014].

UNESCO: Broadband Commission for Digital Development. 2012. *Broadband empowers global partnerships for development*. [Online]. Available: http://www.broadbandcommission.org/mediacorner/Stories/MDG8.aspx [Accessed 22 May 2013].

UNESCO: Broadband Commission for Digital Development. 2012. *The State of Broadband 2012: Achieving digital Inclusion for all.* [Online]. Available: http://www.broadbandcommission.org/Documents/bb-annualreport2012.pdf [Accessed 23 May 2013].

UNESCO. 2012. Turning on mobile learning: Illustrative Initiatives and Policy Implications in Asia. *UNESCO: Working Paper Series on Mobile Learning*. [Online]. Available: http://unesdoc.unesco.org/images/0021/002162/216283E.pdf [Accessed 21 May 2013].

UNESCO Broadband Commission: Working Group on Education. 2013. *Technology, Broadband and Education: Advancing the education for all agenda.* [Online]. Available: http://unesdoc.unesco.org/images/0021/002196/219687e.pdf [Accessed 21 May 2013].

University of California, Berkerley. (2014). *Career Development: Skill Development*. [Online]. Available: http://hrweb.berkeley.edu/learning/career-development/skill-development [Accessed 18 February 2014].

Volunteering Options. 2008. *What is Development?* [Online]. Available: http://www.volunteeringoptions.org/VolunteeringDevelopment/WhatisDevelopment/tabid/78/Default.aspx [Accessed 31 July 2013].

WBTIC. 2009. *What is Web-Based Training*? [Online]. Available: http://www.webbasedtraining.com/primer_whatiswbt.aspx [Accessed 10 February 2014].

Werquin, P. 2010. *Reasons for recognising non-formal and informal learning outcomes. Recognising Non-Formal and Informal Learning: Outcomes, Policies and Practices.* OECD Publishing. [Online]. Available: http://dx.doi.org/10.1787/9789264063853-3-en [Accessed 28 July 2013].

Wheeler, K. 2013. What's the Difference Between Training, Education, Development and Learning? *Future of Talent Institute: Envisioning the Workforce 2020 Blog*. [Online]. Available: http://futureoftalent.org/whats-difference-training-education-development-learning/ [Accessed 31 July 2013].

Wikinvest. 2012. *Broadband Technologies*. [Online]. Available: http://www.wikinvest.com/concept/Broadband_Technologies [Accessed 20 February 2013].

Wikipedia. 2013. *Blogs*. [Online]. Available: http://en.wikipedia.org/wiki/Blogs [Accessed 6 August 2013].

Winthrop, R. and Smith, M.S. 2012. A new face of education bringing technology into the classroom in the developing world. *Brooke Shearer Working Paper Series: Working Paper 1*, January 2012. Global Economy and Development at Brookings. [Online]. Available: http://www.brookings.edu/~/media/research/files/papers/2012/1/education%20technology%20winthrop/01_education_technology_shearer.pdf [Accessed 6 January 2014].

Zhang, D. and Nunamaker, F. 2003. Powering E-Learning In the New Millennium: An Overview of E-Learning and Enabling Technology. *Information Systems Frontiers*, 5(2), 207–218. [Online]. Available: http://0-download.springer.com.tkplib01.tut.ac.za/static/pdf/921/art%253A10.1023%252FA%253A1022609809036.pdf?auth66=1419864389_e319dadbf2c7436987220498c9adcc28&ext=.pdf [Accessed 29 December 2014].

APPENDICES

Appendix A: Questionnaire A – Librarian Questionnaire

This serves as informed consent for conducting a research survey for an investigation determining the advantages and disadvantages using broadband tools and technologies for librarian web-based training, with specific reference to online resources at the Tshwane University of Technology's, Library & Information Services.

This consent:

1. Grant permission that you will participate voluntarily in this survey as explained in the cover letter
2. Agreed to the nature, objective, possible safety and health implications as indicated in the cover letter and that you understand it
3. Indicate that you have the right to choose whether to participate in the project and that the information furnished will be handled confidentially
4. You are aware that the results of this investigation may be used for the purposes of publication
5. Upon signature of this consent, you will be provided with a copy

1. Do you agree with the consent conditions stipulated above?
   - ○ I fully agree with the conditions of the consent
   - ○ I do not agree to the conditions of the consent

2. Consent was provided by:
   - ○ I choose to stay anonymous
   - ○ My name is:

3. Date of consent provided (DD/MM/YYYY):

4. Do you currently work at the Tshwane University of Technology, Library and Information Services?
   - Yes
   - No

5. What work do you currently do?
   - Information Librarian
   - Information Literacy Trainer
   - Head of Library
   - Other:

If "Yes" please specify:

6. Have you ever utilized web-based training tools and technologies for your own personal benefits?
   - Yes
   - No
   - Other (please specify)

7. If you answered “No” in question 6, do you have a specific reason for not using online tools and technologies? (Please mark multiple options if applicable and specify if there are any other possible reasons not mentioned)
   - ☐ It is not necessary, I know everything

- ☐ Using web-based tools and technologies are too complicated
- ☐ The slow Internet does not allow me to use the various tools and technologies for web-based training
- ☐ Our computers are too old to use the latest online technologies
- ☐ You do not have the appropriate equipment
- ☐ Other:

8. Have you ever used web-based training for any of the e-resources you currently use in the library?
   - ○ Yes
   - ○ No

9. If "Yes" in Question 8, what web-based training tools and technologies did you use? (Please mark multiple options if applicable and specify if there are any other possible reasons not mentioned in the options provided)
   - ☐ Online User Guides/Manuals
   - ☐ Web 2.0 tools (Facebook, Chatrooms etc.)
   - ☐ Online Video Tutorials
   - ☐ Live online training sessions (Webinars, Virtual Classes, Online Conferences, Video Streaming)
   - ☐ Online Courses
   - ☐ Online Gaming
   - ☐ Teleconferencing
   - ☐ Online Blogs or Vlogs
   - ☐ Podcasts or Vodcasts
   - ☐ Other

10. Which of these options selected in question 9, do you use most? (Please rank your options according to importance marking the most used option as number one and the, number 2 being the second most used etc.)

- ☐ Online User Guides/Manuals
- ☐ Web 2.0 tools (Facebook, Chatrooms etc.)
- ☐ Online Video Tutorials
- ☐ Live online training sessions (Webinars, Virtual Classes, Online Conferences, Video Streaming)
- ☐ Online Courses
- ☐ Online Gaming
- ☐ Teleconferencing
- ☐ Online Blogs or Vlogs
- ☐ Podcasts or Vodcasts
- ☐ Other as specified in question 6

11. Please provide a reason why you would use or prefer any of your selections in question 10?

12. Do you think the use of web-based training tools and technologies have any of the following advantages? (Please mark multiple options if applicable and specify if there are any other possible reasons not mentioned in the options provided)
    - ☐ Most of the time I can do the training at my own time
    - ☐ I can redo the training should I think it is necessary
    - ☐ Because I am situated in a remote location I do not have to travel and waste time and money to attend training sessions
    - ☐ Because the training is conducted over the Internet, I can do it anywhere
    - ☐ I do not need special equipment to attend (to) the training
    - ☐ I do not need any special software to attend the training sessions
    - ☐ The Internet is fast enough for me to download or use online Technologies in order to attend (to) the training
    - ☐ Ease of use
    - ☐ Training courses are standardized
    - ☐ Problem solving has been easy to solve
    - ☐ Training and training material has been compatible my current equipment

- ☐ I could see who of my colleagues at other locations has been conducting the same training and it helped with further interaction
- ☐ Allowed for more flexible scheduling times to conduct in training sessions
- ☐ Other:

13. Do you think using any web-based training tools and technologies have any of the following disadvantages (Please mark multiple options if applicable and specify if there are any other possible reasons not mentioned in the options provided)
    - ☐ Accept for live online training sessions, nobody is readily available should you have a burning question to ask while busy with the training
    - ☐ Once I started and for no reason be interrupted I normally does not Restart the session again
    - ☐ Our Internet connection does not allow us to use web-based training tools and technologies
    - ☐ Using these tools and technologies are too complicated
    - ☐ I do not have the right software to conduct the online training
    - ☐ I do not have the right equipment to benefit from online training
    - ☐ I did not receive any training in the use of these technologies to benefit from the online training
    - ☐ The workstation used is not in the right location to reap the full benefit of the online training
    - ☐ I am too busy to invest time in web-based training
    - ☐ I struggled to get a training session accommodating South African time slots; most were either in the middle of the night or too early
    - ☐ I was blocked by our IT staff to use the web-based training opportunities available
    - ☐ The training session was time consuming for the part I really needed help with
    - ☐ My Internet connection was not stable enough to keep me logged in for the whole session and therefore I lost interest
    - ☐ Other

14. Do you think investing time and energy conducting any e-resource or work related web-based training will benefit yourself for personal development purposes?
    - Yes
    - No

15. Please explain your answer in question 14?

16. Do you think that the service you deliver to your users will improve by conducting / attending e-resource or related web-based training?
    - Yes
    - No

17. Please explain your answer in Question number 16?

18. Do you think that you could improve your service delivery and improving the TUT community by attending / conducting e-resource or related web-based training?
    - Yes
    - No

19. Please explain your answer given in Question number 18?

Appendix B: Questionnaire B – Vendor Questionnaire

This serves as informed consent for conducting a research survey for an investigation determining the advantages and disadvantages using broadband tools and technologies for librarian web-based training, with specific reference to online resources at the Tshwane University of Technology's, Library & Information Services.

This consent:

1. Grant permission that you will participate voluntarily in this survey as explained in the cover letter
2. Agreed to the nature, objective, possible safety and health implications as indicated in the cover letter and that you understand it
3. Indicate that you have the right to choose whether to participate in the project and that the information furnished will be handled confidentially
4. You are aware that the results of this investigation may be used for the purposes of publication
5. Upon signature of this consent, you will be provided with a copy

1. Do you agree with the consent conditions * stipulated above?
   - o I fully agree with the conditions of the consent
   - o I do not agree to the conditions of the consent

2. Consent was provided by:
   - o I choose to stay anonymous
   - o My name is:

3. Consent date (DD/MM/YYYY:

4. Are you an E-resource vendor or electronic product supplier for the Tshwane University of Technology, Library and Information Services?
   - Yes
   - No

5. Do you have an office or do you have employees based in South Africa?
   - Yes
   - No

6. Do you offer any web-based training opportunities for your electronic products?
   - Yes
   - No

7. If yes, what web-based training tools and technologies do you offer librarians and other users? (Please mark multiple options if applicable and specify if there are any other possible reasons not mentioned in the options provided)
   - ☐ Online User Guides/Manuals
   - ☐ Web 2.0 tools (Facebook, Chatrooms etc.)
   - ☐ Online Video Tutorials
   - ☐ Live online training sessions (Webinars, Virtual Classes, Online Conferences, Video Streaming)
   - ☐ Online Courses
   - ☐ Online Gaming
   - ☐ Teleconferencing
   - ☐ Online Blogs or Vlogs
   - ☐ Podcasts or Vodcasts
   - ☐ Other:

8. Do you believe that using these web-based training tools and technologies has been used effective in the sense that librarians can deliver better services after conducting the training sessions?

- ⭘ Yes
- ⭘ No
- ⭘ I am uncertain

9. Please explain your answer provided in Question number 8?

10. Do you think by providing web-based training has any of the following disadvantages for librarians? (Please mark multiple options if applicable and specify if there are any other possible reasons not mentioned in the options provided)

- ☐ Accept for live online training sessions, nobody is readily available should they have a burning question watching offline videos or reading online manuals
- ☐ Once they start and for no reason get interrupted they normally does not restart the session again
- ☐ Their Internet connection might not allow the use of web-based training tools and technologies
- ☐ Using these tools and technologies are too complicated
- ☐ They do not have the right software to conduct the online training
- ☐ They do not have the right equipment to benefit from online training
- ☐ They did not receive any training in the use of these technologies to benefit from the online training
- ☐ The workstation used might not in the right location to reap the full benefit for the online training
- ☐ They might be too busy to invest time in web-based training
- ☐ They struggle to get a training session that accommodate South African time slots
- ☐ They are blocked by their IT departments to use the web-based training opportunities available
- ☐ The training session might be too time consuming for the part they really need training on

- ☐ Their Internet connection is not stable enough to keep them logged in for the whole session and therefore they loose interest
- ☐ Other:

11. Do you think librarians who utilize your web-based training tools and technologies will benefit, enhancing their level of service delivery?
    - ○ Yes
    - ○ No

12. Please explain your answer in Question 11?

13. How does web-based training effect your institution? (Please mark multiple options if applicable)
    - ☐ Learners has limited access to instructors if certain concepts are unclear
    - ☐ Although web-based training fill a lot gaps it still does not replace valuable face-to-face training
    - ☐ Self-motivation are not always present in all learners to complete the training
    - ☐ The technology and applications are sometimes complicated or unknown
    - ☐ Learners might not have the right software or equipment to conduct in training opportunities
    - ☐ All technologies does not present in the same way and might jeopardize the quality of instruction as screens and hardware vary in size and quality
    - ☐ Training programmes and presenters are not always of prime quality
    - ☐ Learners might not have access to the broadband required to conduct training as presented
    - ☐ IT staff might block certain aspects which jeopardise the quality
    - ☐ Developing these training material could be costly
    - ☐ Loss in network accessibility could influence training accessibility and completion of sessions
    - ☐ Saving in travel and venue costs

- ☐ Flexible concerning time and location
- ☐ Providing equal access to training opportunities
- ☐ Ease of use by both the instructor and learner
- ☐ Training compatible with most computers and systems
- ☐ Other:

14. Do you have any other remarks concerning the advantages and disadvantages using web-based training in South Africa?

Appendix C: Cover Letter for Questionnaire A

Dear Participant,

My name is Belinda Boucher and I am a Master's student at the University of Pretoria and an employee of the Tshwane University of Technology (TUT). In order to finalize my mini-dissertation, I am investigating the advantages and disadvantages using broadband tools and technologies for librarians at the Tshwane University of Technology's, Library & Information Services.

Because you are a librarian at the TUT, you have been invited to participate in this research study by completing this online survey.

The questionnaire will require approximately 15 minutes of your time to complete. There is no compensation for responding nor is there any known risk. By completing the consent in the beginning of the survey, please note that the information provided will remain confidential, but should you wish to remain anonymous the option to do so is provided. Copies of the project will be provided to my Supervisor, Dr. Marlene Holmner at the University of Pretoria.

If you choose to participate in this project, please answer all questions as honestly as possible and submit the online questionnaire via Survey Monkey, promptly. Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavours. The data collected will provide useful information regarding advantages and disadvantages of librarians making use of web-based training opportunities and will hopefully encourage other librarians whom have not done so to invest time and effort into it in order to provide and deliver a better and a more improved service to their users. If you would like a summary copy of this study please request it providing the information below and e-mail me at belindaeboucher@gmail.com.

Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below. I will appreciate your input until December 9th, 2015.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to Dr. Holmner, the Academic Coordinator: Carnegie MIT, Department of Information Science at the University of Pretoria: marleneholmner@up.ac.za.

Yours sincerely,

Belinda Boucher

(012) 382 5244

belindaeboucher@gmail.com

Supervisor:

Dr. M. Holmner

marleneholmner@up.ac.za

Request for Information:

Please request a copy of the study results providing me with your name with an e-mail to:

belindaeboucher@gmail.com

Appendix D: Cover Letter for Questionnaire B

Dear Participant,

My name is Belinda Boucher and I am a Master's student at the University of Pretoria and an employee of the Tshwane University of Technology (TUT). In order to finalize my mini-dissertation, I am investigating the advantages and disadvantages using broadband tools and technologies for web-based training for librarians at the Tshwane University of Technology's, Library & Information Services.

Because you are an electronic product supplier for the TUT Library and Information Services, you have been invited to participate in this research study by completing this online survey.

The questionnaire will require approximately 15 minutes of your time to complete. There is no compensation for responding nor is there any known risk. By completing the consent in the beginning of the survey, please note that the information provided will remain confidential, but should you wish to remain anonymous the option to do so is provided. Copies of the project will be provided to my Supervisor, Dr. Marlene Holmner at the University of Pretoria.

If you choose to participate in this project, please answer all questions as honestly as possible and submit the online questionnaire via Survey Monkey, promptly. Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavours. The data collected will provide useful information regarding advantages and disadvantages of librarians making use of web-based training opportunities and will hopefully encourage other librarians whom have not done so to invest time and effort into it in order to provide and deliver a better and a more improved service to their users. If you would like a summary copy of this study please request it providing the information below and e-mail me at belindaeboucher@gmail.com.

Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below. I will appreciate your input until December 9th, 2015.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to Dr. Holmner, the Academic Coordinator: Carnegie MIT, Department of Information Science at the University of Pretoria: marleneholmner@up.ac.za.

Thank you in advance.

Yours sincerely,

Belinda Boucher

(012) 382 5244

belindaeboucher@gmail.com

Supervisor:

Dr. M. Holmner

marleneholmner@up.ac.za

Request for Information:

Please request a copy of the study results providing me with your name with an e-mail to:

belindaeboucher@gmail.com