THE USE OF WEB 2.0 TECHNOLOGIES IN ACADEMIC LIBRARIES IN SOUTH AFRICA

Eunice Nonhlanhla Ngcobo

B.Soc. Sc., PGDLIS, B.Bibl (Hons) and MIS

Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the Information Studies Programme, School of Social Science, College of Humanities, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

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DECLARATION

I, Eunice Nonhlanhla Ngcobo declare that:

i) The research reported in this dissertation, except where otherwise indicated, is my original work.

ii) This dissertation has not been submitted for any other degree or examination at any other university.

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………………………………………………   Date: ……………………

Eunice Nonhlanhla Ngcobo

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Prof Ruth Hoskins

DEDICATION

This dissertation is dedicated to my mother and my grandmother.

ABSTRACT

The potential of Web 2.0 to profoundly change higher education has been acknowledged. As libraries aspire to remain relevant as premier suppliers of information and endeavour to attract and engage their users, embracing and implementing Web 2.0 technologies has become synonymous with their overall success. This study investigated the use of Web 2.0 technologies in academic libraries in South Africa. The study noted that many academic libraries in South Africa are not lagging behind their global counterparts in adopting these technologies to enhance their services. Many academic libraries in South Africa are leveraging the power of Web 2.0 technologies to provide services that meet the needs of today's users.

The population for this study was made up of 17 academic libraries in South Africa. Out of the population of 347 librarians in research libraries, a total of 51 librarians were selected to participate in the study using the random selection method, which translated into three librarians per academic library. The selected number included library directors with whom semi-structured telephonic interviews were held. The study achieved a response rate of 80.3%, which is very good for making generalizations to a larger population.

The study employed both qualitative and quantitative research paradigms to investigate the extent of use of Web 2.0 technologies in South African academic libraries. Neither research approach is better than the other. The two research paradigms are different and both have their strengths and weaknesses. Furthermore, in order to maximize the strengths of the two research approaches, the study made use of both the quantitative and the qualitative paradigms. The qualitative research approach was found to be appropriate for this study since it is the predominant paradigm of research in the social sciences. The quantitative research paradigm was chosen because it has two primary strengths, namely, the findings are generalizable and the data are objective.

The researcher opted for a two-pronged method of data collection, which are the self-administered questionnaire and structured interview, as both methods were deemed appropriate for collecting data on academic librarians' use or non-use of Web 2.0 technologies to deliver

high-quality services to their users. Primary data was collected using the questionnaire (for librarians) and a semi-structured interview (for library directors), as data collection methods.

The findings of the study show that Web 2.0 technologies are used in the majority of academic institutions surveyed in South Africa, as indicated by 78% of the respondents. This is an indication of the commitment to provide up-to-date services in the platforms that library patrons use, since the literature clearly states that the use of Web 2.0 technologies ensures that libraries keep abreast of technological developments locally and globally by occupying the same space their predominantly techno-savvy users occupy.

Providing innovative services and resources that are responsive to users' needs plays a crucial role in ensuring that academic libraries remain relevant, especially if one considers the threats to their existence, which libraries face currently. The findings also show that although academic libraries in South Africa have adopted the use of Web 2.0 technologies to deliver quality services, the uptake has been slow. The study recommends a comprehensive training programme, which includes a review of the Library and Information Science (LIS) curriculum, to ensure Web 2.0 compliance among LIS practitioners. Furthermore, the study proposes a model for the successful implementation of Web 2.0 technologies in academic libraries in South Africa. The model can be adapted to fit any type of library with few or no amendments.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

ACRL	Association of College and Research Libraries
AJAX	Asynchronous JavaScript and XML
ATEI	Alexander Technological Educational Institution of Thessaloniki, Greece
ARL	Association of Research Libraries
CIBER	Centre for Information Behaviour and the Evaluation of Research
CSAQ	Computerised Self-Administered Questionnaire
DUT	Durban University of Technology
DVC	Deputy Vice Chancellor
HTML	Hypertext Markup Language
ICT	Information and Communication Technology
IFLA	International Federation of Library Associations
ILL	Inter Library Loans
IM	Instant Messenger
IT	Information Technology
LAN	Local Area Network
LIASA	Library and Information Association of South Africa
LIS	Library and Information Services
LSIS	Library Science and Information Systems
MULTA	Murdoch University Library Thinking Aloud
NRF	National Research Foundation
OCLC	Online Computer Library Center
PLCMC	Public Library of Charlotte and Mecklenburg County
RSS	Really Simple Syndication or Rich Site Summary
SCECSAL	Standing Conference of Eastern, Central and Southern Africa Library and Information Associations
SDI	Selective Dissemination of Information

SMS	Short Message Service
SNS	Social Networking Sites
UK	United Kingdom
UKZN	University of KwaZulu-Natal
UNESCO	United Nations Educational, Scientific and Cultural Organization
UoT	Universities of Technology
UP	University of Pretoria
USA	United States of America
VC	Vice-Chancellor
XML	Extensible Mark-up Language
WWW	World Wide Web

Chapter 1: Introduction to the study

This introductory chapter outlines Web 2.0 and its use in academic libraries in South Africa. The definition of key terms such as Web 2.0 and Library 2.0, together with the principles underpinning these terms, the justification for the study, the research problem and objectives are discussed. A discussion of issues regarding the limitations of the study, the conceptual framework upon which the study is based, the research approach the study has adopted, ethical considerations as well as the structure of the study, is also included.

1.1 Introduction

According to McManus (2009) the idea of being able to use Internet social software via an Internet platform is a relatively new idea, considering the history of the computer and its networking capabilities. There has been increasing interest in the new generation of web-based technologies, tools and services under the labels of Web 2.0 and other social software or social media in the past ten years (Bryant 2007). It was during this period of time that Internet services from Internet platforms, such as Facebook, MySpace, Blogger, Meebo and from other providers became available for public consumption. Some Internet platforms specialize in one aspect of Web 2.0, for example, Blogger.com, where registered users can write blogs and share with others. Other Web 2.0 service providers offer a mashup or combination of Web 2.0 content to registered users, for example, Facebook.com, where users can create a public profile, micro-blog using the 'status' function, send messages, and even chat with other users using the Facebook.com instant messenger (McManus 2009).

Miller (2005) sees Web 2.0 as a:

> "hot story out on the blogosphere right now, with an army of advocates facing off against those who argue that it is nothing new, and their allies with painful memories of Dot Com hysteria in the 1990s. Even respectable media outlets such as Business Week are getting excited, and an expensive conference in San Francisco at the start of October had to turn people away as it passed over 800 registrations" (Miller 2005: Introduction).

Miller's assertion accurately describes the tremendous interest Web 2.0 has created in the network environment.

Tim O'Reilly (2005), who is credited with coining the term Web 2.0, states that Web 2.0 is
> "revolutionizing the way we interact with information and with one another online by harnessing the collective intelligence of Web users, thus facilitating community, dynamic collaboration and the sharing of ideas (in Wusteman 2009:171)".

Academic research could benefit enormously from adopting Web 2.0 ingenuity and functionality, which has led to the coining of the term 'Research 2.0' which refers to "the extension of Web 2.0 tools to support academic and other research" (Lin 2008:3).

Since the coining of the term Web 2.0 by O'Reilly Media in 2004, Web 2.0 has been growing into one of the most frequently used words in our current network environment (Han and Liu 2010:41). It has undoubtedly extended its influence to the library environment. The new tools and services utilizing Web 2.0 are changing the way people use the Internet, making it easier to collaborate, communicate and share information.

A huge shift in the manner in which libraries delivered their services to users has occurred over the years. In the past services were delivered to users with very little user involvement. The traditional role of the library as a knowledge repository has given way to a more active, user-centred agent for the dissemination of knowledge. The advent of Web 2.0 has introduced a dramatic change in the relationship between the library and its users (Kim and Abbas 2010:211). Web-based services which pull data from a wide range of back-end systems to deliver value to users, when, and where and in the form that they require it, have emerged (Miller 2005).

The use of Web 2.0 technologies has ushered in a radical change in the manner in which academic librarians deliver their services to users. Many academic libraries in the world, especially in developed countries like the United States of America (USA), are leveraging the power of Web 2.0 technologies to provide better and more relevant services to their users (McManus 2009). They are incorporating these technologies into their library instruction programmes, their web presence and reference services.

The potential of Web 2.0 to profoundly change higher education has been recognized (Franklin and van Harmelen 2007 in Wusteman 2009:171). As libraries aspire to remain relevant as premier suppliers of information that attract and engage their users, embracing Web 2.0 has become almost synonymous with their overall success (Han and Liu 2010). It is encouraging to note that some academic libraries in South Africa are not lagging behind their counterparts globally regarding the use of Web 2.0 technologies. There are, however, academic libraries in South Africa that have not displayed much enthusiasm in integrating Web 2.0 technologies into their programmes and services for various reasons (Pienaar 2010). It is the focus of the proposed study to investigate why these libraries are not adopting Web 2.0 technologies into their programmes and services.

1.2 Types of Web 2.0 applications

This study makes mention of a number of terms which need to be clearly and succinctly defined in order to enhance the readers' understanding of their meanings and avoid confusion.

1.2.1 Web 2.0

There is no universal definition of Web 2.0 technologies. A number of authors have put forward various definitions. Tim O'Reilly, president of O'Reilly Media, who is credited with coining the term Web 2.0 in 2004, provided the following compact definition on the O'Reilly Radar blog:

> "Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver richer user experiences (in Murley 2008:198; Stephens and Cheetham 2011:35)".

Coombs (2007: Introduction) defined Web 2.0 in much simpler terms, which is "a space that allows anyone to create and share information online – a space for collaboration, conversation, and interaction; a space that is highly dynamic, flexible, and adaptable".

The Wikipedia definition of Web 2.0 is:

> "a term often applied to a perceived ongoing transition of the World Wide Web from a collection of websites to a full-fledged computing platform serving web applications to end users. Ultimately Web 2.0 services are expected to replace desktop computing applications for many purposes (in Abram 2006: Web 2.0)".

Web 2.0 refers to a "conglomeration of technologies, ideas, and approaches that, at least to some, represent a new way of interacting online" (Notess 2006:40). Web 2.0 refers to

> "a group of technologies which have become deeply associated with the term: blogs, wikis, podcasts, RSS feeds, etc., which facilitate a more socially connected Web where everyone is able to add to and edit the information space (Anderson 2007:5)".

It is evident, from these definitions, that the capabilities of Web 2.0 allow users to engage the library in two-way communication and knowledge exchanges.

1.2.2 Examples of Web 2.0 applications

According to Anderson (2007), Maness (2006), Harinarayana and Raju (2010) and Miller (2005) the examples of Web 2.0 applications are as follows:

1.2.2.1 Blogs

A blogs, or web-log is a simple web page which consists of brief paragraphs of opinion, information, personal diary entries or links, called posts. The posts are arranged chronologically with the most recent first. Library web sites, as information dissemination spaces, provide information services to their users and act as a library promotional mechanism. A blog is the best information communication channel to extract latent feedback information from library users to

enhance the quality of library services. Blogs are the most widely used Web 2.0 feature (Harinarayana and Raju 2010).

1.2.2.2 Wikis

A wiki is a web page or a set of web pages that can be easily edited by anyone who is allowed access. Librarians can create wikis to manage electronic and physical library collections reserved for university courses.

1.2.2.3 RSS

RSS (Really Simple Syndication or Rich Site Summary) is a simple lightweight Extensible Markup Language (XML) format to share web site content. It resembles current awareness and selective dissemination of information (SDI) service. The purpose of providing an RSS news feed in university library web sites is to publish library news (for example, announcements, events, exhibitions, and so forth), provide information about information literacy/retrieval classes and to subscribe to RSS feeds for podcasts.

1.2.2.4 Podcasts

A podcast is audio content that is available on the internet that can be automatically delivered to a personal computer or MP3 player. It is audio on the web. Podcasts and vidcasts (video content that is available on the internet) can be used to deliver library web-based services.

1.2.2.5 Instant messaging (IM)

Instant messaging refers to a live online synchronous channel which facilitates online interaction between two people. It can be used to replace the traditional e-mail and form-based reference services.

1.2.2.6 Folksonomies

Folksonomies, also known as collaborative tagging, social indexing and social tagging, allow users to tag online content. It is an open and informal method of categorising that allows users to associate keywords or 'tags' with online content. Like-minded users can easily create their own community with the same subject interest.

1.2.2.7 Social networking sites (SNS)

Examples of SNSs such as, Facebook, YouTube, Flickr, and so forth, allow information ranging from highly personal to academic interests of the participants to be shared among users.

1.2.2.8 Social bookmarking/user tagging

Social bookmarking sites such as del.icio.us, furl, dig, Flickr, connote, CiteUlike, and so forth, allow like-minded users to easily create their own community with the same subject interest.

1.2.2.9 Mashups

Mashups refer to hybrid applications where two or more technologies or services are conflated into a completely new, novel service (Maness 2006).

1.2.3 The principles of Web 2.0

In addition to the compact definition of the term Web 2.0 provided by Tim O'Reilly given above, he proceeded to define the concepts underpinning Web 2.0 and offered the following diagram to illustrate some of the related ideas in Figure 1.1 below.
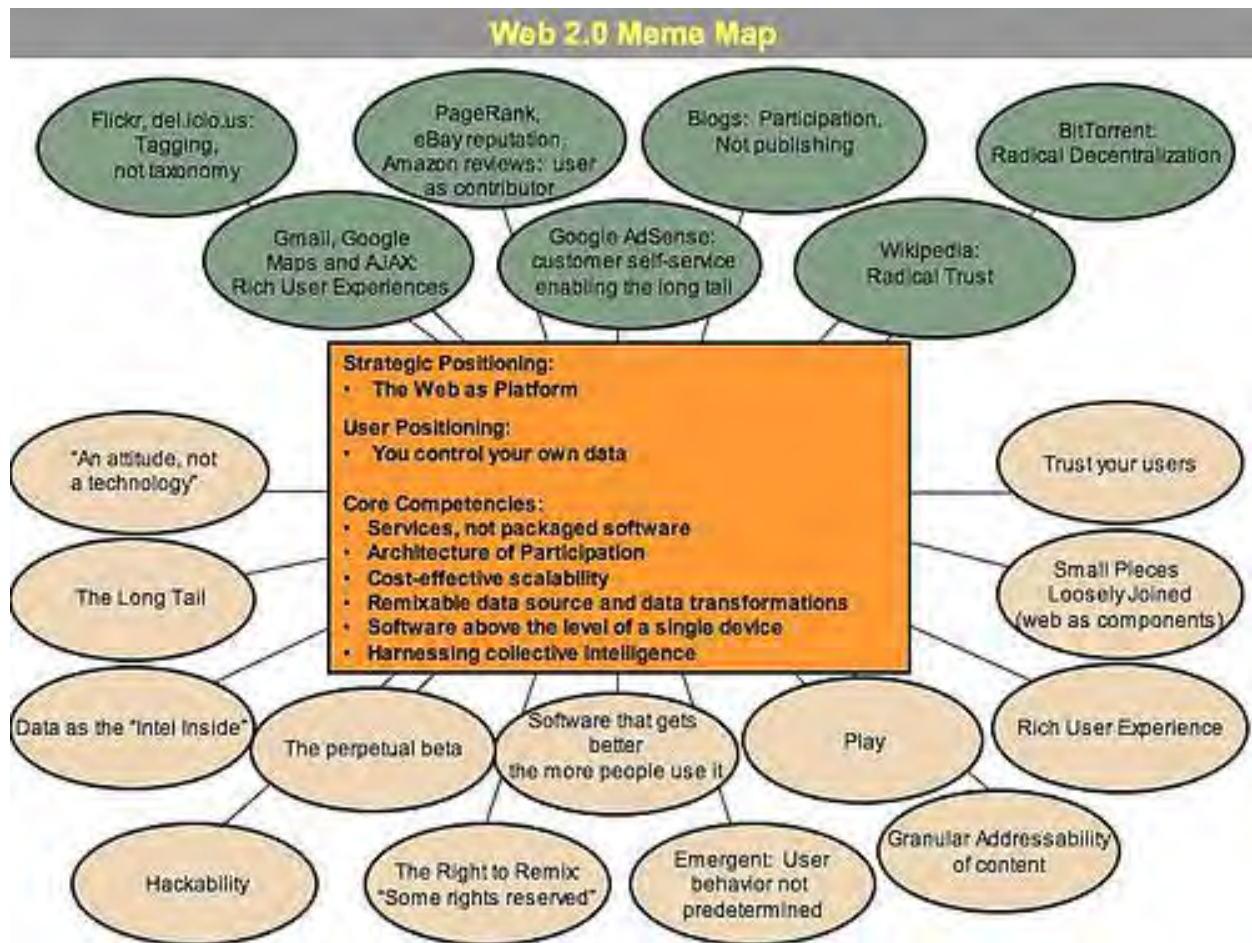
Figure 1.1: Tim O'Reilly's Web 2.0 Meme Map

Source: O'Reilly (2005:4)

Figure 1.1 above shows ad hoc relationships formed by and for Web-based services at the point of need, rather than the costly and time-consuming human creation contracts or service level agreements. It shows the disaggregation of content and services into components that are far more meaningful to the user, alongside disintermediation of the Gate Keepers in favour of direct access to Web-visible resources (Miller 2005).

Miller (2005) outlined the following nine principles of Web 2.0, in order to provide understanding of what Web 2.0 entails, which are as follows:

1. Web 2.0 presages a freeing of data, allowing it to be exposed, discovered and manipulated in a variety of ways distinct from the purpose of the application originally used to gain access. There is great support for the presumption that access to information is a right, not a grudgingly granted privilege.

2. Web 2.0 permits the building of virtual applications, drawing data and functionality from a number of different sources as appropriate.

3. Web 2.0 is participative, in contrast to the traditional Web (Web 1.0) which tended to be one-sided, with a flow of content from provider to viewer. It allows users to participate online by blogging, sharing files, tagging and bookmarking content that is of interest. It acknowledges the value of user-generated content.

4. Web 2.0 applications work for the user, and are able to locate and assemble content that meets users' needs.

5. Web 2.0 applications are modular, allowing developers and users to pick and choose from a set of interoperating components in order to build something that meets their needs. Furthermore, the Web 2.0 applications themselves become components for building yet more applications.

6. Web 2.0 is about sharing of content and ideas.

7. Web 2.0 is about communication and facilitating community. It facilitates a two-way information process between the providers and users of content.

8. Web 2.0 is about remix. It allows users to unambiguously reference and document the information they require, incorporating it into something new that is both the users' and the original contributor's.

9. Web 2.0 is built on trust, whether that trust is placed in individuals, in assertions, or in the uses and reuses of data.

What distinguishes Web 2.0 from Web 1.0 (the traditional Web) is its interactivity (Abram 2006). Although the Web is interactive in the sense that a user is able to click and get results, send email and get responses and go to web sites and surf, the traditional Web was based on the Web 1.0 paradigm of web sites, email, search engines and surfing. Web 2.0, on the other hand, is about conversations, interpersonal networking, personalization, and individualism.

It must be noted that while this study examines the use of Web 2.0 technologies in university libraries in South Africa, a discussion about Web 3.0 is already underway. There is already discussion of what Web 3.0 will look like (Notess 2006:42). Abram (2006) speculates that Web 3.0 will probably be even more distributed in form than Web 2.0 and maybe some of the Web 2.0 applications will disappear or merge with a new integrated whole. Web services or the semantic Web may replace such things as social networking sites and repositories.

Hendler (2009) views Web 3.0 as semantic Web technologies integrated into, or powering, large-scale Web applications. The first generation of enterprise Web 3.0 systems uses behind-the-scenes structural semantics to extend their current capabilities, for example, taxonomies with simple properties that can be used to relate terms to each other or to integrate terminologies from multiple sites. The base of Web 3.0 applications resides in the Resource Description Framework (RDF) for providing a means to link data from multiple websites or databases. The fact that these semantic Web technologies are largely based on mashups that occur at the data, rather than application, level, and often involve the read-write nature of Web 2.0 applications, has earned these evolutionary technologies the term Web 3.0 technologies (Hendler 2010:77). Hendler (2009:112) further states that this sort of "controlled vocabulary has been around for a long time, but emerging technologies allow it to be more easily integrated with Web development."

1.2.4 Library 2.0

According to Maness (2006) the term 'Library 2.0' was first coined by Michael Casey on his LibraryCrunch blog. Casey and Savastinuk (2006) state that any definition of Library 2.0 should include at least the following:

1. Library 2.0 is a model for constant and purposeful change. This involves an ongoing process of evaluation of library services with a willingness to make changes as needed.
2. Library 2.0 empowers library users through participatory, user-driven services.
3. Through the implementation of the first two elements, Library 2.0 seeks to improve services to current library users while also reaching out to potential library users (in Murley 2008:199).

Library 2.0 refers to the application of Web 2.0 thinking and technologies to library services and collections. It is the "application of interactive, collaborative, and multi-media web-based technologies to web-based library services and collections" (Maness 2006:2). Maness (2006) recommends the adoption of this definition of Library 2.0 by the library science community. This is the definition the study has adopted because it is appropriate in the context of the study.

There is correlation between the definition given above and those of other authors, for example, Kim and Abbas (2010:211) referred to Library 2.0 as the integration and utilization of Web 2.0 technology into library services. It is the process of equipping traditional web sites with more Web 2.0 elements (Han and Liu 2010:41).

Library 2.0 is the integration of Web 2.0 features in library web-based services (Harinarayana and Raju 2010). Most authors agree that Library 2.0 includes the application of Web 2.0 technologies and business ideas to library services (Murley 2008:198).

1.2.4.1 Elements of Library 2.0

Maness (2006) further identified the following four elements as essential elements for Library 2.0. It must be noted that there is a very striking similarity between the following Library 2.0 elements and the principles of Web 2.0, which were discussed in 1.2.3 above:

1. It is user-centred. It allows users to participate in the creation of content and services they view within the library's web-presence, OPAC, and so forth. The roles of librarian and user become blurred due to the dynamic nature of the consumption and creation of content.

2. It provides a multi-media experience, because both the collections and services of Library 2.0 contain video and audio components.

3. It is socially rich. The library's web-presence includes users' presences. It has both synchronous (for example Instant Messaging) and asynchronous (for example wikis) ways for users to communicate with one another and with librarians.

4. It is communally innovative. Library 2.0 functions on the foundation of libraries as a community service, with the understanding that as communities change, libraries must

not only change with them, but they must allow users to change the library. It seeks to continually change its services, to find new ways to allow communities, not just individuals to seek, find, and utilize information.

It is clear, from the elements mentioned above, that Library 2.0 is a model of library activities (Koltay 2010). It embraces a new philosophy of library service (Mahmood and Richardson 2013). The heart of Library 2.0 is user-centred change (Casey and Savastinuk 2006; Xu, Ouyang and Chu 2009).

1.2.5 The Web generation

The terms web generation, millennial generation, millennials, net generation, digital natives, generation Y and the N-gen are used interchangeably to refer to students born from roughly 1980 to the turn of the millennium (Burhanna, Seeholzer and Salem 2009:523, Virkus 2008:266). Generation Y students have their playground in the virtual space of the World Wide Web which is an important part of their information universe (Adams 2010:68).

A study conducted by the Centre for Information Behaviour and the Evaluation of Research (CIBER) at University College London, highlighted the following characteristics of the millennials or the web generation:

- They prefer quick information in chunks;
- They are impatient;
- They like using social networks such as Facebook and YouTube; and
- They search swiftly, with poor grasp of their information requirement, which in turn leads to inadequate search strategies and keyword formation, leaving them no time to evaluate relevance, accuracy or authority (Godwin 2009).

Academic libraries are serving a 'web generation' of users with advanced computer skills and it is very important that libraries embrace tools such as chat services (for example, 'Ask a librarian' or 'Virtual librarian'), cell phone technology (for example, to inform users about new databases), ipods, blogs, Facebook, LinkedIn, and so forth. The use of these technologies will enable

libraries to occupy the same space as their techno savvy users (Godwin 2009). The digital or Web generation needs the experience of the Web, not just content, to learn and succeed.

1.3 The rationale and contribution of the research

As libraries aspire to remain relevant as premier suppliers of information that attract and engage their users, embracing Web 2.0 technologies has become almost synonymous with their overall success (Han and Liu 2010:41). Leveraging the approaches embodied by Web 2.0's principles and technology presents libraries with many opportunities to serve their existing users better, and to reach out beyond the walls and web sites of the institution to reach potential users where they are (Miller 2005). The use of these technologies assists in breaking down the internal silos of the separate systems within a single library.

Many studies (Godwin 2009; McManus 2009; Han and Liu 2010; Harinarayana and Raju 2010; Kim and Abbas 2010) have been done on the use of Web 2.0 tools in academic libraries in various countries such as the United States, United Kingdom, China and India. These studies were done by people in the librarianship profession, for example, librarians, Information Technology (IT) specialists and library lecturers, who captured their libraries' experiences of introducing and utilizing Web 2.0 technologies. Academic libraries in Africa are therefore able to learn from these experiences and adapted these technologies to fit their particular needs.

Olasina's study (2011) documents the experiences of librarians and other information professionals of using Web 2.0 tools in Nigerian libraries. It also highlighted the initial reluctance of library managers to make Web 2.0 tools available to staff due to fears of abuse and neglect of official duties in favour of social networking sites. The results of the study, however, revealed that when the content of the social network is useful to the user, he/she takes advantage of it and informs other users (Olasina 2011).

The above study shows the Web 2.0 tools or social networking sites (these terms are used interchangeably in most of the reviewed literature) hold tremendous professional value for

librarians as information workers. It captured the usefulness of Web 2.0 tools for academic librarians in the developed world.

This study on the use of Web 2.0 technologies in academic libraries in South Africa is important as it gives effect to Library 2.0 aims and objectives, which are:

1. To improve the service and satisfy user needs;
2. To keep up with technological developments locally and globally.

There is support for this view in the literature, as Pienaar (2010) states that the slow adoption of new technologies by academic librarians obstructs new and improved services.

A review of the literature reveals a scarcity of studies done on the use of Web 2.0 technologies in South African academic libraries. There are studies of the use of Web 2.0 technologies at the University of Pretoria Library (Penzhorn and Pienaar 2009; Pienaar 2010). Although there are studies done on the use of Web 2.0 technologies at the University of Pretoria, no studies were found on the use of Web 2.0 technologies in other academic libraries in South Africa in the literature. This study therefore filled the gap in knowledge on this subject that currently exists in the literature.

Since this research investigated what has worked well in the academic libraries that have implemented Web 2.0 technologies successfully, the results would hopefully provide assistance to those libraries that are still contemplating the integration of these technologies into their programmes and services by highlighting the challenges other libraries faced and how those challenges were handled. It also highlighted the disadvantages of incorporating Web 2.0 technologies into library instruction programmes. The research would help close the gap of knowledge that currently exists due to a lack of studies done on the use of these technologies in South African university libraries.

1.4 The research problem and objectives

As an academic librarian at the University of KwaZulu-Natal, the researcher had a keen interest in this topic and a desire to see Web 2.0 technologies implemented at the University of KwaZulu-Natal Library. This research therefore fulfilled three objectives, namely:

1. To determine the extent of use of Web 2.0 technologies by academic librarians to make information accessible to their users;
2. To ascertain the reasons for the adoption and non-adoption of Web 2.0 technologies by some academic librarians in South Africa;
3. To put forward remedial measures for adapting Web 2.0 technologies by academic librarians at the University of KwaZulu-Natal (UKZN) Library, drawing on the experiences of those academic libraries in South Africa which have successfully implemented these technologies.

This research explored the value (if any) of Web 2.0 technologies in facilitating access to information by library users, namely, students and academic staff. The experiences and lessons from libraries that have successfully implemented these technologies are outlined. The research also paid particular attention to those academic libraries that have not taken full advantage of these technologies with a view to ascertaining reasons for their reluctance to implement Web 2.0 technologies.

This study therefore attempted to answer the following questions regarding the use of Web 2.0 technologies in academic libraries in South Africa:

1. What were the reasons for choosing to incorporate Web 2.0 technologies into library programmes and services?
2. What processes were followed in accomplishing this goal?
3. What were the implications of the implementation of Web 2.0 technologies for library staff?
4. What challenges were encountered in the implementation of Web 2.0 technologies?

5. How were these challenges overcome?

6. Has the value and impact of these technologies been measured?

7. Are there any plans in place to ensure the sustainability of these technologies in library programmes and services?

The study also attempted to answer the following questions in respect of institutions that have not displayed eagerness to embrace these technologies:

8. What were the reasons for not choosing to incorporate Web 2.0 technologies into library programmes and services?

9. What was the impact of this decision on the library service?

10. In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?

11. Were there any plans to incorporate Web 2.0 technologies in future?

The research problem of this study was that there was not adequate use of Web 2.0 technologies by academic librarians to deliver services such as information literacy programmes, user education and selective dissemination of services to library patrons. This slow adoption of Web 2.0 tools by academic librarians may have a negative impact on the services they provide. As the researcher was an academic librarian at UKZN, it was of great interest to ascertain the extent of use or non-use of Web 2.0 technologies by UKZN librarians and hopefully provide valuable information gleaned from other institutions' experiences.

The objectives and research questions are reflected as a matrix in Table 1.1.

Table 1.1: Objectives, research questions and data tools

No.	Objective	Research question	Data tool
1.	To determine the extent of use of Web 2.0 technologies by librarians to make information accessible to their users.	1. What were the implications of the implementation of Web 2.0 technologies for library staff?	Questionnaire and interview
		2. Has the value of these technologies been measured?	Questionnaire and interview
		3. Were there any plans in place to ensure the sustainability of these technologies in library programmes and services?	Questionnaire and interview
2.	To ascertain the reasons for the adoption and non-adoption of Web 2.0 technologies by some academic librarians in South Africa.	1. What were the reasons for choosing to incorporate Web 2.0 technologies into library programmes and services?	Interview
		2. What processes were followed to accomplish this goal?	Interview and questionnaire
		3. What challenges were encountered in the implementation of Web 2.0 technologies?	Interview and questionnaire
		4. How were these challenges overcome?	Interview and questionnaire
3.	Remedial measures for adoption of Web 2.0 technologies at UKZN Library.	1. What were the reasons for not choosing to incorporate Web 2.0 technologies into library programmes and services?	Interview
		2. What was the impact of this decision on the library service?	Interview and questionnaire
		3. In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?	Interview and questionnaire
		4. Were there any plans to incorporate Web 2.0 technologies in future?	Interview and questionnaire

The assumption on which this study is based is that the use of Web 2.0 technologies enhances the services academic librarians provide immensely. Great rewards are experienced by both the users (students and academics) and librarians in institutions where these technologies have been incorporated into library instruction programmes. There is support for this view in the literature, as mentioned earlier. Pienaar (2010) states that the slow adoption of new technologies by academic librarians obstructs new and improved library services.

1.5 The conceptual approach of the study

The constructivist theory of learning informs the Library 2.0 model which forms the conceptual framework within which the problem will be investigated since Web 2.0 is based on constructivism and Library 2.0 approaches to learning and have great potential to socialise online learning (Virkus 2008). Web 2.0 tools and services support much flexibility in the learning process and allow for easy publication, sharing of ideas and re-use of study content, commentaries, and links to relevant resources in information environments that are managed by teachers and learners themselves (Virkus 2008).

Web 2.0 is well suited to active and meaningful and collaborative knowledge building and shares characteristics that are in harmony with constructivist approaches to learning (Virkus 2008). A detailed discussion of the conceptual framework is provided in the next chapter, Chapter 2.

1.6 The research approach

There are three broad methodological paradigms in social research: the quantitative, qualitative, and participatory action paradigms (Babbie and Mouton 2001:49). The study makes use of both the quantitative and qualitative paradigms. According to Cohen, Manion and Morrison (2000: 112), the use of two or more methods to study a phenomenon is called triangulation. Triangulation bridges issues of reliability and validity and contributes to a better understanding of the study. Methodological triangulation is the "best way to collect information about different events and relationships from different points of view" (Babbie and Mouton 2001:217).

The quantitative research paradigm was chosen because it has two primary strengths, namely, the findings are generalizable and the data are objective (Terre Blanche, Durrheim and Painter 2006:132). The qualitative research paradigm, on the other hand, enables the researcher to conduct research in a natural setting and is concerned with viewing experiences from the perspective of those involved and attempts to understand why individuals react or behave as they do (Hoskins 2009).

This was an exploratory study that examined the use(s) of a phenomenon, in this case Web 2.0 technologies by academic librarians in South Africa. It was a survey of people (academic librarians) who have had practical experience of Web 2.0 technologies as well as those that were contemplating using these technologies. Information or research librarians working at academic libraries in South Africa were the unit of analysis. Heads of libraries or directors, who were also the unit of analysis, were interviewed telephonically to obtain data relating to policy, budget and staffing issues. The telephonic method of interviews was chosen because of its cost effectiveness.

Primary data was obtained from information librarians, using surveys as a style of research. Surveys gather data at a particular point in time in order to describe the nature of existing conditions (Babbie and Mouton 2001). The survey was chosen as a style of research because similar studies have also adopted surveys to collect information.

In addition to surveys, telephonic interviews were conducted with library directors of all academic institutions as they played the pivotal role of formulating and enforcing policy in their institutions. As policy makers in the libraries where they work, library directors were in a better position to give clarity regarding policy issues in their libraries. The interviews with library directors were conducted telephonically in order to minimise costs as research libraries are geographically dispersed. Sampling was not necessary as the population that was studied was relatively small. The whole population of library directors (17 in total) was interviewed.

A link to the self-administered questionnaires was emailed to all library directors to distribute to academic librarians in their institutions to collect quantitative data. The purpose of the

questionnaires was to ascertain whether libraries were using Web 2.0 technologies to make their services accessible to their users or not, to establish the reasons for not using the technologies and also to determine what impact the use or non-use of Web 2.0 technologies had on the services of the library. Use of e-mail as a method of questionnaire distribution was the most economical and also the quickest (Hoskins 2009:192). A low response rate which is usually associated with self-administered questionnaires that are sent by email to respondents, could affect the generalizability of findings (Hoskins 2009:220). Respondents were informed about the study before the questionnaire was sent by email. Regular reminders, which informed respondents about the deadline for completion of the questionnaire, were made to increase the response rate.

There are approximately 370 research librarians, including library directors, in academic libraries in South Africa. The numbers per university library are outlined in Chapter 4. The research librarians were identified from the online staff directories of different academic institutions in South Africa. The respondents (research librarians) belonged to different cultures and had different home languages. It was therefore important to pre-test the questionnaire before it was administered to ensure that there were no questions which might be offensive to other cultures or language groups and that there were no errors (Ngulube 2003).

Quantitative data was analysed using SPSS, which is a statistical analysis programme that is used to analyze data (Babbie and Mouton 2001:411). SPSS was chosen because of its ability to perform intricate computations and provide sophisticated presentations of the results (Ngcobo 2008). It was also easy to use and readily available on the UKZN Local Area Network (LAN) (Kwanya 2011). Qualitative data was analysed using thematic content analysis. Content analysis is defined as

> "collecting and organizing information systematically in a standard format that allows analysts to draw a conclusion about the characteristics and meaning of recorded material (Babbie and Mouton 2001:383)".

Content analysis was found to be the most appropriate method of analyzing qualitative data because it is "particularly well suited to the study of communications" (Babbie and Mouton 2001:384). Content analysis addresses the 'why' and 'with what effect'.

1.7 Limitations of the study

There are 17 research universities and six universities of technology in South Africa, as identified in the Library and Information Association of South Africa (LIASA) University Libraries List. The research universities are listed in Chapter 4. The six Universities of Technology, which were formed as a result of the merger of former technikons did not form part of this research because of their technical rather than research focus. Since former technikons did not form part of the study, Durban University of Technology (DUT) librarians, as information specialists who were not directly involved in the study, were the population on which the pre-testing of the questionnaire was conducted. DUT was chosen because of its proximity to UKZN and also because DUT librarians have recently introduced Web 2.0 technologies in their library programmes.

This research covered the use of Web 2.0 technologies by academic librarians to make information accessible to their patrons. Reference librarians, as librarians who interact with library patrons regarding information needs, were studied. Librarians who work in other sections of the library, such as Acquisitions, Cataloguing and Inter-Library Loans, did not form part of the study. The use of Web 2.0 technologies by other library professionals, for example, librarians working in public, special and school libraries, is beyond the scope of this research.

1.8 Ethical considerations

According to Sekaran (2003:17) ethics refers to a code of conduct or expected societal norm of behaviour while conducting research. Any research that is conducted should consider these ethical issues:

- protection from harm;

- informed consent;
- privacy and confidentiality of research data;
- honesty; and
- accuracy (Babbie and Mouton 2001; Cohen, Manion and Morrison 2000).

Ethical considerations are very important in social science research. This study adhered to the University of KwaZulu-Natal Research Ethics Policy. The researcher complied with the University's Code of Conduct for Research throughout the study (see Appendix 9). Respondents participated voluntarily. The autonomy of respondents was protected through the use of an informed consent form (see Appendix 6). The collected data was aggregated to reflect categories of responses, rather than individual responses in order to ensure confidentiality and the privacy of respondents.

1.9 Structure of the study

This study consists of seven chapters. Chapter 1 lays the foundation regarding Web 2.0 technologies, outlines the research problem, the rationale, the contribution and the scope of the study. The next chapter, Chapter 2, discusses the conceptual framework of the study. Chapter 3 provides a review of the relevant literature for the study whereas Chapters 4, 5 and 6 focus on the research methodology, research results and analysis of the research results respectively. The final chapter, Chapter 7, deals with recommendations and conclusions. Appendices are situated after the list of works cited.

1.10 Summary of the chapter

This chapter focused on laying the foundation for the study, that is, giving a brief introduction to the study, defining key concepts that will be used, explaining the rationale and the contribution the study will make, detailing the key questions the study seeks to answer, providing the conceptual framework on which the study is based and the research approach the study will use. The chapter concluded with an outline of the limitations, ethical considerations as well as the structure of the study.

The reader might perhaps question the relevance of studying the use of Web 2.0 technologies in academic libraries in South Africa when discussion of what Web 3.0 will entail is already taking

place (Hendler 2009; Notess 2006 and Abram 2006). The slow pace on the part of academic libraries in South Africa to adopt Web 2.0 technologies to enhance their services and programmes was highlighted by Pienaar (2010), who conducted a study about the use of Web 2.0 technologies by university librarians, students and academic staff at the University of Pretoria. The study found that there was not adequate use of Web 2.0 technologies by university librarians to deliver services such as information literacy (IL) programmes, user education and selective dissemination of services to library patrons. It is for this reason that the proposed study investigates the use of Web 2.0, rather than Web 3.0, technologies in academic libraries in South Africa as there is evidence that indicates inadequate use of Web 2.0 technologies by university librarians in South Africa. The researcher holds the view that there ought to be an understanding and adequate use of Web 2.0 technologies by university librarians in South Africa before they can venture into the use of Web 3.0 technologies to provide services geared for the Web generation to which the academic libraries provide services.

Chapter 2: Conceptual framework

In this chapter, the constructivist theory of learning, which is the conceptual framework upon which the study is based, will be discussed in detail. The chapter also includes the rationale for choosing this particular conceptual framework as well as the shortcomings of the constructivist theory of learning. A discussion of how the chosen conceptual framework fits into the topic, the drawbacks of Library 2.0 and Web 2.0, including an explanation of how the study will not be limited or subjected to criticisms of constructivism, will conclude the chapter.

2.1 Introduction

According to Terre Blanche and Durrheim (1999), identifying a conceptual framework upon which to base the study is crucial when undertaking research. This is because the conceptual framework "serves as an orientation for gathering facts since it specifies the types of facts to be systematically observed" (Bless and Higson-Smith 1995:23). In a conceptual framework, elements or concepts or variables of a theory are logically interrelated and "if relevant theory exists, hypotheses or research questions can be deduced based upon particular relationships between these elements" (Terre Blanche and Durrheim 1999:19).

Mouton (1996:195) states that a conceptual framework is a result of the organization of scientific statements according to certain interests or objectives. These statements become integrated into conceptual frameworks. Mouton (1996) distinguishes between three types of conceptual frameworks, which are:

1. "Typologies – which basically have a classifying or categorising function based on single variables;
2. Models – which provide a systematic representation of phenomena by identifying patterns and regularities amongst variables; and
3. Theories – which provide an explanation of phenomena by postulating an underlying causal mechanism" (Mouton 1996:195). Theories are "sets of concepts used to define and/or explain some phenomenon" (Silverman 2011:52).

It can be deduced, from the distinction between the different types of conceptual frameworks given above, that a theory, in a fundamental sense, provides an explanation of events or phenomena. Theories explain "by way of causal models or stories, by postulating a set of causal mechanisms (a causal process) that account for phenomena" (Mouton 1996:202). A framework should be regarded as a starting point for reflection about the research and its context. It is intended to assist a researcher to develop awareness and understanding of the situation under scrutiny and to communicate this (Smyth 2004).

2.2 The constructivist theory of learning

According to Phillips (2000:7) constructivism refers to "a set of views about how individuals learn and about how those who help them to learn ought to teach". This definition asserts that learners actively construct their own sets of meanings or understandings, which means that knowledge is not acquired by passive absorption or by simple transference from one person (usually the teacher as the dispenser of knowledge) to another (the learner who is receiving knowledge). Phillips' definition closely resembles that given by Talja, Tuominen and Savolainen (2005), that constructivism is a view in which an individual mind constructs reality, but within a systematic relationship to the external world. The common factor between these two definitions is that knowledge is made rather than acquired.

The names of psychologists and educators, such as Jean Piaget, Jerome Bruner, George Kelly and Lev Vygotsky, are associated with constructivism. Vygotsky, for example, identified four central points on knowledge acquisition by instruction, which are as follows:
1. Knowledge to be acquired by the learner (a less mature member of the society) is possessed by the teacher (a more mature member) usually in the form of a set of skills or strategies for solving the target problems. The teacher is assigned by the society the job of transmitting knowledge.
2. The learner is brought into the instructional situation to solve a few samples of the target problems together with the teacher; the teacher communicates the knowledge in a verbally coded form (as a set of commands or condition-action pairs) and demonstrates how to solve the problems by using this coded form of knowledge.

3. The teacher asks the learner to take over the solution steps she or he can, with other steps being executed by the teacher; the supporting role of the teacher becomes less and less important as the learner acquires the knowledge; and

4. When the learner becomes able to solve the problems without help from the teacher, it is considered that the knowledge has been transferred successfully (in Foreman, Minick and Stone 1993:154-155).

The four points mentioned above stress Vygotsky's emphasis on the social origin of individual cognition in general, as well as his notion of the zone of proximal development in particular, which approximates cultural transmission. Foreman, Minick and Stone (1993:155) state that Vygotsky's view is accompanied by a set of empiricist assumptions about knowledge acquisition, which are:

1. The learner is rather a passive participant in the knowledge acquisition process;

2. The learner does not have to understand the meaning of the skills taught or construct knowledge that goes beyond them;

3. Only the interaction with the teacher, who is always more capable than the learner, facilitates the acquisition; and

4. The teacher is the only source of information and evaluation.

In an effort to address the four above-mentioned assumptions made by Vygotsky, Foreman, Minick and Stone (1993) came up with four corresponding points which constitute the core of a constructivist Vygotskian conception, which are as follows:

1. Learners are active;

2. Learners almost always seek and often achieve understanding;

3. Learners' construct of knowledge is facilitated by horizontal as well as vertical interactions; and

4. Availability of multiple sources of information enhances knowledge construction (Foreman, Minick and Stone 1993:156).

There is support for the revised assumptions given above by constructivist scholars. Cognitive constructivists, such as Piaget and George Kelly, start with the assumption that the individual

mind generates knowledge by creating knowledge structures and mental models which represent the world and mediate or filter information (Talja, Tuominen and Savolainen 2005). According to Smith (2000) cognitive constructivism was shaped with the help of research conducted by Piaget in the fields of developmental psychology and genetic epistemology, which sought to explain how information is formed.

Constructivist theories in information science assume that the individual mind is the most important arena of knowledge creation. The constructivist learning approach operates on the premise that individuals are not passive receivers of information, but rather they are active creators of information, owing to their cognitive processes, past experiences and the social environment (Cuhadar and Kuzu 2010).

In the constructivist approach humans construct their own unique world and show emotions such as thinking, feeling and acting when they are involved with learning activities (Kuhlthau 1994). Adams (2010:73) states that the learning theories and models of Piaget and Vygotsky are discernible within the constructivist paradigm. Piaget's theory of cognitive development suggests that humans need to make sense of information to be able to interpret and understand the information. Vygotsky believes that when humans bring their past and future together this will lead to the construction of memory (Adams 2010:73).

The theory of constructivism includes knowledge integration instead of compartmentalization, meaningful learner involvement and effective utilization of a variety of information resources for curricula activities, continuous assessment and collaborative learning (Foreman, Minick and Stone 1993).

The crux of constructivism is in the active construction of meaning through interactions with the social and the physical environment (Bush 2006). Constructivism is a deeply textured perspective on learning, because it has both the theory and practice in play. Bush (2006) concedes that without the social learning aspect, constructivism could be problematic for educators. The learning environment has a necessary social community component that ensures that students share a negotiation of sorts when constructing meaning from content knowledge.

26

Social learning also lends itself to learners giving up misconceptions that are individually held as the group comes to a shared understanding (Bush 2006, Phillips 2000).

According to Perkins (1991:20 in Driscoll 2005:386) "constructivism has multiple roots in psychology and philosophy of this century." The concept map below shows a number of constructivist learning theorists who influenced the development of constructivism.

Figure 2.1: Concept map showing leading constructivist theorists
Source: Driscoll (2005:386)

Driscoll (2005) further extrapolated the main three constructivist theorists and their contributions as indicated in Table 2.1 below:

Table 2.1: The three main constructivist theorists and their contribution to constructivism

Who	Area of research	Theme	Principles
Piaget	Focused on the development of mathematical and logical concepts.	The concept of cognitive structure is central to his theory. Cognitive structures are patterns of physical or mental action that underlie specific acts of intelligence and correspond to stages of child development (schemas).	1. Children will provide different explanations of reality at different stages of cognitive development. 2. Cognitive development is facilitated by providing activities or situations that engage learners and require adaptation (i.e., assimilation and accommodation). 3. Learning materials and activities should involve the appropriate level of motor or mental operations for a child of given age; avoid asking students to perform tasks that are beyond their current cognitive capabilities. 4. Use teaching methods that actively involve students and present challenges.
Vygotsky	Context of language learning in children.	Social interaction plays a fundamental role in the development of cognition.	1. Cognitive development is limited to a certain range at any given age. 2. Full cognitive development requires social interaction.
Bruner	Child development research and originated from a conference focused on science and math learning.	Learning is an active process in which learners construct new ideas or concepts based upon their current / past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so.	1. Instruction must be concerned with experiences and contexts that make the student willing and able to learn (readiness). 2. Instruction must be structured so that it can be easily grasped by the student (spiral organisation). 3. Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

The three constructivist theories mentioned above agree that cognitive development consists of a constant effort to adapt to the environment in terms of assimilation and accommodation (Driscoll 2005).

2.3 The relevance of the constructivist theory to this study

The constructivist theory of learning as well as the Library 2.0 model are the conceptual frameworks within which the problem will be investigated since Web 2.0 supports constructivist and Library 2.0 approaches to learning and has potential to socialise online learning to a great extent (Virkus 2008). Web 2.0 tools and services support much flexibility in the learning process and allow for easy publication, sharing of ideas and re-use of study content, commentaries, and links to relevant resources in information environments that are managed by teachers and learners themselves (Virkus 2008).

The constructivist theory has been chosen as a conceptual framework on which this study is based because constructivist theories emphasize that information is not a pill an individual can swallow in order to become informed, but a plastic substance that can be shaped in many ways. Talja, Tuominen and Savolainen (2005) assert that an information user is not a passive information processing system, but actively makes sense of the surrounding reality and attaches meanings to information.

In information science, constructivist ideas are commonly labeled under the cognitive viewpoint. Talja, Tuominen and Savolainen (2005) define cognitive constructivism as a metatheoretical position that sees knowledge production as the creation of mental models. This position has been influenced by Piaget's theory of cognitive development proposing that humans cannot be given information which they immediately understand and use. Instead, humans must construct their own knowledge. Individuals acquire their knowledge through experiences that enable them to build mental models of the world. Mental models consist of schemas, scripts and knowledge structures. These models may change and become more detailed and sophisticated as individuals receive new sensory data or encounter novel situations. This view is supported by Smith (2000) (in Cuhadar and Kuzu 2010) who states that cognitive constructivism was developed using research conducted by Piaget in the fields of developmental psychology and genetic epistemology which sought to explain how information is formed.
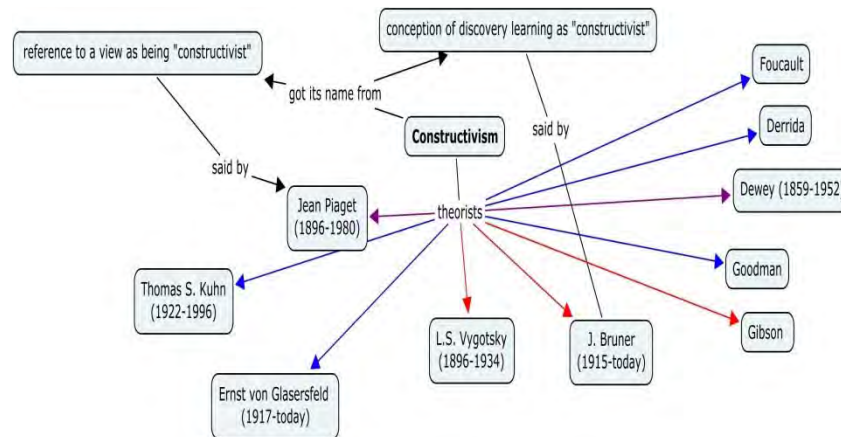
According to Rolloff (2010) the assumption underpinning the constructivist and Library 2.0 theories is that learners construct knowledge as part of a process of making sense of their experiences. Learners are regarded as active organisms that seek meaning, rather than empty vessels waiting to be filled (Driscoll 2005 in Rolloff 2010). Constructivist goals include "the development of skills in critical thinking, collaboration and personal enquiry" (Rolloff 2010:291). In constructivist models, teachers first introduce foundational concepts and as students master the basic concepts, increasingly complex ones are introduced. Constructivist theories in information science view the individual mind as the most important arena in knowledge creation.

Students actively construct meanings from their learning experiences. They interact in positive ways with other students while actively engaging, at their own pace, in the process of knowledge construction (Coupal 2004). In constructivist and Library 2.0 practices students are actively engaged in identifying and solving real-world problems by making judgements, comparing and contrasting information, synthesising issues, arguing a position and constructing personal meaning to concepts and ideas.

A constructivist learning environment enables students to construct knowledge and achieve learning objectives. Jonassen, Peck and Wilson (1999:4) define constructivist learning environments as technology-based spaces in which students "explore, experiment, construct, converse and reflect on what they are doing so that they learn from their experiences" (in Wang 2009). Constructivist learning environments are more student-centred, engaging, reflective and encourage collaborative learning, as opposed to traditional instructional settings which tend to be more teacher-centred. Coupal (2004:590) states that students "actively construct meaning from their learning experiences". Similarly, Library 2.0 environments encourage interactive, collaborative, and multi-media web-based technologies among library users (Maness 2006). User participation in the creation of both the physical and virtual services library users require is the distinguishing feature of Library 2.0.

According to constructivist learning theories, knowledge is actively constructed by learners based on their prior experiences, rather than directly delivered by the teacher. Consequently,

learners become active knowledge constructors, rather than passive information receivers (Wang 2009). This view is supported by Coupal (2004) who asserts that "students interact in positive ways with others and actively engage, at their own pace, in the process of knowledge construction" (2004:590). Cognitive constructivists further claim that learners are most likely to construct knowledge individually dependent on their personal experiences and newly obtained information. Knowledge construction therefore becomes a process of internalisation and reconstruction of external reality, in which the individual interaction with the content plays a vital role (Wang 2009).

In educational environments in which the constructivist learning approach is applied, technology is an important aid for both students and teachers (Coupal 2004). In this learning approach, the role of technology is to support new learning and thus to provide tools that contribute to the cognitive and meta-cognitive processes (Nanjappa and Grant 2003 in Cuhadar and Kuzu 2010). In the same way, Library 2.0 principles are user-centred and they facilitate seamless collaboration between the users themselves to create content using new communication technologies (Kwanya 2011).

In constructivist learning environments, technology provides students with tools that they can use to form information as appropriate to their own mental processes, to share this information, and to cooperate and interact with their peers and teachers constantly. Technology helps students become:

    12. Skilled information technology seekers;

    13. Information seekers, analysts and evaluators;

    14. Problem solvers and decision makers;

    15. Creative and active users of productivity tools;

    16. Communicative, cooperative, and productive individuals; and

    17. Responsible and participatory citizens (Lowther, Jones and Plants 2000).

There are two types of the constructivist perspective, which are cognitive constructivism and social constructivism (Jonassen1994). Although these two constructivist perspectives differ in emphasis, they share many common perspectives about teaching and learning. Jonassen (1994)

31

described the general characteristics of constructivist learning environments which differentiate it from social constructivist learning environments, which are:

- Constructivist learning environments provide multiple representations of reality;
- Multiple representations avoid oversimplification and represent the complexity of the real world;
- Constructivist learning environments emphasize knowledge construction instead of knowledge reproduction;
- Constructivist learning environments emphasize authentic tasks in a meaningful context rather than abstract instruction out of context;
- Constructivist learning environments provide learning environments such as real-world settings or case-based learning instead of predetermined sequences of instruction;
- Constructivist learning environments encourage thoughtful reflection on experience;
- Constructivist learning environments enable context- and content-dependent knowledge construction; and
- Constructivist learning environments support collaborative construction of knowledge through social negotiation, not competition for recognition among learners (Jonassen 1994:35).

It must be noted that the eight characteristics identified by Jonassen (1994) enjoy the support of both social and cognitive constructivists.

Academic libraries must play a critical role in creating these learning environments through their policies, programmes, resources and strategies that reflect constructivist pedagogy by providing the real-world environment, learning tools, varying interpretations of reality depicted in numbers of resources, promoting access to information, thereby facilitating learning and by focusing on the individual's active construction of knowledge. The conceptual framework for this study is supported by the United Nations Educational, Science and Cultural Organization/International Federation of Library Associations (UNESCO/IFLA) (1999) University Library Manifesto, which provides a framework for the evaluation of university/academic libraries. The Manifesto is based on the United Nations Universal Declaration of Human Rights and Freedom, which states that access to services and collections should not be subject to any form of ideological, political or religious censorship, or commercial pressures. It further explains how libraries contribute to

education by providing information and ideas that are fundamental to functioning successfully in today's information and knowledge world. Academic libraries offer learning services, print and electronic collections and resources in an effort to achieve their objectives.

According to Dalgarno, Kennedy and Lee (2010:266) constructivist learning theory is fundamentally underpinned by three key tenets, which are:

- Each person forms his/her own representation of knowledge (Hawkins 1994, Aaronsohn 1996);
- People learn through active exploration (Bruner 1962, Piaget 1973); and
- Learning occurs within a social context (Vygotsky 1987, Karagiorgi and Symeou 2005, Liu and Matthews 2005).

These tenets are of "critical importance in the design of learning resources and environments" (Dalgarno, Kennedy and Lee 2010:267). The similarities between the three tenets of constructivism and the learning objectives of Web 2.0 application are astounding, since both constructivism and Web 2.0 applications support the construction of knowledge by the individual (Karagiorgi and Symeou 2005).

Academic libraries are serving a generation of users called digital natives (Virkus 2008). It is imperative that academic librarians take advantage of Web 2.0 technologies in order to cater for the learning preferences of both digital natives and digital immigrants. Web 2.0 supports constructivist approaches to learning and has great potential to socialize online learning to a great extent (Virkus 2008:262). Web 2.0 is well suited to active and meaningful and collaborative knowledge building and shares characteristics that are in harmony with constructivist approaches to learning (Virkus 2008).

2.4 The shortcomings of the constructivist theory of learning

While constructivism has been praised for its emphasis on learners' active participation and the heightened recognition given to the social nature of learning, the downside of constructivism cannot be overlooked. According to Neas (2012) the biggest disadvantage of the constructivist theory regarding its application to learning is its lack of structure. Some students require highly

structured environments to able to excel. Constructivism calls for the teacher to discard standardized curriculum in favour or a more personalized course of study based on what the student already knows, which could lead some students to fall behind others.

It also removes grading in the traditional way and instead places more value on students evaluating their own progress, which may lead to students falling behind but without standardised grading and evaluations, teachers may not be aware that the student is struggling. Since there is no evaluation in the traditional sense, the student may not be creating knowledge as the theory asserts, but simply just be copying what other students are doing (Neas 2012).

Phillips (1995) considers its tendency towards epistemological relativism, including individual and social community relativism, to be the major challenge that constructivist theorists face. Constructivist learning theorists emphasize the individual or social community construction of learning, thus drawing the conclusion of individual or community idiosyncrasy. Personal constructivism, for example, asserts that the universe is no longer a mind-dependent existence and all individuals cannot be expected to have given or uniform cognition. Social constructivism, on the other hand, proposes that cross-community transfer of learning cannot and should not be relied on. It is these claims which are believed to have led to epistemological relativism, where there exists no absolute truth and any other truth is as good as other (Liu and Matthews 2005:388).

The other main criticism of constructivism is its quasi-religious or ideological aspect:
> "Across the broad fields of educational theory and research, constructivism has become something akin to secular religion. …constructivism, which is, whatever else it may be, a "powerful folktale" about the origins of human knowledge. As in all living religions, constructivism has many sects – each of which harbours some distrust of its rivals. This descent into sectarianism, and the accompanying growth in distrust of nonbelievers, is probably the fate of all large-scale movements inspired by interesting ideas; and it is the ideological or ugly side of the present scene, which is reflected in the article's title (Phillips 1995:5)".

This quasi-religious or ideological aspect of constructivism is closely linked to the tendency to prescribe it as the human epistemology (Liu and Matthews 2005). It is the desire to prescribe the truth about human epistemology and about the universe as the object of knowing which has earned constructivism the reputation of "exclusive church of thinking" (Liu and Matthews 2005:388).

Karagiorgi and Symeou (2005) assert that the translation of constructivism into practice constitutes an important challenge for instructional designers. Most designers do not unconditionally embrace this new epistemology as there are many areas of conflict. Another disadvantage is that it can actually lead students to be confused and frustrated because they may not have the ability to form relationships and abstracts between the knowledge they already have and the knowledge they are learning for themselves. Constructivism has its place in the learning system, but as an absolute learning system it has some flaws. Students may benefit with some constructivism principles integrated into the classroom setting, however, Neas (2012) argues that most students need more structure and evaluation to succeed.

According to Fox (2001), because of its emphasis on learners' active participation in the learning process, constructivism is thought to dismiss the roles of passive perception, memorization, and all the mechanical learning methods in traditional didactic lecturing too readily. There are researchers, such as Biggs (1998), Jin and Cortazzi (1998), who have noted that

> "while constructivist teaching approaches, including one-to-one or small group classroom interaction, do not always guarantee teaching effectiveness, traditional didactic lecturing in large classes of 50 to 70 students in China has not always meant the doom of teaching efforts (Liu and Matthews 2005:389)".

Mergel (1998) emphasises the importance of understanding the strengths and weaknesses of each learning theory to optimise their use in appropriate instructional design strategies. Considerable interest has been paid to the design of constructivist learning environments during the last decade (Karagiorgi and Symeou 2005:17).

The advantages and disadvantages of constructivism are tabulated below for easy reference.

Table 2.2: The advantages and disadvantages of constructivism

Benefits	Criticisms
• Encourages higher level thinking; • Student centred; • Actively engaged learners (Tudor 1996); • Offers differentiated instruction to all learners; • Higher retention of learned material (Silberman 1996); • Gain in confidence of learner (Aaronsohn 1996); • Cross curricular integration; • Development of problem solving skills; • Use of authentic tasks; • Self-management skills; • Teamwork skills; • Schema accommodation due to different perspectives from other learners; and • encourages diversity of thought.	• time consuming; • expensive; • inefficient; • mix of other theories, no one clear theory; • too subjective; • learner must have a higher level of self-management/ maturity for success; • unpredictable outcomes; • difficult to develop authentic tasks; and • encourages diversity of thought where conformity is required.

It is evident, from Table 3 above, that the application of constructivism to instructional design has certain advantages such as more meaningful learning outcomes, more independent problem-solving capability and more flexibility in both design and instruction activities (Karagiorgi and Symeou 2005).

2.5 The drawbacks of Library 2.0 and Web 2.0

Olasina (2011) states that the use Library 2.0 and Web 2.0 technologies in the workplace brings to mind an image of employees chatting away aimlessly. Many organizations associate Web 2.0 applications with personal leisure (Nogueira 2010). This perception could be responsible for the

placing of an outright ban on the use of social networks in some academic institutions both locally and globally. A study conducted by Bloxx, a web filtering company, revealed that over 90% of IT professionals from public and private organizations in the United Kingdom (UK) believe that access to social networking sites should be restricted or banned (Buckley 2009).

Although Library and Information Services (LIS) practitioners commend the use of Library 2.0 and Web 2.0 technologies for enabling them to reclaim their intellectual space, there is very little documented evidence to back this claim. While the use of Web 2.0 technologies to reach the 'techno savvy' millennial generation academic libraries serve has steadily increased over the last eight years, there is a need not only to document this, but also to conduct usage analysis, study the patterns of use, impact on work environments and library users and management issues at workplaces (Olasina 2011).

According to Mahmood and Richardson (2013) the problems associated with the use of Web 2.0 technologies in academic libraries are related to policy, technology, staff and users. In a survey of European librarians conducted by Harnesk (2010), the participants mentioned difficulties they faced implementing social media in libraries, which include the following:

- takes too much to maintain (41%);
- too many social media features/tools to learn (28%);
- low interest of users (26%);
- restrictive internal organization policies (24%);
- information security (20%); and
- confidentiality issues (18%).

Bejune and Ronan's (2008) survey of the member libraries of the Association of Research Libraries (ARL), which resonates with findings of the survey mentioned above, reported the following as challenges of using Web 2.0 technologies:

- Finding the time to learn and use the tools;
- Developing staff expertise;
- Competing priorities;
- Getting staff buy-in;
- User privacy concerns; and

- Keeping up with technology.

There appears to be a correlation between the findings of the surveys mentioned above and many other surveys which have been conducted across the globe to determine the challenges academic libraries encountered with the use of Web 2.0 technologies to deliver quality services. For example, a study by Cao (2009) identified these issues as challenges to implementing Web 2.0 technologies in Chinese academic libraries:

- Management buy-in;
- Lack of awareness;
- Lack of user participation; and
- Lack of technology staff.

A survey of LIS practitioners in New Zealand, which was conducted by Chawner (2008), mentioned the following as challenges to implementing Web 2.0 technologies:

- Doubtful quality of information (Joint 2010);
- Privacy and security issues (Joint 2010; Rudman 2010);
- Increasing rate of change;
- The challenge of keeping up; and
- Lack of staff training.

A study conducted by Mathews (2007) identified threats and dangers associated with using social networking sites, and these include:

- Online predators (Kelly et al. 2009; Rudman 2010);
- Spyware/viruses (Kelly et al. 2009; Rudman 2010);
- Identity theft/stalking (Mullan 2009; Joint 2010);
- Cyber bullying (Fernandez 2009; Rudman 2010);
- Invasion of privacy (Cvetkovic 2009; Joint 2010); and
- Addiction (Phillips 2009).

Morris and Allen (2008) provided a useful summary of potential barriers to the successful implementation of Web 2.0 technologies in academic libraries, which are:

- A perceived lack of privacy on the part of students (Mullan 2009; Cvetkovic 2009; Joint 2010);
- The possibility of identity theft (Cvetkovic 2009; Rudman 2010);
- Lack of peer-reviewed content (Miranda, Gualieri and Cocca 2010; Mullan 2009; Joint 2010);
- The perception that such services might create information overload (Mullan 2009);
- Copyright infringement (Kelly et al. 2009);
- The breaching of licensing agreements if students outside the organisation are able to access the content (Miranda, Gualieri and Cocca 2010);
- Legal implications if individuals post illegal material such as race hate, defamation (Byrne 2008; Rudman 2010), pornographic or terrorist-encouraging materials (Brown-Sica and Beall 2008);
- Library and academic staff lacking the necessary skills to develop and use the system (Cvetkovic 2009; Rudman 2010); and
- The difficulties and extra cost associated with making such systems (Byrne 2008; Miranda, Gualieri and Cocca 2010; Hricko 2010).

Libraries that employ Web 2.0 tools with a static, Web 1.0 mind-set (for example, by mimicking a homepage on Facebook), risk driving away net-savvy users instead of attracting them (Berube 2012). Ascertaining the needs of Web 2.0 users, especially non-library users, as well as what they might enjoy doing in their virtual space, would help to ensure that relevant and timely services are provided.

In their eagerness to plunge into the social networking world of Web 2.0, LIS professionals can run the risk of ignoring the intended purpose of Web 2.0 which is not one-way communication from experts to users (Berube 2012). Berube (2012:46) cautions that

> "presence on the Internet, even using Web 2.0 tools, is not genuine social networking unless the library is committed to establishing a participation framework that actively invites the public to transform library spaces".

Exercising such radical trust can be a huge challenge to LIS practitioners who are not digital natives. This is a challenge that needs to be overcome to extract maximum benefit from the use of Web 2.0 technologies.

2.6 The relevance of the study compared to the limits of constructivism and/or Web 2.0

The constructivist learning theory, like other learner-centred teaching theories and strategies such as problem-based learning, operates based on the principle that students build knowledge based upon prior knowledge (Jonassen, Peck and Wilson 1999, Neas 2012). Constructivism states that there is no knowledge independent of the knower, only the knowledge that they create for themselves based on the information that they obtain from the world around them (Coupal 2004). Instead of having a finite answer, constructivism teaches that the learner creates the answer as they see it (Karagiorgi and Symeou 2005).

Since students begin with existing knowledge as the starting point, teachers are less like dispensers of information and more like learning guides that allow students to make their own conclusions. This method of teaching tends to be more tolerant of different cultures and encourages diversity rather than other theories. In a constructivist learning environment:

- Students are actively involved, rather than passively absorbing information;
- The learning environment is democratic, the teacher is not seen as an authority figure as much as a learning guide;
- The activities are interactive and student-centred instead of being lesson-centred;
- A teacher facilitates activities in which students are responsible for their own learning and are autonomous from one another (Neas 2012).

Student-centred instruction is a key feature of constructivist learning practices. According to Stuart (1997) student-centred instruction allows for the differentiation of instructional strategies for every learner in a classroom.

According to Mahmood and Richardson (2013) since there are no empirical data available on the use of Web 2.0 technologies in academic libraries, there is a need to study and document the perceptions (positive or negative) of academic librarians of the use of these technologies in

academic library settings. It was the purpose of this study, therefore, to accomplish these two main objectives:

- To determine the adoption of various Web 2.0 technologies in academic libraries in South Africa; and
- To articulate the perceptions and/or experiences of academic librarians about the advantages and disadvantages of these technologies for academic libraries in South Africa.

It was mentioned in Chapter One that a review of the literature reveals a scarcity of studies done on the use of Web 2.0 technologies in South African academic libraries. There are studies of the use of Web 2.0 technologies at the University of Pretoria Library (Penzhorn and Pienaar 2009; Pienaar 2010). Although there are studies done on the use of Web 2.0 technologies at the University of Pretoria, no studies were found on the use of Web 2.0 technologies in other academic libraries in South Africa in the literature. The study will therefore fill the gap in knowledge on this subject that currently exists in the literature.

The limitations of Web 2.0 technologies will have no adverse impact on the study as a balanced view which will include both positive and negative experiences of using Web 2.0 technologies, will be documented and presented. Since the study covers all academic libraries in South Africa, this will eliminate bias towards a particular viewpoint. Similarly articulating both the advantages and disadvantages of the constructivist theory ensured that the reader is presented with a balanced view which does not lean on any one perspective.

2.4 Summary of the chapter

Constructivist learning theory has its place in the educational setting, but may not be appropriate as an exclusive practice (Neas 2012). Some of the pros and cons of constructivist learning theory as well as some ideas on how to integrate its principles into the learning environment were discussed in detail. The constructivist theory of learning, as advocated by constructivist theorists such as Piaget and Vygotsky, was discussed in detail in this chapter. The choice of constructivism as the conceptual framework for this study, together with its relevance to this study, were provided and substantiated.

Chapter 3: Literature review

This chapter provides a review of important literature on the use of Web 2.0 technologies in academic libraries. It does not give a chronological list of published literature on the topic, but rather a summary and conceptually organized synthesis of published material written by accredited scholars and researchers in the Web 2.0 arena. It seeks also to address the gap that currently exists in the literature regarding the use of Web 2.0 technologies in academic libraries in South Africa.

3.1 Introduction

Taylor (2006) and Davies and Beaumont (2007) describe a literature review as the presentation, classification and evaluation of what accredited scholars and researchers have written on a particular subject. It provides an account of what has been published on a topic by accredited scholars and researchers (Taylor 2008). It is not a chronological catalogue of published material on a subject, but rather an effective evaluation of selected documents on a research topic (Shuttleworth 2009; Lie 2008).

A literature review refers to any collection of materials on a topic, not necessarily great literary texts (The Writing Center 2010). A literature review does not and cannot refer to every piece of literature in a subject field (Davies and Beaumont 2007). It is a critical summary of related studies on the research under study, generally surveyed to put the study in context and provide an integrated overview of the field of research (Taylor 2006). It is a discursive prose which is organised into sections that present themes or identify trends, including relevant theory (Taylor 2008). It may form an essential part of the research process or may constitute an entire research project in itself (Shuttleworth 2009; Lie 2008). In this study it is a precursor in the introduction to a thesis.

According to Taylor (2008) the purpose of a literature review is to convey to readers what knowledge and ideas have been established on a topic, as well as their strengths and weaknesses. It is a summary and synopsis of a particular area of research. It enables the reader of the research

paper or thesis to establish why the researcher is pursuing a particular research project (Shuttleworth 2009). It is a handy guide to a particular topic (The Writing Center 2010). It keeps readers well informed about developments and trends in a particular field.

It is organized according to a guiding concept, such as the research objective or the research problem, a researcher wishes to address (Taylor 2006; 2008; Davies and Beaumont 2007). It provides a solid background to the study being proposed (Lie 2008; The Writing Center 2010). According to Lie (2008) the background should cover one or more of the following aspects depending on the research question the research seeks to address:

a) Theoretical background – past, present and future;
b) Clinical practice – previous or contemporary;
c) Methodology and/or research methods;
d) Previous findings; and
e) Rationale and/or relevance of the current study.

The background to this study consists of the following key points:

3.2 Theoretical background on the use of Web 2.0 technologies in academic libraries;
3.3 The South African context;
3.4 The 2.0 culture;
    3.4.1 Research 2.0
    3.4.2 Learning 2.0
    3.4.3 E-learning 2.0
    3.4.4 User 2.0
    3.4.5 Information 2.0
    3.4.6 Information Literacy 2.0
    3.4.7 Public library 2.0
    3.4.8 Library 2.0
    3.4.9 Academic library 2.0
    3.4.10 Librarian 2.0
    3.4.11 Catalogue 2.0
3.5 The N-Generation

A discussion of the key points mentioned above will provide a concise understanding of what accredited scholars and researchers have published on the use of Web 2.0 technologies in academic libraries in difference countries and in South Africa specifically.

3.2 Theoretical background on the use of Web 2.0 technologies in academic libraries

According to Wawrzaszek and Wedaman (2008) the traditional mission of academic libraries has been to select, collect, and preserve information and to facilitate access to and use of this information. Earlier academic libraries were 'place-based' service-providing institutions and

users visited the library to consult the catalogue and use the physical collection of books, journals, and multi-media materials (Tripathi and Kumar 2010).

In this print-based context, libraries are held in high esteem as they are seen as the centre of the academic institution. The librarian acts as a mediator to the collection of information. The value of the library and the librarian derives from the amount of information stored locally, the mediation process, such as classification, cataloguing, reference and circulation services, that allow users to use the information collections, and the training programmes that help users to locate the information within library collections, such as information literacy, research and citation skills training (Wawrzaszek and Wedaman 2008).

The rapid changes in the information and communication technologies (ICTs) field have completely transformed the manner in which libraries, especially academic libraries, operate. The emergence of the internet, together with its accompanying technologies, has necessitated a change in how library users seek information, communicate and collaborate (Kwanya, Stilwell and Underwood 2012a). The use of Web 2.0 technologies has ushered in a radical change in the manner in which academic librarians deliver their services to users. Many academic libraries especially in developed countries like the United States, are leveraging the power of Web 2.0 technologies to provide better and more relevant services to their users (McManus 2009). They are incorporating these technologies into their library instruction programmes, their web presence and reference services.

The new wave of applications of Web 2.0-related technologies in libraries has gained increasing popularity globally (Han and Liu 2010). This growth in the use of Web 2.0 technologies has not come without concern (Han and Liu 2010). The 2007 Association of College and Research Libraries (ACRL) Research Committee's Environmental Scan implores librarians to facilitate new approaches to library services by continually assessing the impact that the proliferation of Web 2.0 has on users' perception of the library, including the use of social networking sites, wikis, blogs, RSS feeds and recommendation systems (Association of College and Research Libraries 2007). This stance is endorsed by some authors. Olasina (2011) states that although library and information professionals in Nigeria use Web 2.0 technologies, there is a need to

document and conduct a usage analysis, study the patterns of use, impact on work environments and library users and management issues at workplaces. Breeding (2007) warns that simply implementing Web 2.0 technologies is not enough. Libraries need to focus on methods of engaging users and emphasizing content while integrating various Web 2.0 components.

3.3 The South African context

According to Boxen (2008:22), "most tech-savvy librarians have embraced at least one or two aspects of Library 2.0 and incorporated them into either their library, their personal interactions, or both". Academic libraries carry a unique mandate of providing innovative information services and resources to satisfy the needs of their 'techno-savvy' users. Therefore, the adoption of Web 2.0 technologies by academic libraries is perceived as "an effort to effectively meet the emerging and diversifying needs of their users in an increasingly networked info-sphere" (Gichora and Kwanya 2015:22).

While there has been a rapid adoption of Web 2.0 technologies by many academic libraries situated in first world countries, the development of Web 2.0 services in university libraries in Africa has been very slow (Makori 2012). However, it must be noted that some academic libraries in South Africa are not lagging behind their counterparts globally regarding the use of Web 2.0 technologies. There are studies which have been done on the use of Web 2.0 technologies at the University of Pretoria, which show that there are university libraries in South Africa taking advantage of opportunities presented by these technologies to enhance their library programmes and services.

The University of Pretoria Library Services formulated an e-information strategy as early as 2006 (Penzhorn and Pienaar 2009). The aim of the e-information strategy was to make optimum use of Web 2.0 technologies to support its basic client-centred approach to service delivery (Pienaar and Smith 2008). Features of Web 2.0, such as RSS feeds from the catalogue, book covers sourced from Amazon.com and integrated with the catalogue and email notification via FeedBlitz when the library page is updated, had been in place for a considerable time (Penzhorn and Pienaar 2009). The University of Pretoria Library Services management discovered that the

social networking tools of Web 2.0 technologies, on the other hand, were not being optimally utilized by subject/reference librarians.

The University of Pretoria library management felt that it was imperative for subject/reference librarians, as front line library services staff, to adapt to the reality of working with their socially networked and 'techno savvy' clients (Penzhorn and Pienaar 2009). The social networking tools were therefore used in the reference services, thereby making the reference service participatory, which meant that the client could be served by multiple sources and a variety of authoritative, scholarly perspectives which in turn resulted in an enriching wealth of information and experience (Penzhorn and Pienaar 2009). It must be noted that no empirical studies on the use of Web 2.0 technologies in other academic libraries in South Africa were found. It was therefore the purpose of this study to document the use of Web 2.0 technologies in South African academic libraries, thereby addressing the gap that currently exists in the literature.

Pienaar (2010) conducted a study of the use of Web 2.0 technologies by university librarians, students and academic staff at UP. The study found that there was not adequate use of Web 2.0 technologies by university librarians to deliver services such as information literacy programmes, user education and selective dissemination of services to library patrons. This slow adoption of Web 2.0 tools by university librarians may have a negative impact on the services they provide.

3.4 The 2.0 culture

There has been an ever increasing interest in the new generation of web-based technologies, tools and services in the last 18 years (Virkus 2008). The experimental, user-focused, participatory approach, enabled by the web as a platform, is known as Web 2.0 (Godwin 2009). New tools and services utilizing Web 2.0 are changing the way people use the internet, allowing people to collaborate, communicate and share information (Han and Liu 2010). Web 2.0 has revolutionised the way in which people create, edit, search, evaluate, organize, *and* share information (Cohen 2007). The static websites and passive, surfing-based environment that characterised Web 1.0 have given way to the user-driven, participatory, personalized Web as manifested on such sites as MySpace. Facebook, Twitter, del.icio.us, Flickr, YouTube, Digg, Wikipedia and other online gathering places.

Gross and Leslie (2008:790) consider Web 2.0 technologies as "the next big thing in academic libraries because they offer social networking capabilities in providing information and services to the library's clientele". Although Radcliff (2007) asserts that the term "Web 2.0" is not well defined, there are numerous definitions in existence. According to Ahmed (2015:6) Web 2.0 "is about the two-way communication between World Wide Web and humans through computers and the Internet". The emergence of Web 2.0 is a social revolution rather than a technological revolution. Its tools and services foster new modes of connectivity, communication, collaboration, sharing of information, content development and social organisation (Downes 2005). To better understand Web 2.0 (as well as Library 2.0, which utilizes these same concepts), it is useful to examine its principles or affordances, which are:

- Conversations: User participation, discussion and feedback are welcomed and encouraged.
- Community: Open conversations can lead to a sense of community and belonging within social sites.
- Participation: New information is created via collaboration between users. Everyone can create content; ideas and knowledge flow freely and are remixed and reused.
- Experience: Engagement with other users and the community as a whole is rewarding and provides some type of fulfilment; and
- Sharing: Users can post about as much or as little of their lives as possible (Stephens and Collins 2007:253).

Web 2.0 is considered a distinct departure from the traditional provider–consumer model (Chua and Goh 2010). It enables any user to consume, create, and control content at little or no cost and with great ease (Lai and Turban 2008). It is the evolution of the browser from a static request-response interface to a dynamic, asynchronous interface (Rudman 2010:212). Bryant (2007) calls this revolution the 'always on' culture where distinctions between learning, working and entertaining are beginning to blur. Some scholars call this revolution the 'point oh' phenomenon, which is the use of version numbers or labels with deeper meanings to denote improved service models (Kwanya, Stilwell and Underwood 2012b:187). Lexicons such as Web 2.0, Web 3.0, Web 4.0, Library 2.0, Library 3.0 or Library 4.0 are steadily gaining popularity with librarianship

professionals and library users although, according to Evans (2009), they have stirred significant controversy with some scholars calling it a hype while others embrace them.

According to Kwanya, Stilwell and Underwood (2012b:187) the 'point oh' phenomenon has been "borrowed from the software development industry". They state that in software programming, minor improvements on a product normally change the version from perhaps 1.1 to 1.2 or even 1.10 to 1.11, using existing architecture. According to Saint-Onge (2009) the movement into a different whole number usually signifies an improvement in the product and indicates a significant change from the previous one. One can therefore deduce that a higher number indicates the superiority of the product and the newest label signifies the latest development. Thus, Web 3.0 is considered to be better than Web 2.0 which in turn is better than Web 1.0. This kind of reasoning has sparked a big debate among researchers of the 'point oh' movement.

Kwanya, Stilwell and Underwood (2012b:188) state that "the use of version numbers to represent perceived improvement of library services is currently closely tied to the application of the corresponding labels of the World Wide Web", which means that Library 1.0 is associated with Web 1.0 in the same way Library 2.0, 3.0 and 4.0 are linked to their corresponding versions of the Web. Some authors (for example, Rothman 2008) dismiss this logic of using web version suffixes as a marketing gimmick meant to promote newer web developments. Evans (2009) views the use of this lexicon as a means of exerting pressure on LIS practitioners to transform the library services and appear techno-savvy. Other authors, however, support the use of version numbers as they aptly denote trends (Cho and Giustini 2008) and accurately articulate developments in LIS (Maness 2006). This has given rise to a whole group of 2.0s, such as Research 2.0, Learning 2.0, Public Library 2.0, Library 2.0 and Librarian 2.0, to name a few, which are discussed briefly below.

3.4.1 Research 2.0

The term 'Research 2.0' refers to the utilization of Web 2.0 tools and technologies to facilitate research (Lin 2008).

3.4.2 Learning 2.0

Learning 2.0 was developed in August 2006 by Helene Blowers, Public Services Technology Director at the Public Library of Charlotte and Mecklenburg County in North Carolina (Gross and Leslie 2008). Inspired by an article by Stephen Abram, Vice President of Innovation at SirsiDynix, in which he outlined 43 things to be done to learn about new technology, the programme was transformed by Blowers into 23 things and Learning 2.0. Learning 2.0 is now a licensed programme, with content that is freely available for others to use (Gross and Leslie 2008). Learning 2.0 programmes require a substantial amount of learner self-motivation and drive, particularly for those students who are new to Web 2.0 technologies (Rethlefsen, Piorun and Prince 2009:253).

3.4.3 e-Learning 2.0

Downes (2005), who is credited with coining the phrase 'e-learning 2.0', believes that e-learning reflects the ideas of a community of practice. According to Virkus (2008:265) in the e-learning 2.0 model,

> "students form networks according to their interests, they collaborate and learn together, they develop and share content using various tools and resources, and re-use and organize content according to their preferences and needs."

Virkus proceeds to identify Web 2.0 tools that are considered to be of interest for e-Learning 2.0, which are:

- Social software for easy publishing and sharing of ideas, content and links in particular blogs, wikis, social bookmarking, and content sharing websites such as Flickr, increasingly collaborative authoring and other interactions in real time (examples include Whiteboard, Writely, SynchroEdit).
- Collaborative filtering: discovery of the "most interesting" resources through filtering techniques, but also ongoing conversations, recommendations and cross-linking of resources in social networks.

- Open Application Programming Interfaces (APIS) of web service applications (for example, Google Maps API, Flickr API) for creative re-use (that is "mashups") of services and content.
- Many services based on RSS feeds as well as the personal libraries of end users with information about, and a link to, available thematically relevant content (which can also be podcasts or videocasts).
- The content on Web 2.0 websites which is often licensed as open content (for example Creative Commons) (Guntram 2007:24, Virkus 2008:266).

3.4.4 User 2.0

Xu, Ouyang and Chu (2009:329) state that the user groups Librarian 2.0 serves in Academic Library 2.0 comprise both the Net Generation (that is students) and seasoned experts in their own respective fields (that is faculty/academic members). Each group of users manifests its own information behaviours and needs. Students, belonging to the Net Generation, also called digital citizens, are expert in using various kinds of technologies, including Web 2.0 tools. The faculty/academics group, in contrast, could have members of digital immigrants, typical Library 1.0 users or anywhere in between. The multiple hats librarians wear (for example, contributor and coordinator) in Academic Library 2.0 likewise indicate the responsibilities they are expected to shoulder. On one hand they are responsible for selecting, collecting, organizing, and disseminating knowledge and, on the other, they serve as the link between the library and user on the Web 2.0 platform by providing services as well as considering user inputs after collecting them. Table 3.1 below shows the needs of the two user groups in an Academic Library 2.0 setting.

Table 3.1: User 2.0 in Academic Library 2.0

Students	Faculty members
Quick adoption of Web 2.0 tools	Teaching and research with Web 2.0 applications
Active participation in Academic Library 2.0	Wide range in adopting Web 2.0 tools
Extension of Academic Library 2.0 to other dimensions of campus life	

Source: Xu, Ouyang and Chu (2009:329)

3.4.5 Information 2.0

Information 2.0 displays different characteristics compared to Information 1.0. The differences are in four aspects, namely:

- Presentation of information prior to the advent of Web 2.0 was linear. Now non-linear presentation of information using hyperlinks has become the norm.
- Organizing and providing information was the exclusive responsibility of librarians in the past. Now this duty can be performed by both librarians and users using Web 2.0 tools such as tagging and blogging.
- The direction of information flow was traditionally one-way in Information 1.0 and is being changed into N-way in Information 2.0 as the communication takes place among librarians and users in all possible directions. Users are no longer passive receivers of information, but rather they are able to edit content in the Web 2.0 environment; and

- Information of various kinds can be accessed more timeously in Academic Library 2.0 than in the past because of Web 2.0 applications such as RSS (Xu, Ouyang and Chu 2009:330).

The dissimilarities between Information 1.0 and Information 2.0 are depicted in the Table 3.2 below.

Table 3.2: Information 1.0 and Information 2.0

Information 1.0	Information 2.0
Linear	Nonlinear
Organized and provided by librarians.	Organized and contributed by both librarians and users.
One-way information flow: from librarians to users.	N-way information flow among librarians and users.
Huge time lag.	Negligible time lag.

Source: Xu, Ouyang and Chu (2009:329)

3.4.6 Information Literacy (IL) 2.0

The term Information Literacy 2.0, which emerged from the blogosphere related to information instruction, is about using Web 2.0 services in information literacy training and activities, i.e., as a medium of information delivery and a method of education (Zorica 2010:144). This understanding of Information Literacy 2.0 suggests renewed central conceptions of information literacy, new focus in relation to programme development and content and a brand new philosophy of information literacy in general. Zorica (2010:145) further states that

"if information landscapes are changing and so is learning, and if IL is in correlation with learning and information environments, it is then necessary to restructure, update and extend our views on information literacy and express these changes through the 2.0 extension".

53

Information Literacy 2.0 is an updated subset of information literacy. The changes in the information landscape that influenced the development of Information Literacy 2.0 are shown in the figure below.
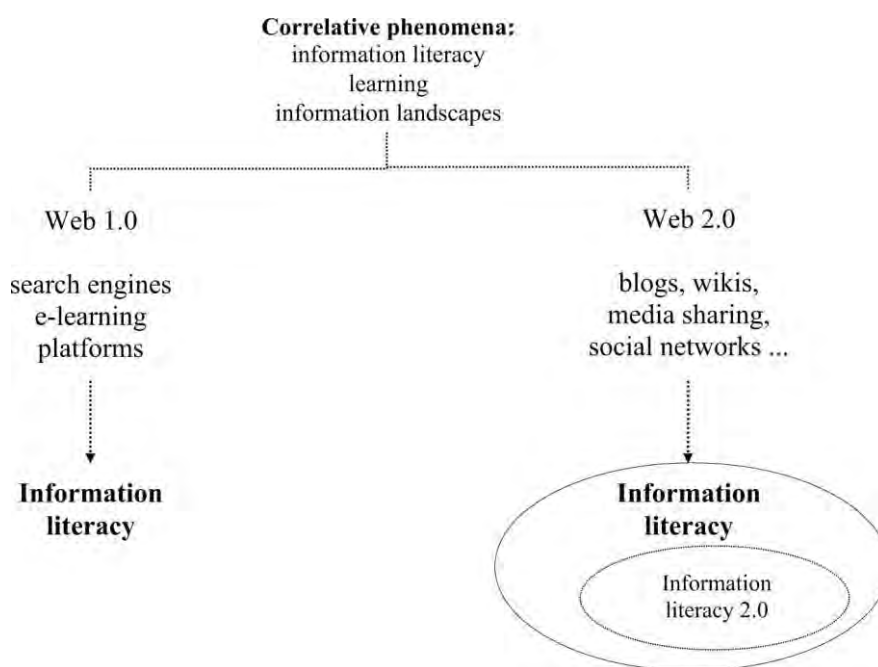
Figure 3.1: Phenomena that influenced the development of Information Literacy 2.0
Source: Zorica (2010:145)

A significant aspect of Information Literacy 2.0 is its compatibility with the Library 2.0 concept (Zorica 2010:145). Information Literacy 2.0 is not only one of the concepts for realizing Library 2.0, but it is also a means to overcome many of its critical aspects. Curran, Murray and Christian (2007:288) conducted literature reviews that deal with Library 2.0, which show that the concept of Library 2.0 is different from the library service we know today and that it operates according to the expectations of today's users. Library 2.0 encourages feedback and participation from users.

3.4.7 Public library 2.0

The term 'Public Library 2.0' depicts an institution which provides a platform for the storage and dissemination of local community knowledge, using digital technologies and Library 2.0

principles (Koltay 2010). It is the application of Web 2.0 tools by public libraries to provide enhanced services to their users (Gosling, Harper and McLean 2009:846). It is the utilization of Web 2.0 tools to better serve and engage with the users of a public library.

3.4.8 Library 2.0

The term 'Library 2.0' was coined by Michael Casey in his blog LibraryCrunch (www.librarycrunch.com) which appeared on 20 September 2005 (Maness 2006; Murley 2008; McManus 2009). It is a concept, greatly different from the traditional library service that operates according to the expectations of users (Han and Liu 2010). It is the application of Web 2.0 tools in libraries and information centres (Thanuskodi 2012). Maness (2006:3) defines Library 2.0 as "the application of interactive, collaborative, and multi-media web-based technologies to web-based library services and collections". This is the definition the current study adopted since it places emphasis on both web-based services and library services, rendering the term more useful in professional discourse.

Library 2.0 is a concept that operates to meet the rising and changing expectations of users, with a vision of a library that is available at the point of need, providing services from beyond the library, for example, through portals and within virtual learning environments (Tripathi and Kumar 2010). Serantes (2009) predicts that Library 2.0 compliant libraries in the future would be without books and physical space. Maness (2006) identified four essential elements of Library 2.0 which were discussed in Chapter 1 (at 1.2.4.1).

Library 2.0 refers to the introduction of Web 2.0 technologies in library services (Chad and Miller 2005). It represents myriad viewpoints concerning how academic librarians can utilize Web 2.0 tools for disseminating their services (Baro, Ebiagbe and Godfrey 2013). It is a model for library service that "encourages constant and purposeful change, inviting user participation in the creation of both the physical and the virtual services they want, supported by consistently evaluating services" (Habib 2006:7). It is the integration and the utilization of Web 2.0 technology into library services (Kim and Abbas 2010:211). Library 2.0 represents a change in the "interaction between users and libraries in a new culture of participation catalysed by social

web technologies" (Holmberg et al. 2009:677). Library 2.0 "is not simply a trivial revamping of traditional library services, but involves deep changes in management and service ideas, service patterns, system structures, and the like" (Zheng and Wang 2008:294).

The differences between Library 1.0 and Library 2.0 are depicted in the Table 3.3 below.

Table 3.3: Library 1.0 and Library 2.0

Library 1.0	Library 2.0
References with traditional means	References with Blogs, IM, RSS, Tagging, Wikis
Cataloguing	Tagging in OPACs
Online communities via mailing lists	Online communities via social networks
Text-based tutorials	Podcast-based Tutorials

Source: Zheng and Wang (2008:295)

Library 2.0 is essentially a mash-up of traditional library services and innovative Web 2.0 services (Harinarayana and Raju 2010:71). Fan and Hu (2006) first introduced the concept of Library 2.0 to the Chinese library and information science community in the January 2006 issue of the *Journal of Academic Libraries* (Cao 2009:2). Figure 3.2 below outlines the four key features of Library 2.0, which distinguishes it from Library 1.0.

Figure 3.2: Library 2.0's four features

Source: Cao (2009:3)

3.4.9 Academic Library 2.0

When the academic library meets Web 2.0, Academic Library 2.0 should emerge (Xu, Ouyang and Chu 2009:23). Habib (2006) introduced the concept of Academic Library 2.0, describing how Web 2.0 tools could be applied in academic libraries for various purposes. Figure 3.3 below shows the three components that make up Academic Library 2.0.

Figure 3.3: The three components of Academic Library 2.0

Source: Xu, Ouyang and Chu (2009:329)

The building blocks of Academic Library 2.0 are highlighted in Figure 3.4 below.
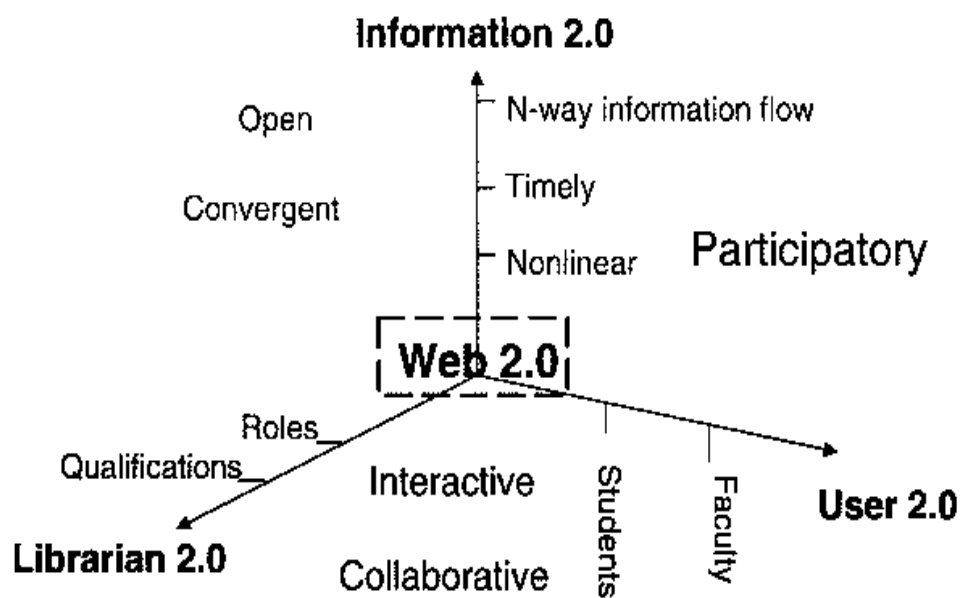
Figure 3.4: The Academic Library 2.0 model

Source: Xu, Ouyang and Chu (2009:330)

3.4.10 Librarian 2.0

Librarian 2.0, a term used to describe a librarian who utilizes the power Web 2.0 opportunities to deliver library services to users where they are, denotes a librarian with a deep understanding of end-users in terms of their goals and aspirations, workflows, social and content needs (Abram 2006). Librarians functioning in the Librarian 2.0 environment possess qualifications and perform roles that are different from the time before Web 2.0 came into existence (Xu, Ouyang and Chu 2009:329). These qualifications and skills are outlined in the table below.

Table 3.4: Qualifications and roles of Librarian 2.0

Qualifications	Roles
Creative	Contributor
User-oriented	Organizer
Active participation	Coordinator

Source: Xu, Ouyang and Chu (2009:329)

The qualifications listed above enable the Librarian 2.0 to meet the challenges of providing quality services to Academic Library 2.0 users, that is, the Net Generation (students) and faculty members who are experts in their fields. The librarian's role is changing from being "a provider of information to a facilitator or moderator" (Minocha 2009:9). Similarly, Stephens (2006) identified the core competencies of a Librarian 2.0, which are:

- plans for his or her users;
- embraces Web 2.0 tools;
- controls 'technolust';
- makes good, yet fast decisions;
- is a trendspotter;
- gets content, and
- never stops dreaming about the best library service (Stephens 2006:9).

According to Partridge, Lee and Munro (2010:315) "core competencies needed by Librarian 2.0 have appeared in the 'biblioblogosphere' (blogs written by LIS professionals)". Cohen (2006) provided 17 statements that should guide the professional practice of Librarian 2.0. These statements reflect "the attitude or ethos that a successful librarian in the 2.0 world must possess" (Partridge, Lee and Munro 2010:317). These statements, which are referred to as 'the Librarian's 2.0 manifesto', are provided in Appendix 5.

3.4.11 Catalogue 2.0

Created by Innovative Interfaces as a development of Encore, Catalogue 2.0 is a new unified search and access tool that leverages Web 2.0 technologies. Catalogue 2.0 "provides an attractive and stylish superstructure for traditional library technologies and continues to ensure the stability of quality information that libraries are known for" (Fifarek 2007:13). It aims to bring together library content, community participation and ease of discovery, thus making the library the preferred destination for finding information by using new programming techniques that seamlessly collect relevant data and useful features that guide the user along their path of discovery (Innovative Interfaces Inc. 2006).

3.5 The N-Generation

Since this study discusses the use of Web 2.0 technologies in academic libraries in South Africa, it is important to consider the profile of academic library users and future users. These users are referred to as the net generation, millennials, digital natives (Gross and Leslie 2008), Generation Y students (Adams 2010) or digital immigrants (Prensky 2001). Academic libraries are serving a 'web generation' of users with advanced computer skills and it is very important that libraries embrace tools such as chat services (for example, 'Ask a librarian' or 'Virtual librarian'), cell phone technology (for example, to inform users about new databases), ipods, blogs, Facebook, LinkedIn, and so forth. The use of these technologies will enable libraries to occupy the same space as their 'techno savvy' users (Godwin 2009).

3.5.1 Characteristics of the N-Generation

According to Burhanna, Seeholzer and Salem (2009) since the web generation began to enter college, librarians have been discussing the best strategies for reaching and attracting the digital generation. A study conducted by Weiler (2004:47) found that "the millennial generation has a different approach to research and the amount of time they are willing to wait to receive information". Gardner and Eng (2005) also drew similar conclusions about the characteristics of the net generation, which are:

- Their demand for quality academic facilities and high academic achievement;
- Their need for customization of technology and research;
- Their need for integration of technology into learning; and

- Their usage of new communication modes.

Virkus (2008:266) drew a similar conclusion with regards to the ways in which the net generation approaches learning, which is that:

- They are better at taking in information, making decisions quickly, multi-tasking, parallel processing and thinking graphically rather than textually;
- They assume connectivity and see the world through the lens of games and play;

- They have a diversity of experiences and needs, and they are expecting instant responses and feedback; and

- They are goal and achievement oriented.

Their learning preferences include the use of technology, interaction, teamwork, experiential and collaborative activities and multitasking (Prensky 2004). In view of this, libraries should provide quality services that meet the needs of this 'techno savvy' generation. Gross and Leslie (2008) advise libraries to consider updating some of their methods for teaching students to incorporate gaming technology, or develop more visually oriented instruction methods.

According to Miller (2005) libraries were considered to be the guardians of knowledge and central reference points for those seeking knowledge. With the rise of Google, Amazon, Wikipedia and so forth, there is:

> "an oft-stated fear that many users, much of the time, will bypass processes and institutions that they perceive to be slow, unresponsive, unappealing and irrelevant in favour of a more direct approach to services offered by others that just might be good enough for what they need to do (Miller 2005:4)".

Instead of viewing Google with suspicion and as a competitor, libraries seize every opportunity not only to challenge these perceptions, but push their genuinely valuable content, services and expertise out to places where users are and where users stand to benefit from such services.

3.6 The differences between Web 1.0 and Web 2.0

The World Wide Web, commonly known as the Web, is not synonymous with the internet "but is it the most prominent part of the internet that can be defined as a techno-social system to interact with humans based on technological networks" (Aghaei, Nematbakhsh and Farsani 2012:1). It is a techno-social system that enhances human cognition, communication and cooperation. Great progress was achieved with the web in more than two decades since its introduction by Sir Tim Burners-Lee in 1989 (Anderson 2007).

The Web before the dot.com crash is referred to as Web 1.0 (Virkus 2008:263). Web 1.0 was designed so that users could just see Web pages but not to be able to change or comment on the content material of the particular Web page (Ahmed 2015). Technically, information of a Web 1.0 Web page was actually shut to external editing, rendering the Web pages mono-directional (Aghaei, Nematbakhsh and Farsani 2012). Commonly known as a read-only web, Web 1.0 is the first generation of the web which is characterised by static hypertext markup language (HTML) websites that are updated infrequently (Aghaei, Nematbakhsh and Farsani 2012). While Web 1.0 was mainly a platform for information, Web 2.0 is considered a platform of interaction (O'Reilly 2005). A typical example of Web 1.0, which is also known as the 'read-only Web', is Britannica Online, whereas the Wikipedia is considered a typical example of Web 2.0, which is also known as the 'read-write Web' (Virkus 2008).

When Web 1.0 came into existence, Web developers began a way for two-way interaction, which resulted in the creation of Web 2.0 (Ahmed 2015). When Web 1.0 was created, the key areas of interest centred on protocols such as HTTP, open standard markup languages such as HTML and XML, Internet access through ISPs, the first Web browsers, Web development platforms and tools, Web-centric software languages such as Java and Javascript, the creation of websites, the commercialization of the Web and Web business models, and the growth of key portals on the Web (Spivack 2007).

There are fundamental differences between Web 1.0 and Web 2.0. Sir Tim Burners-Lee, the creator of the World Wide Web, maintains that Web 2.0 is really just an extension of the original ideals of the Web (Anderson 2007). Aghaei, Nematbakhsh and Farsani (2012) and Spivack (2007) distinguished between four generations of the Web since its inception, that is, Web 1.0 as a web of cognition, Web 2.0 as a web of communication, Web 3.0 as a web of co-operation and Web 4.0 as a web of integration.

For many authors, for example, Gross and Leslie (2008); Coombs (2007); Notess (2006); Maness (2006); Han and Liu (2010); Kim and Abbas (2010), Web 2.0 refers to a group of technologies such as blogs, wikis, podcasts, RSS feeds, social networking sites, and so forth, where everyone is able to add and edit the content, creating a socially networked web environment. Harinarayana and Raju (2010:70) state that Web 2.0 includes the second generation web-based services such as collaborative publishing sites (Facebook, Bebo, MySpace and Friendster and so forth), wikis, blogs, social bookmarking sites (del.icio.us, furl, dig, and so forth), and photo sharing sites (Flickr, photobucket, and so forth).

The main distinguishing feature of Web 2.0 is interactivity (Abram 2006). The old World Wide Web was characterized by the Web 1.0 paradigm of static websites. Web 2.0, on the other hand, is about conversations, interpersonal networking, personalization and individualism (Abram 2006). Web 2.0, the 'read-write Web', enables users to add, share, rate or adjust information (Drachsler, Hummel and Koper 2007). Another trend that has been a major factor in Web 2.0 is the emergence of the mobile internet and mobile devices, including camera phones (Spivack 2007).

Web 2.0 tools and services foster new models of connectivity, communication, collaboration, sharing of information, content development and social organization (Virkus 2008). There are many factors that distinguish Web 2.0 from Web 1.0, some of which are:

- Web 1.0 was a platform for information, Web 2.0 is a platform for participation;
- In Web 1.0 information was transmitted and consumed, in Web 2.0 content is created, shared, remixed and passed along;
- Web 1.0 had static and non-interactive web pages, content management systems, portals and taxonomy. Web 2.0, on the other hand, is about blogs, wikis, IM (Instant Messaging), RSS (Really Simple Syndication) and social tagging; and
- Britannica Online is a typical example of Web 1.0 whereas Wikipedia is an example of Web 2.0 (Virkus 2008; Gross and Leslie 2008).

The distinction between Web 2.0 and Web 1.0 succinctly explains the interactive nature of Web 2.0 technologies, a trait that is attractive to the 'millennial' generation the academic library serves (Burhanna, Seeholzer and Salem 2009). Aghaei, Nematbakhsh and Farsani (2012:3) provide the distinction between the first and second generations of the web in the table below.

Table 3.5: A comparison of Web 1.0 and Web 2.0

Web 1.0	Web 2.0
Reading	Reading/writing
HTML, portals	XML, RSS
Web forms	Web applications
Taxonomy	Tags
Owning	Sharing
Dial up	Broadband
Information portals	Platforms
Netscape	Google
Services sold over the web	Web services

Source: Aghaei, Nematbakhsh and Farsani (2012:3)

Web 2.0 focuses on several major themes, including Asynchronous JavaScript and XML (AJAX), social networking, folksonomies, lightweight collaboration, social bookmarking, and media sharing (Spivack 2007). The main examples of Web 2.0 are blogs, networking sites, wikis and social networking sites, such as Facebook, Twitter, Flickr, YouTube, and so forth, which were discussed in Chapter 1. In Web 2.0 sites, content is not limited to just watching, users are able to add and comment on the content and can communicate with other users. Sodt and Summey (2009:97) succinctly described the advantages of Web 2.0 technologies by stating that "Web 2.0 takes the stagnant Web 1.0 and makes it more user-driven, collaborative, participatory, and personalized".

3.7 Web 3.0 and Web 4.0

The semantic web is called Web 3.0, a new version of Web 2.0 in which the web has advanced to form the 'Giant Global Graph' (Hendler 2009; Lassila and Hendler 2007 in Garcia-Crespo et al. 2010). The Semantic Web "imparts meaning to existing Web content in order to improve automated searching and data mining functions" (Connor 2007:13). According to Spivack (2007) the phrase 'Web 3.0' which was coined by John Markoff of the New York Times in 2006, refers to a third generation of internet-based services that collectively comprise 'the intelligent Web', such as the use of semantic web, micro formats, natural language searching, data-mining, machine learning, recommendation agents and artificial intelligence technologies, which emphasize machine-facilitated understanding of information in order to provide a more productive and intuitive user experience (Aghaei, Nematbakhsh and Farsani 2012:5).

Hendler (2009:111) views Web 3.0 as "semantic Web technologies integrated into, or powering, large-scale Web applications". Web 3.0 is the third generation of the web (Aghaei, Nematbakhsh and Farsani 2012:1). Ahmed (2015:6) sees Web 3.0 as basically "the use of robotics and artificial intelligence in two-way communication, first between humans and computers and second between humans and humans through computers".

Table 3.6: A comparison of Web 2.0 and Web 3.0

Web 2.0	Web 3.0
Read/write web	Personal web
Sharing content	Dynamic content
Blogs	Lifestream
Wikipedia, google	Dbpedia, igoogle
Tagging	User engagement

Source: Ahmed (2005:6)

Table 3.7 below gives a clear delineation between the first three generations of the Web.

Table 3.7: The first three generations of the Web

	Web 1.0	Web 2.0	Web 3.0
Meaning is...	Dictated	Socially constructed	Socially constructed & contextually reinvented
Technology is...	Confiscated at the classroom door (digital refugees)	Cautiously adopted (digital immigrants)	Everywhere (digital universe)
Teaching is done...	Teacher to student	Teacher to student & student to student	Teacher to student, student to student, & student to teacher
Schools are located...	In a building	In a building or online	Everywhere & thoroughly infused into society
Parents view schools as...	Daycare	Daycare	A place for them to learn, too
Teachers are...	Licensed professionals	Licensed professionals	Everybody, everywhere
Hardware & software in schools...	Are purchased at great cost and ignored	Are open source and available at lower cost	Are available at low cost and are used purposively
Industry views graduates as...	Assembly line workers	As ill-prepared assembly line workers in a knowledge economy	As co-workers or entrepreneurs

Source: Moravec (2013:3)

Figure 3.5 below shows the various components of Web 3.0.

Figure 3.5: Components of Web 3.0

Source: Moreyne (2011:2)

Figure 3.6 below shows technology developments from filing systems to Web 3.0, including predictions for Web 4.0, which is to be started in 2020 (Ahmed 2015). The figure includes timelines for each version of the Web technology.
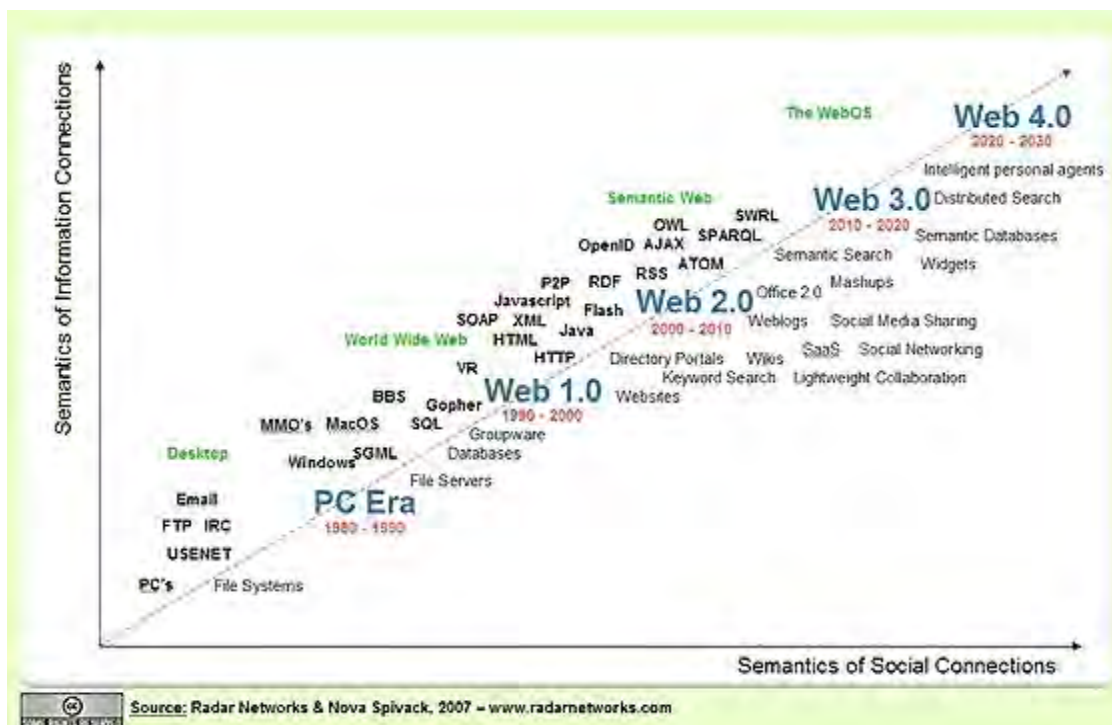
Figure 3.6: Graph of historical and predictive generations of the Web

Source: Ahmed (2015:7)

3.8 Previous findings of studies conducted on the use of Web 2.0 technologies

Mahmood and Richardson (2013:509) assert that while no specific study has been conducted on the impact of Web 2.0 technologies on academic libraries, brief mentions of this topic are found in various surveys, case studies and opinion papers. This section will provide an overview of surveys and case studies that have been done on the utilization of Web 2.0 technologies in academic libraries in different continents or countries.

3.8.1 International studies

Pioneering libraries in the United States of America (USA) and United Kingdom (UK) have steadily made increasing efforts to equip their traditional library websites with more Web 2.0 elements (Han and Liu 2010). Tripathi and Kumar (2010) conducted a study on the use of Web 2.0 technologies which covered 277 academic libraries in four countries, namely, Australia, Canada, UK and USA. The researchers chose the survey method for collecting data for the study

because "the survey based research methodology is most appropriate when investigators do not have direct access to subjects of the survey and/or the size of the sample is large" (Tripathi and Kumar 2010:198). The libraries of the universities which are listed at the following sites were surveyed for the present study:

- The University of Wolverhampton maintains a directory of the universities situated in the United Kingdom. The directory reflects information about 82 universities (http://www.scit.wlv.ac.uk/ukinfo/).
- The University of Texas maintains a directory of universities situated in the United States of America. The directory provides information about 151 universities (http://www.utexas.edu/world/univ/state/).
- The Network of Universities of Canada web site provides information about universities situated in Canada for students to compare academic standards before applying for the admission. The network reflects information about 37 prominent Canadian universities, out of a total of 95 universities in Canada (http://university-canada.net/); and
- The researchers also investigated the use of Web 2.0 tools in seven out of 40 universities in Australia (Tripathi and Kumar 2010:198).

The selection of universities from four countries ensured coverage of diverse socioeconomic and educational environments and minimized sample bias. The study found that 211 academic libraries (76%) had adopted at least one of the Web 2.0 tools, whereas 66 of them (24%) did not use any of the Web 2.0 tools. The results showed that Instant Messaging was the most popular Web 2.0 tool in academic libraries and its adoption ranged from seven to 73% in the libraries surveyed. Instant Messaging was used in 43.7% of the libraries surveyed. Instant messaging allows users to communicate with one another using short text messages and provides virtual reference services to the users. The second most popular Web 2.0 tool was blogs, which were used by 26% to 43% of the surveyed libraries. Since blogs are easy to maintain and do not require much time and effort, their popularity is growing steadily. The results showed that blogs are more popular at an individual level rather than at the institutional level (Tripathi and Kumar 2010:200). Blogs are used in 33.2% of the libraries surveyed. The RSS tool was used by 22-62%

of the surveyed libraries. The popularity of the RSS tool may be attributed to its clear functions, simplicity and ease of use (Stephens 2006). RSS was used in 31.4% of the libraries surveyed.

Harinarayana and Raju (2010) conducted a study on the use of Web 2.0 tools using a sample of 57 university library websites. The universities to be studied were selected from the Times Higher Education web site (2007), which can be accessed at www.timeshighereducation.co.uk. The results showed that RSS was used by 37 (64.91%) of the libraries that were studied. Libraries used RSS feeds to publish library news and provide information about library services. Blogs were used in 15 (26.32%) of the library websites that were analysed. Librarians created specific subject blogs to keep users current with subjects of interest and to provide news and library services (Harinarayana and Raju 2010:77).

A study of 120 websites of public and academic libraries from North America, Europe and Asia was conducted by Chua and Goh (2010). The list of academic libraries that were included in the study was compiled from QS World University Rankings 2007 and The Times Higher World University Ranking 2007. The results showed that Web 2.0 applications were adopted in libraries across the three continents, although in varying degrees of prevalence. Blogs were found to be the most popular (56.6%), followed by RSS (50%), instant messaging (46.6%), social networking services (20%), wikis (16.6%) and finally social tagging (16.6%).

3.8.1.1 Europe

Harnesk (2010) in Mahmood and Richardson (2013:509) conducted a survey of 1, 241 European librarians, in which the participants gave their opinions about the goals of using Web 2.0 technologies in libraries, which were as follows:
- Maximize library exposure (78%);
- Modernize the library image and e-reputation (59%);
- Promote specific content offers (53%); and
- Build discussion groups and collaborative work (53%); reach a new audience of potential users (40%); and publish library news and press releases (38%).

The study also found that 94% of the librarians surveyed expressed positive impressions about the use of Web 2.0 technologies in libraries, with social networking, blogging, widgets, micro-blogging, social bookmarking, wikis, photo sharing, video sharing and document sharing being the main Web 2.0 tools used by libraries (Mahmood and Richardson 2013:509).

Pacheco, Kuhn and Grant (2010) conducted a study to determine the use of various Web 2.0 technologies by UK university medical libraries. A short survey was developed using Survey Monkey and emailed to 31 UK university medical libraries. The purpose of the survey was to:

- Identify which academic health libraries were using some of the high profile Web 2.0 facilities, such as blogs, Facebook and Twitter;
- Establish how they were being used for two-way communication; and
- Detail other Web 2.0 applications apart from those being used to communicate with undergraduate medical students, what means were being used instead.

The results showed that out of 20 libraries which responded to the survey, six used blogs, four of which were specifically directed at medical students. In the four sites that used blogs for medical students (Cambridge University Medical Library, Swansea School of Health Science, Hull York Medical School and the University of Sheffield) the posts were wide ranging, and covered customer service information such as opening hours, e-journal access, and library training sessions, as well as in-depth subject specific information about relevant web resources, information on news stories, best practice information, and clinical information. Older posts were available from the archive.

The study found that the use of Facebook by medical school librarians was still evolving and where it was used, it was directed at all students, not focusing only on medical students. Medical librarians posted information about library opening hours, new books, and other customer service style announcements. Links to allow users to search the library catalogue were provided. The Durham University Library Facebook site, for example, aims to complement rather than replace the official library homepage. It highlights the most useful and popular services, and even gives information that was not strictly 'library' information, for example, about printer credits, which were controlled by the computing service (Pacheco, Kuhn and Grant 2010:81).

Responses from librarians who did not use Facebook varied. The responses received were as follows:

- "It's their space, not the libraries (sic). Pretty much every library generated page only has librarians as members, which isn't really the point."
- "Did a small survey with student representatives and they weren't interested in the Library being on Facebook."
- "Not sure it's an appropriate tool for library purposes,"
- "Advantages [are] unclear." (Pacheco, Kuhn and Grant 2010:82).

Although these views are acknowledged in the literature, there is however evidence that suggests that increasingly only a minority of students like to keep their personal and academic space apart (Minocha 2009). The issue of staff capacity to create and maintain the site was also a factor behind not having a Facebook site. Twitter was found to be the least extensively used by the UK Medical School librarians compared to the three Web 2.0 technologies that were investigated. Shoniwa and Hall (2007) audited library websites of 152 higher education institutions in the UK. RSS feeds and blogs were the most popular Web 2.0 tools in British libraries. The results showed that 18% of the institutions surveyed used RSS, 11% used blogs and 5% used podcasts.

3.8.1.2 Greece

Garoufallou and Charitopoulou (2012) investigated the use of Web 2.0 of the Library Science and Information Systems (LSIS) Department at the Alexander Technological Educational Institution (ATEI) of Thessaloniki, Greece. A total of 240 students participated in the survey which was conducted in December 2009. The results showed that the most popular Web 2.0 applications that were used by LSIS students were Web games (78.5%), digital maps (63.3%), blogs (60.7%) and social media (59.6%). Social bookmarks (73.8%), RSS feeds (57.5%) and wikis (47.6%) appeared to be the least used Web 2.0 applications. The results of this study correlate with the results of a study conducted by Andreou et al., (2008) which surveyed 83 Greek and 32 Cypriot Information Scientists about their familiarity with Web 2.0 tools. Social networking services such as Facebook and blogs were among the services with a high usage,

whereas wikis, social bookmarkers and RSS feeds were among the services with low use by library staff.

3.8.1.3 Israel

Aharony (2009) conducted a study on the use of Web 2.0 applications by school, public and academic librarians in Israel. The research examined whether librarians' use of Web 2.0 is affected by personality characteristics (resistance to change, cognitive appraisal, empowerment, and extroversion or introversion) and computer expertise, motivation, importance, and inclination toward studying and integrating different applications of Web 2.0 in the future. The results showed that "the more the librarians are motivated, the more they think Web 2.0 is important, and the more they feel capable to handle Web 2.0. The more they use it, the more they perceive Web 2.0 as challenging instead of threatening" (Aharony 2009:32).

3.8.1.4 United States of America

Kim and Abbas (2010) conducted a survey of 230 library websites, which were selected from 459 libraries using the random sampling method. They visited the websites for the main and branch libraries within each university in the sample in order to identify the availability Web 2.0 functionalities on the websites. The search for Web 2.0 tools in each of the websites was limited to those functionalities that are publicly available since the researchers did not have library accounts for all the libraries in the sample. This is a valid method of investigation as the majority of academic libraries provide Web 2.0 information on their websites without requiring the user to have a library account. The results of the study revealed that RSS feeds, used by 73% of the academic libraries, were the most widely used Web 2.0 tools, followed by blogs, used by 65% of the academic libraries. The third most widely used Web 2.0 tool was personalized content (30%), followed by podcasts (27%), bookmarks (22%), wikis (20%), Twitter (15%), folksonomy (13%) and finally tagging (12%).

The findings of the study showed that the adoption rate differed for each Web 2.0 application. Some of the library-initiated knowledge transfer functions, such as RSS feeds and podcasts, were

widely adopted among academic libraries, whereas some of the user-initiated functions, such as tagging and wikis, were at a budding stage. The authors then cautioned that

> "while it is imperative to integrate newer technologies and leverage such capabilities, it is also essential for academic libraries to be more attentive to users' needs and meet their requirements. For example, 73% of the academic libraries have RSS feeds, but only 10% of the surveyed users utilized this functionality. Also, the availability of podcast among the surveyed libraries is 27%, while the adoption of podcast by users is only 4.3%, which is a big gap" (Kim and Abbas 2010:216).

This could be attributed to the fact that librarians find it easier to transfer information to users, but not the other way round. As a result, library-initiated functionalities tend to be higher than that of user-initiated knowledge functions.

Xu, Ouyang and Chu (2009) visited the websites of 81 academic libraries on Long Island, New York using a list of higher education institutions in the region. The list was available at: http://www.librarysites.info/states/ny.htm. They examined the homepage of each web site to locate any links or other similar indications of Web 2.0 applications which included blogs, IM, podcasts, RSS, social networks, tagging, and wikis in the survey. The study sought to determine whether particular Web 2.0 tools were adopted and how the adopted tools were applied in library operations and services.

The results showed that 42% of institutions out of the total introduced Web 2.0 tools to their libraries while 58% did not, which means that only less than half of the 81 academic libraries surveyed used one or more Web 2.0 applications, for example, blogs and wikis, for various purposes. Instant messaging was the most frequently used tool. Other Web 2.0 technologies found were blogs, RSS, tagging, wikis, SNS and podcasts, respectively, in order of frequency. The findings show that the majority of libraries included in the study still rely on traditional means such as email, telephone or regular webpages for providing services to their users (Xu, Ouyang and Chu 2009:326).

Liu (2008) investigated the websites of the ARL members to discover the current state of academic library websites. These libraries were available on this web site:

. The sample consisted of 111 ARL members. The results showed that about 30 libraries used RSS for library news and events and almost all the libraries that were investigated had Live Chat, a reference communication method, appearing in the library homepages (Liu 2008:9). Similarly, Mahmood and Richardson (2013) surveyed library websites of 100 academic libraries in USA which are members of the Association of Research Libraries. The list was available at: www.arl.org/arl/membership/members.shtml. The results showed that the most popular Web 2.0 tools used by the academic libraries under study were RSS, instant messaging, social networking sites like Facebook and Twitter (sharing news and announcements), blogs and vodcasts.

Rod-Welch (2012) also conducted a study of 125 academic libraries in North America that were members of ARL to determine whether they incorporated and promoted reference and social networking tools in their websites, using quantitative content analysis. The entire population was selected. A total of 11 reference and social networking tools were chosen to determine whether 125 members of ARL incorporated them in their libraries' websites. These reference and social networking tools were Live chat, e-mail/ask a librarian, research consultation/subject specialist/services, text/Short Message Service (SMS), YouTube, Flicker, RSS, Facebook and Twitter. Telephone calls were chosen because they were considered reference tools.

The results revealed that 89% of libraries that were investigated made e-mail/ask a librarian available on their website, 58% of libraries offered feedback/suggestions, 54% provided RSS, 49% of the 125 libraries provided live chat and Facebook. Twitter was used by 46% of libraries, 33% of libraries provided their reference phone number, 27% of libraries offered research consultation/subject specialist/services. YouTube was offered by 19% of the libraries, 16% offered Flickr, 11% offered Text/SMS, 24% of these libraries used other services on their website that were not part of the study such as del.icio.us, Digg, Friend Feed, iTunes U, Myspace, and so forth. E-mail/ask a librarian, feedback/suggestions, RSS, live chat, and Facebook were the top five tools offered (in this order) on these 125 libraries' homepages (Rod-Welch 2012:142).

Dickson and Holley (2010) investigated the use of the major social networking tools in academic libraries in the USA. The researchers focused on only the major social networking services, such as Facebook, Twitter, and del.icio.us, as useful forms of student outreach within an academic library. The results indicated that many academic libraries used Facebook for outreach purposes, such as marketing the library, advertising hours, location and website information. Some academic librarians used Facebook to embed the library catalogue, so that users could access the catalogue from Facebook without going to the library web site, and others embedded subject guides within the Facebook page through a LibGuides application (iLibrarian 2007).

3.8.1.5 China

A study conducted by Cao (2009) targeted librarians and information professionals that worked in the libraries of mainland China and used Web 2.0 tools and applications in their professional duties and personal lives. The results showed that Chinese libraries were in the early stage of exploring Library 2.0 applications (Cao 2009:7). The study highlighted management buy-in, lack of awareness, lack of user participation and lack of technology staff as factors that had an impact on the implementation of Web 2.0 technologies. Si, Shi and Chen (2009) also conducted a study on the use of Web 2.0 in Chinese academic libraries. They searched Web 2.0 components in library websites of the 30 top-ranked universities and found that two-thirds of libraries adopted one or more such technologies. The most widely used Web 2.0 tools were RSS, IM, toolbars, blogs, AJAX, tag/folksonomy and finally wikis. Another Chinese study was conducted by Han and Liu (2010). They selected 38 top ranked universities and evaluated catalogues and libraries' websites to determine the presence of tools or services that reflect the principles of Web 2.0. The researchers implemented these steps to identify Web 2.0 tools in the universities' library websites and obtain information about their application:

1. Refer through each of the integrated services of the following 38 university library's web pages: enhance communication with patrons (RSS feeds, blogs, Web 2.0 applications IM, podcasts, vodcasts, SNS, text messaging alert), cataloguing services (federated research interface, the integration of resources such as Google Books or Douban Books, web browser tools that connect directly to the library catalogue), and feedback devices and interfaces that allow users to contribute to the substance of a

web site (wiki, tag clouds, submitting book review, book rating). By this method, the researchers could find Web 2.0 applications with direct links from the home pages or the second-level sub-pages.

2. Search the websites to find words or phrases which are included in the checkpoints such as 'RSS', 'blog' or 'IM', 'wiki. If the library does not have a 'search' function on their websites, then the researchers used 'Google search' to search within the libraries' websites. This step enabled researchers to identify the applications of Web 2.0 even if they did not have links in the home pages or the second-level sub-pages of the websites.

3. Search the most popular public blog platforms in China for hosted libraries' blogs. By doing so, Shanghai Jiao Tong University Library's official blog on Sina was found.

4. Search for the libraries' presence on the popular SNSs in China. In this way, Shanghai Jiao Tong University Library and Xiamen University Library's presence on SNSs were tracked (Han and Liu 2010: 46-47).

The results showed that multiple tools were used in these Chinese university libraries to enhance patron engagement and facilitate usability (Han and Liu 2010: 46-47). Among the 38 university libraries that were investigated, 31 of them used at least one kind of Web 2.0 tool. The tools used, in their order of frequency, were OPAC 2.0 (71%), RSS (55%), blogs (13%), IM (11%), SNS (11%) and wikis (5%).

3.8.1.6 Hong Kong and the USA

Nesta and Mi's survey (2011) surveyed the websites of academic libraries in New Jersey, USA and Hong Kong to find out the extent of adoption of Web 2.0 technologies and the success of implementation of these technologies in terms of interaction and user numbers. With regards to the New Jersey academic libraries, the most extensively used Web 2.0 technologies were IM (38 libraries), blogs (17 libraries), RSS (14 libraries), LibGuides (nine libraries), Facebook (seven libraries) and Twitter (six libraries). The study found that Hong Kong academic libraries used blogs and wikis to post library news and video links. Overall, the authors found that although Web 2.0 technologies such as IM, blogs, RSS, Facebook and Twitter were used, the students' participation in these technologies was low.

3.8.1.7 Pakistan

Khan and Bhatti (2012) conducted a study to investigate the attitude of LIS professionals towards the use of social media in marketing of library resources and services and to find out the ways for optimum utilization of social media tools for marketing the library and information products and services in university libraries in Pakistan. The objectives of the study were three-fold:

- To explore the respondent's attitude towards the use of social media in marketing of library resources and services;
- To provide the possible impact of social media on marketing library and information products and services; and
- To investigate the problems in utilizing social media for marketing purposes in libraries (Khan and Bhatti 2012:3).

The population was comprised of librarians and LIS academics working at Bahauddin Zakariya University of Multan and the Islamia University of Bahawalpur, Pakistan. The results showed the respondents' positive attitude towards the use of social media in Pakistani libraries. The respondents viewed social media as an important tool for marketing of library products and services among online information users (Khan and Bhatti 2012).

3.8.1.8 India

Thanuskodi (2012) conducted a study of library and information science professionals of the Annamalai University, India, to assess their awareness of Web 2.0 technologies. The data collection method used was the questionnaire. The population consisted of 60 library and information professionals in Annamalai University. The objectives of the study were:

- To study librarians' awareness of Library 2.0 applications;
- To study librarians' perceptions of Library 2.0 applications; and
- To identify factors that would influence the successful implementation of Library 2.0 applications in libraries (Thanuskodi 2012:77).

The results of the study showed that 42 respondents (70%) had read blogs, while 58.33% had added posts to blogs. The findings also showed that 27 respondents (90%) had read entries in Wikipedia, but only 19 (31.66%) had added entries in Wikipedia. A small number of respondents, six (10%), had used RSS feeds and 15 (25%) had participated in social networking, eight respondents (13.33%) said that they had used pictures from Flickr and only five (8.33%) of the respondent had added pictures to Flickr (Thanuskodi 2012:81).

3.8.1.9 Australia and New Zealand

Linh (2008) conducted a study on the use of Web 2.0 tools in Australia and New Zealand by analyzing the content of 47 university library websites (39 universities in Australia and eight universities in New Zealand). The researcher implemented the following steps in order to identify the existence of Web 2.0 tools in the websites:

- Accessed all libraries' websites of Australasian universities, look at links such as 'news', 'new titles', 'library communication', 'library services', and so forth, to see the availability of RSS, blogs, IM, podcasts and wikis. Such links are usually on the home pages or the second-level sub-pages (direct links from the home pages) of the library websites. Either the number '1' or '0' was filled in the corresponding cell on the checklist.
- Used 'search' function of the websites. Almost all websites of Australasian university libraries provide search boxes that allow users to search for words or phrases such as 'RSS', 'blog', 'library blog', 'instant messaging', 'chat', 'podcast', 'vodcast', 'wiki' and 'tag'. This step is useful as it enabled the researcher to identify the availability of Web 2.0 in the libraries' websites even if the links to those applications are not in the home pages or the second-level sub-pages of the websites.
- Used 'Google search' for libraries that do not provide a search box on their websites to search within the libraries' website domain by following the syntax: keyword site: www.domainname. For example, to see whether the library of Flinders University uses RSS or not, the following search expression was used:

RSS site: www.lib.flinders.edu.au. The first ten links in the search results usually provided the answers.

- Used 'Google search' to search for the libraries' blogs that are hosted by free domain names instead of the libraries' domain names. By doing this step, a number of blogs were found such as blogs of Canterbury University Library, Queensland University of Technology Library, University of Sydney Library and Southern Cross University Library (Linh 2008:639-640).

In addition to simply identifying Web 2.0 tools in the websites, the study also explored purposes and features of their use. The results showed RSS to be the most widely used Web 2.0 tool (63.8%), blogs (36.2%), podcasts (21.3%) and finally IM (10.6%). All these technologies were applied with their basic features. A study of 37 university library websites in Australia by Nguyen (2008) to determine the presence of Web 2.0 applications in library websites yielded a similar result. The results showed that RSS was the most widely used technology and IM was the least applied technology.

Chan (2010) explored the implementation of four Web 2.0 technologies at Murdoch University Library, Western Australia. These Web 2.0 technologies are:

1. MULTA (Murdoch University Library Thinking Aloud), then available at http://carcit.library.curtin.edu.au/index.php/MULTA:Murdoch_University_Library_Thinking_Aloud. The librarians focused on five Web 2.0 technologies (RSS feed, wikis, blogs, Forum and social tagging);

2. 23 Things: A Learning 2.0 program. Inspired by the work done by Helen Blowers, Technology Director of Public Library of Charlotte and Mecklenburg County (PLCMC) and her colleagues who created and developed the 'Learning 2.0' programme, it was intended to expand skills and empower in using new technologies, then available at http://creativecommons.org/licenses/by-nc-sa/2.5/;

3. Collaborative Learning About Emerging Technologies, then available at: http://blogs.murdoch.edu.au/23things08/about/; and

4. Web 2.0 Easier, faster, friendlier, then available at http://blogs.murdoch.edu.au/libraryweb2/welcome/ (Chan 2010).

The results of the study showed that the awareness levels of staff regarding different types of Web 2.0 tools were raised, which in turn led to the embedding of a large number of Web 2.0 tools into librarians' work to improve productivity and to enhance the sustainability of information dissemination.

3.8.2 Africa

According to Baro, Ebiagbe and Godfrey (2013), the uptake of Web 2.0 applications in African countries has been very slow. This sentiment is echoed by Lwoga (2011) who stated that:

> The use of Web 2.0 in Africa is still at infancy stage. In order to improve the quality of education, African universities should take advantage of innovative and emerging technologies and consider the learning preferences of the Net generation or digital natives (2011:2).

3.8.2.1 Zambia

A survey of three universities in Zambia, Copperbelt University, University of Zambia and Mulungushi University, on the use of social networking tools by librarians revealed that there was minimal use of social networking tools by Zambian university librarians for enhancing library services (Banda 2011).

3.8.2.2 Nigeria and South Africa

Baro, Ebiagbe and Godfrey (2013) conducted a study on the use of Web 2.0 tools in university libraries in Nigeria and South Africa. The universities were selected from the 2012 World University Web Ranking of top 100 universities and colleges in Africa available at (www.4icu.org/topAfrica/). The questionnaire was sent to 11 South African and Nigerian university libraries. There was a 74% response rate from Nigerian librarians and a low 32.7% response rate from South African librarians. The gap which was created by the low response rate from South African librarians will be filled by the current study. The results showed that Facebook was the most frequently used Web 2.0 tool by librarians in Nigeria (47.3%) and South

82

Africa (63.9%). The findings of this study resonate with the findings of Kwanya, Stilwell and Underwood' study (2012a) which showed Facebook as the most popular Web 2.0 tool used in Kenya, followed by Twitter.

Another study of Nigerian LIS professionals was conducted by Olasina (2011). The study was aimed at determining the perceptions or attitudes of LIS professionals in Nigeria to the use of Web 2.0 tools and social networking sites. The sample for the study was made up of 200 librarians, information professionals and other professionals. The results showed that the population that was studied used Web 2.0 tools mostly for entertainment purposes. Some respondents (33) accessed Web 2.0 tools using their mobile phones and 26 of them cited restriction to the use of Web 2.0 tools in their offices as the reason for using their mobile phones for access.

Penzhorn and Pienaar (2009) conducted a longitudinal study of the use of Web 2.0 technologies by reference librarians at the University of Pretoria (UP) Library. It must be noted that the UP study was the only study that was found on the use of Web 2.0 technologies in academic libraries in South Africa. Therefore, the current study will fill the gap that currently exist in the literature, especially since the scope of the study is extensive, that is it covers all 17 academic institutions in South Africa with a research focus.

The study was conducted in two phases. Phase one took the form of a qualitative study which involved conducting interviews with library staff and academics. Phase two comprised a quantitative approach which employed the use of online questionnaires as a data collection method. In order to ensure that a smooth transition to a Library 2.0 environment was achieved, library management provided training for reference librarians to equip them with the skills necessary to meet the changing needs of their users effectively. Therefore, reference librarians were given training on various Web 2.0 tools such as Facebook, Flickr, YouTube and Blogger (Penzhorn and Pienaar 2009:69). The researchers received positive feedback from both reference librarians and academics concerning Facebook, Flickr, YouTube and blogging. Respondents viewed these tools as good marketing or general information, training and communication tools.

3.8.2.3 Tanzania

Muneja and Abungu (2012) investigated the adoption of Web 2.0 tools by librarians and IT personnel in libraries in Tanzania. A total of 23 respondents were surveyed, which was comprised largely of academic librarians (81%), public librarians (9.5%) and special librarians (9.5%). The results showed that Facebook was the most popular Web 2.0 application, used by 94.4% of the population that were studied, followed by Twitter and blogs (66.7%). The least used Web 2.0 tool was podcasts (used by less than 10%). The study also highlighted a number of challenges respondents encountered with accessing Web 2.0 applications, such as restriction of access by the institutions (77.8%), lack of reliable power sources (83.3%), unstable internet access (55.6%) and lack of technical knowledge (44.4%) (Muneja and Abungu 2012).

Lwoga (2012) conducted a study of six public universities in Tanzania. Data was collected using content analysis, which analysed the websites of the six universities and semi-structured interviews. The study identified a number of barriers to the effective implementation of not only Web 2.0 technologies, but also e-learning initiatives. The challenges included poor technological infrastructure, such as low internet bandwidth, prohibitive cost of educational technologies, lack of technical support, high cost of internet connectivity and low awareness of Web 2.0 technologies (Lwoga 2012).

3.8.2.4 Kenya

Kwanya, Stilwell and Underwood (2012a) surveyed 30 libraries in Kenya, which consisted of seven academic, 10 special, five research, five public and three school libraries to determine the use of Web 2.0 technologies in these libraries. The study used both primary and secondary data. Primary data was collected using face-to-face interviews in which open-ended questions were used to solicit information from librarians, whereas secondary data was collected using documentary and library website analysis. The small number of school libraries (three) that were chosen to participate in the study was due to the existence of a policy which prohibited the use of social media in school libraries. The results showed that academic libraries had the highest level of Web 2.0 adoption, with five out of seven using Web 2.0 technologies, followed by special

libraries (seven out of ten libraries), then research libraries (two out of five) and finally public libraries (one out of five). The study also showed that the most popular Web 2.0 technologies used in Kenyan libraries were Facebook, followed by Twitter, RSS, SlideShare, YouTube, Flickr and blogs in that order (Kwanya, Stilwell and Underwood 2012a).

Gichora and Kwanya (2015) conducted an analytical survey of nine academic library websites in Kenya with a view to establish the use of Web 2.0 tools to deliver high quality library services. The study also included two universities, namely, The Technical University of Kenya and Strathmore University, which were selected using purposive sampling, for further study. Primary data were collected from the librarians and users of the two academic libraries using a self-administered questionnaire and secondary data were collected using documentary analysis of various literature sources. The results of the study showed that the major Web 2.0 tools used by academic libraries in Kenya were RSS (used by 100% of the academic libraries that were surveyed), followed by Facebook ((80%), then blogs and wikis (70% respectively), instant messenger (IM) (50%), podcasts (30%), Delicious and Twitter (20% respectively), and finally LinkedIn and YouTube (10% respectively).

The usage of the various Web 2.0 technologies worldwide, especially Facebook, corroborate with the results of a variety of studies, such as Kwanya, Stilwell and Underwood's study (2012); Gichora and Kwanya (2015); Muneja and Abungu (2012); Penzhorn and Pienaar (2009) and Baro, Ebiagbe and Godfrey (2013). Figure 3.7 below illustrates the use of key Web 2.0 tools worldwide, such as Facebook, Twitter, YouTube, Instagram, LinkedIn and WhatsApp, which are used in academic libraries in South Africa, as reported by the respondents of the study. Facebook is the most widely used Web 2.0 technology in the world, with 1.79 billion users, followed by YouTube (1.3 billion users), WhatsApp (1billion), and so forth.
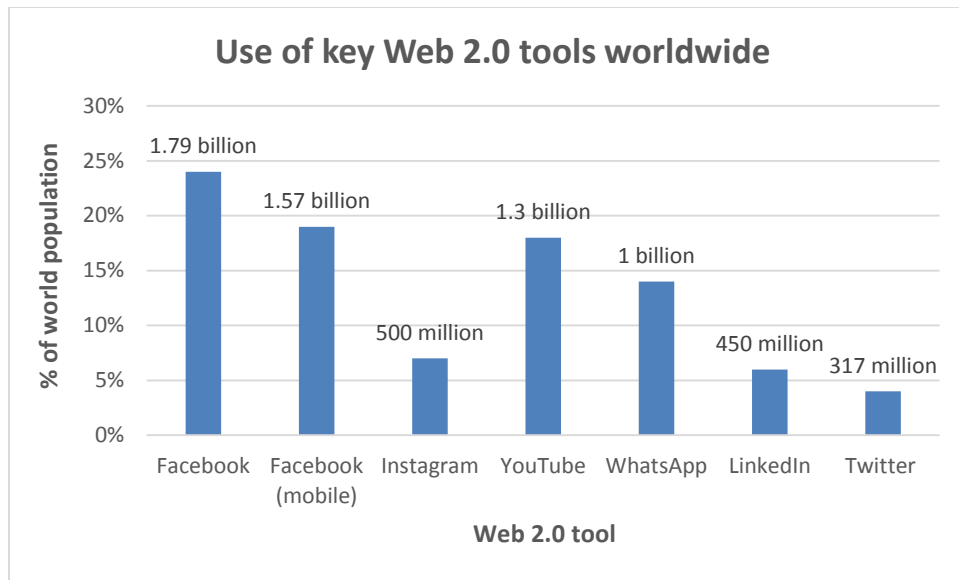
Figure 3.7: Use of key Web 2.0 tools worldwide

Source: Field data (2016)

3.9 Risks associated with the use of Web 2.0 tools

It must be noted that although there are many libraries in different countries of the world which utilize Web 2.0 technologies, there are still many which do not (Han and Liu 2010:42). Factors contributing to the apparent lack of enthusiasm in adopting these technologies include, but are not limited to, shortages of human resources, lack of budgets devoted to newer technologies, uncertainty about Web 2.0's tangible effects and potential abuse by employees (Han and Liu 2010; Olasina 2011 and Lwoga 2012). Olasina (2011:2) mentions 'the weakening line' between the use of social networks for professional, official uses and personal use, which makes it difficult for library managers to ascertain whether the use of social networks is for personal or professional purposes. This has in turn led to some institutions placing a ban on the use of social networks during working hours or alternatively, using restriction software to block off access to social networking sites in workplaces (Olasina 2011).

Abram (2006) cautions that those libraries that block access to Web 2.0 applications are positioning their technological presence as one which is poor, which compromises their efforts to

bridge the digital divide that currently exists among library users. This sentiment is echoed by Wawrzaszek and Wedaman (2008:2), when they advise that:

> "Libraries must actively embrace the changes in the information environment to stay relevant in the 2.0 world. In general, library services and staff must transition from their inherited position as the mediators of a print-focused, highly controlled environment to become collaborators in a multimedia-rich, user-empowered, disintermediated free-for-all where their value will be proven only by demonstrably improving outcomes in learning, teaching, and research".

It is clear that if academic libraries want to continue to assert their value to their institutions, they need to engage in meaningful conversations about what learning, teaching and research are and will become and the role libraries can play, not only to support, but also to enhance these activities. Miller (2005) warns against dismissing Web 2.0 as media hype. There is much value to be gained by libraries through the use of Web 2.0 technologies. Web 2.0 comprises "equal parts of evolution and revolution" (Miller 2005:4). It challenges outdated attitudes towards the rights of the user, customer choice and empowerment.

According to Coetzee and Eloff (2005), a recent trend in IT is business-to-business collaboration, where business functionality is supported through virtual applications, which includes Web 2.0 applications. These technologies have been adopted into the corporate mainstream, with well-known companies embracing Web 2.0. This is not limited to the corporate environment. Libraries, information centres, and information providers, and repositories, and so forth, are also being impacted by Web 2.0 (Burton 2008).

The same characteristics that enable creativity, productivity and collaboration, make Web 2.0 applications prone to attack (Chess 2008; Pescatore and Feiman 2008). According to Rudman (2010) Web 2.0 exposes an organisation to the following potential risks and consequences:

- security threats relating to electronic intrusion by, for example, hackers or malicious software;
- placing reliance on software that does not reside in an organisation's domain and its potential impact on the continuity of operations, because few websites offer service-level guarantees, moreover, have limited support;

87

- the continuously updating user interface may negatively impact on the applications' performance;

- shortages of technical skills and resources required to ensure that the infrastructure operates effectively, are maintained and upgraded;

- software and websites may neither be adequately tested; nor may the newest patches be loaded;

- data leakage and loss of confidentiality and privacy. This could result in brand damage, pose a threat to the organisation's reputation or a loss of intellectual property;

- untrustworthy information sources that might contain factual inaccuracies and errors, impacting on the credibility, ethics and legality of web content, while the ability to combine information from various sources could result in a decrease in relevance of content;

- unproductive use of organisational resources and time, including losses arising from a discontinuation of operations; and

- exposing an organisation to legal liability and financial penalties from regulatory compliance breaches, including copyright breaches or plagiarism (Rudman 2010:216-217).

This list represents internal threats, including authorised users performing unauthorised activities, as well as abusing authority. External threats also exist. According to Bradley (2008) security breaches involve stealing or illegally offering data to those who were never intended to have it. Lamprecht (2004) defines a hacker as someone who attempts to break into a computer system because of his/her proficiency in programming or sufficient technical knowledge to identify weaknesses in a system. Such a person intrudes into an organisation's domain and performs unauthorised acts (Rudman 2010).

Cluley (2007) proposed a multi-layered approach to address the risks at a gateway and at a desktop level, as well as all devices (including mobile devices). Although the threats can be addressed by using technological solutions, Rudman (2010) cautions that these must be complemented by an administrative component. Pescatore (2006) and Rudman (2010) outline

potential safeguards which can be implemented and provided measures to secure Web 2.0 applications, which are:

1. Filtering – this involves implementing next-generation reputation-based web filtering on both inbound and outbound communications, which should limit access to:

   a. the media type, enforcing protocols relating to executable files (.exe), MP3/4's, Active X, and so forth, as well as;

   b. content filters;

   c. approved websites or URLs based on IP addresses rather than hostnames; and

   d. payload analysis that searches for content containing words such as confidential, project names, credit card numbers. Moreover, all forms of communication (including, for example, instant messaging) should be analysed. Filtering should be policy-driven, allowing administrators to configure specific, granular policies for different departments, user groups, individual users, time of day, and so forth. The filter rules must be updated and should be reviewed regularly.

2. Blocking access - Web activity should not be blocked outright. Any deviation from the policy should be monitored and investigated before allowing access.

3. Anti-malware software. Installing anti-virus, anti-spy ware programs and spam-filters for both inbound and outbound traffic. Different anti-malware packages should be implemented at the gateway and desktop level. Anti-malware software, with the following functionalities, should be implemented:

   a. Messages should be deep-scanned, searching for signature patterns placing reliance on library-finger printing for AJAX and Flash libraries. Thus, transition should take place from fingerprint or pattern matching protection to heuristic or behavioural based protection (Pruitt 2007);

   b. Virus scanners should be able to detect zero-day exploits and update the network IDS and firewall rules immediately. Similarly, patches and malware scanners should be updated regularly, possibly automatically daily;

   c. Utilise software that decomposes all container file types (including executable and compressed files and document formats) into its underlying parts, analysing the underlying parts for embedded malware. Similarly, utilised

89

software should consider the binary pattern of a file, not only the file name, which can be misstated, determining the real file type; and

    d.   All SSL traffic, FTP file content, and so forth, should be analysed and scanned (Devgan 2007).

4. Authentication and encryption. Strong authentication and encryption technologies must operate in peer-to-peer formats. Authentication services need to be implemented to determine which user created the data. This authentication must be disclosed to allow users to decide whether to rely on the data, the contribution or feed. Sound password controls should be implemented (Devgan 2007; Hewlett-Packard 2007).

5. Monitoring and review. Extensive logs and audit trails, highlighting activities such as the websites visited, number of requests, bandwidth usage, types of files downloaded, should be maintained. These should be regularly reviewed, with a reporting system implemented (Cisco and Ironport 2007).

6. Network technology. Firewalls should be active and updated with the latest patches. Server technology should also be implemented such as secure remote access solutions (for example, SSL VPN technology), which are used to route all sessions back to an organisation's own site.

7. Browser settings. Browser and security settings should be customised to its highest level. Alternatively, non-standard browsers (such as Mozilla Firefox) that allow for anonymous surfing and which are equipped with advanced functions, can be used. Users should note whether the security features (such as HTTPs, padlock picture) on the browser are operating.

8. Validation of input. Validate the users' input for both type and format including 'if-statements', form fields, query strings, cookies and HTTP headers. Moreover, all input validation on the client-side should be replicated on the server-side (Rudman 2010:221-222).

Librarians must understand the risks associated with using Web 2.0 tools and working together with IT staff, restrict activities that expose libraries to significant risks. Rudman (2010) recommends the adoption of a multi-layered approach, that is, using anti-malware programs and a combination of filters that perform deep analyses of all forms of inbound and outbound

communication, formulation, implementation and monitoring of a clear Web 2.0 policy that is understood and adhered to by all parties, and finally training users on acceptable Web 2.0 practices and security features, to mitigate the risks associated with using Web 2.0 tools.

3.10 Summary of the chapter

Advances in technology have made an impact in many spheres of existence. Libraries, especially academic libraries, have not been left untouched by this technological revolution. LIS practitioners have begun to understand the tremendous impact of Web 2.0 applications and maximise the potential of these tools to radically impact teaching, learning, research and engagement with their major stakeholders, students and staff. Understanding not only the nature of users that academic libraries now serve, but also the risks associated with using the new technologies is critical. Putting measures in place to mitigate the risks, is important to ensure that libraries deliver relevant services anytime, anyhow and anywhere.

Provision of relevant services and resources that are responsive to the needs of today's users, taking the library to the spaces users occupy, will raise the profile of academic libraries, thus ensuring their survival. It is evident that the outdated methods of information provision have no place in today's users whose information needs have undergone a radical change. Although there are challenges which libraries have to overcome in order to successfully implement these technologies, it is the author's view, based on the literature provided in this chapter, that the benefits these technologies carry, outweigh any inconvenience libraries might encounter. Choosing to ignore the tremendous impact of Web 2.0 technologies on academic libraries might be to the detriment of the services libraries provide. The risks that are associated with the use of these technologies can be mitigated in order to extract maximum benefit from the use of these technologies.

Chapter 4: Research methodology

The discussion in this chapter focuses on the research methods and approach the study employed to investigate the use of Web 2.0 technologies by academic librarians in South Africa, the data collection tools that were used, the population of the study and the response rate, followed by data analysis methods. A description of the research methods used to conduct the study is very important as it enables another researcher to replicate the study and also ascertain the validity and reliability of the findings (Hoskins 2009:185). Validity and reliability considerations, together with a brief discussion on ethical issues, will conclude the chapter.

4.1 Introduction

In its basic form, a research design is a plan which details what the researcher intends to observe, why and how (Babbie and Mouton 2001:72). Babbie and Mouton (2001:74) define a research design as "a plan or blueprint of how you intend conducting the research". It is about designing a strategy for scientific inquiry (Terre Blanche, Durrheim and Painter 2006: 34). It is a programme that guides the researcher in the process of collecting, analyzing and interpreting observations (Nachmias and Nachmias 1982:99).

A research design refers to "any investigation of the empirical world that bears upon a proposition's truth value – its degree of truth or probability of truth" (Gerring 2001:155). Miller and Brewer (2003:262) define it as the model used by the researcher to "discharge 'the burden of proof' – the logical organization that allows him or her to feel that whatever they have done in their research allows them to reach valid conclusions".

Babbie and Mouton (2001:72) assert that all empirical social research, regardless of the kind of study or the methods used, conforms to a standard logic, which is known as the ProDEC framework. The term "ProDEC" refers to the four elements that are standard in all forms of empirical research, which are:

- A research problem (Pro). This is considered to be the starting point of all research. The researcher begins by identifying and formulating a clear research problem, which is usually in the form of either a research question or a research hypothesis.
- Research design (D). The researcher then selects the appropriate design for his/her research. The researcher decides what kind of study will best answer the question that was formulated. Examples of research designs are surveys, experiments, qualitative designs and evaluation research, among others. In this case, the survey method was used to gather data from librarians and library directors about their use or non-use of Web 2.0 technologies to enhance library services.
- Empirical evidence (E). Empirical data was collected using the questionnaire and interviews; and
- Conclusions. Collected data was analysed (this is covered in Chapter 6), conclusions drawn and recommendations made (Chapter 7).

The study conformed to the standard logic outlined above, that is, it commenced with the articulation of the research problem, which was then followed by the selection of the most appropriate research design to address the research problem, the collection of empirical data (which is covered in this chapter) and finally drawing conclusions from the data collected (which will be discussed in the last chapter of this work).

4.2 Quantitative and qualitative approaches

There are three broad methodological paradigms that are dominant in social research, namely, the quantitative, qualitative, and participatory action paradigms (Babbie and Mouton 2001:49). However, other authors such as Kellehear (1993); Payne and Payne (2004:175) and so forth,

mention only two, which are qualitative or soft and quantitative or hard approaches to methods of social research.

Qualitative research aims to understand a phenomenon from the respondent's point of view. The goal is to understand and describe rather than to explain and predict human behaviour (Babbie and Mouton 2001:53). It answers questions about the complex nature of phenomena. It explores attitudes, behavior and experiences (Dawson 2007:15). Qualitative research is also referred to as interpretative, constructivist or post-positivist approach (Leedy and Ormrod 2005:94). The emphasis is on "methods of observation and analysis that 'stay close' to the research subject" (Babbie and Mouton 2001:53). These 'stay close' methods include observational methods such as unstructured or semi-structured interviewing, participant observation, focus groups and the use of personal documents to construct life stories. Qualitative research is "especially interested in how ordinary people observe and describe their lives" (Silverman 1993:170). Data analysis is by means of grounded theory, analytical induction, narrative analysis and discourse analysis (Babbie and Mouton 2001:270).

Payne and Payne (2004:180) state that:

> "Quantitative methods (normally using deductive logic) seek regularities in human lives, by separating the social world into empirical components called variables which can be represented numerically as frequencies or rate, whose associations with each other can be explored by statistical techniques, and accessed through researcher-introduced stimuli and systematic assessment".

According to Leedy and Ormrod (2005:94) "quantitative research is used to answer questions about relationships among measured variables with the purpose of explaining, predicting, and controlling phenomena". It is sometimes referred to as the traditional, experimental or positivist approach. Quantitative research "generates statistics through the use of large-scale survey research, using methods such as questionnaires or structured interviews" (Dawson 2007:16).

The processes employed in these approaches are similar, which are:

- Formation of one or more hypotheses (Payne and Payne 2004:182);

- Review of the related literature;

- Data collection; and

- Data analysis.

Quantitative methods consist of counting how frequently things happen. According to Payne and Payne (2004:181), all forms of quantitative research share these features:

- The core concern is to describe and account for regularities in social behavior, rather than seeking out and interpreting the meanings that people bring to their own actions.

- Patterns of behavior can be separated out into variables, and represented by numbers (rather than treating actions as part of a holistic social process and context).

- Explanations are expressed as associations (usually statistical) between variables, ideally in a form that enables prediction of outcomes from known regularities.

- They explore social phenomena not just as they naturally occur, but by introducing stimuli like survey questions, collecting data by systematic, repeated and controlled measurements.

- They are based on the assumption that social processes exist outside of individual actors' comprehension, constraining individual actions, and accessible to researchers by virtue of their prior theoretical and empirical knowledge (Payne and Payne 2004:181-182).

It must be noted that there are marked differences in the ending of these approaches, for example, a quantitative study "usually ends with confirmation or disconfirmation of the hypotheses that were tested", whereas a qualitative study is "more likely to end with tentative answers or hypotheses about what was observed" (Leedy and Ormrod 2005:94-95). The consequent hypotheses the researcher derives may form the basis of future studies, which might be quantitative in nature, designed to test the proposed hypotheses. Leedy and Ormrod (2005:95) further state that it is because of this correlation that the two approaches represent complimentary components of the research process.

No research approach is better than the other (Dawson 2007:17). The two research paradigms are different and both have their strengths and weaknesses. In order to maximise the strengths of the

two research approaches, this study made use of both the quantitative and the qualitative paradigms. The qualitative research approach was found to be appropriate for this study since it is the predominant paradigm of research in the social sciences (Fox and Bayat 2007:64). The quantitative research paradigm was chosen because it has two primary strengths, namely, the findings are generalizable and the data are objective (Terre Blanche, Durrheim and Painter 2006:132).

The ability to collect objective data about the use and non-use of Web 2.0 technologies in academic libraries in South Africa and consequently being able to generalize the findings of the study is of paramount importance to the researcher, since the purpose of the study is to ascertain the use or non-use of Web 2.0 technologies to deliver quality services to techno-savvy users. This view of the generalizability of research findings in quantitative research is shared by Payne and Payne (2004:182) who state that most quantitative research "operates with less detail than qualitative methods, but with a wider scope and more generalized level of explanation". The techniques employed in quantitative research liberate researchers from personal bias and values, thus allowing "the results to approximate to a distinctive truth" (Payne and Payne 2004:183). This link to scientific knowledge and expertise is considered to be one of the key features of quantitative social research.

In quantitative research, the technical process of collecting and analyzing data, for example, sampling designs, questionnaires, code-books, and so forth, is visible, which affords this research method the potential for subsequent replication of studies by other researchers. The study used survey research, which involves "acquiring information about one or more groups of people – perhaps about their characteristics, opinions, attitudes, or previous experiences – by asking them questions and tabulating their answers" (Leedy and Ormrod 2005:183). The survey method is considered to be the archetypical example of quantitative research (Payne and Payne 2004:186). It is also a very old research technique (Babbie and Mouton 2001:230). For example, in the Old Testament in the Bible, the survey method is mentioned:

> "After the plague the Lord said to Moses and to Eleazar the son of Aaron, the priest, "Take a census of all the congregation of the people of Israel, from twenty years old and upward … (Numbers 26:1-2)".

The survey method is the most frequently used research design in the social sciences (Babbie and Mouton 2001:230). Survey research is aimed at learning about a large population by surveying a sample of that population, which is why it is also called a descriptive survey or normative survey. Researchers grapple with various constraints such as distance, time and money, in the process of collecting data for their study, which might render the study of the entire population unattainable.

In survey research, all the respondents in the sample are systematically asked the same questions, in the same order in each interview and by each interviewer, which is a stark contrast to qualitative research methods such as in-depth interviewing and life histories. The survey method is one of the most important data collection methods in the social sciences, which is used extensively to collect information on numerous subjects of research (Nachmias and Nachmias 1982:201).

Surveys can be classified as either cross-sectional or longitudinal. According to Babbie and Mouton (2001:92) cross-sectional surveys study a phenomenon by taking a cross-section of it at one time and analyze that cross-section carefully. Examples of cross-sectional surveys are censuses. Exploratory and descriptive studies are often said to be cross-sectional. Longitudinal surveys, on the other hand, permit observations over an extended period. Examples of longitudinal surveys are most field research studies that involve direct observation and perhaps in-depth interviews (Babbie and Mouton (2001:93). The researcher conducted a cross-sectional study of librarians' experiences of using Web 2.0 technologies at one time. The study was exploratory in nature – it examined the use(s) of a phenomenon, in this case Web 2.0 technologies by academic librarians in South Africa.

4.3 Data collection methods

Methods of collecting data vary. Data can be collected by observation, in-depth interviews, content analysis questionnaire or by a range of other techniques (de Vaus 1996:80). Nachmias and Nachmias (1982:179) outline three major methods of collecting data from respondents, which are: the personal interview, the mail questionnaire and the telephone survey. The advent of the World Wide Web in the eighties has introduced faster ways of eliciting information. For example, the mail questionnaire has given way to the online questionnaire. Also, advances in technology, coupled with urbanization, have given rise to telephone surveys as an alternative to face-to-face interviews. These kinds of surveys carry enormous benefits for the researcher.

According to Blaikie (2010:205) the most commonly used quantitative data-gathering methods in the social sciences are the self-administered questionnaire and the structured interview. According to Cohen, Manion and Morrison (2000:112), the use of two or more methods to study a phenomenon is called triangulation. It is about using more than one measure of the same construct (Fox and Bayat 2007:70). Triangulation bridges issues of reliability and validity and contributes to a better understanding of the study. Methodological triangulation is the "best way to collect information about different events and relationships from different points of view" (Babbie and Mouton 2001:217).

The researcher opted for a two pronged method of data collection, which are the self-administered questionnaire and semi-structured interviews, as both methods were deemed appropriate for collecting data on academic librarians' use or non-use of Web 2.0 technologies to deliver high quality services to their users. Primary data was collected using the questionnaire (for librarians) and semi-structured interviews (for library directors), as data collection methods.

Table 4.1 below shows the common methods used in both quantitative and qualitative research.

Table 4.1: Data collection methods used in quantitative and qualitative research

Quantitative research	Qualitative research
Questionnaire (self-administered)	Participant observation
Structured interview	Semi-structured interview; Observation – semi-structured & unstructured
Observation: structured	Focused interview
Content analysis of documents	In-depth interview
	Oral/life histories
	Focus groups/Group interviews
	Content analysis of documents

Source: Blaikie (2010:205)

4.3.1 Questionnaire

Payne and Payne (2004:186) describe questionnaires as follows:

> "Questionnaires are the printed sets of questions to be answered by respondents, either through face-to-face interviews or self-completion, as a tested, structured, clearly presented and systematic means of collecting data (mainly in the quantitative methods tradition".

Questionnaires provide the researcher with a very cost-effective, yet efficient method of collecting data from any participant on the planet. The distance between the researcher and the participant is an advantage to the participant in the sense that the participant "can respond to questions with assurance that their responses will be anonymous", which encourages the participant to be more truthful than they would be in a face-to-face encounter, particularly if questions includes sensitive or controversial issues (Leedy and Ormrod 2005:185).

The questionnaire is the most common technique used in survey research (de Vaus 1996:5). It is a "highly structured data collection technique whereby each respondent is asked much the same set of questions" (de Vaus 1996:80). The questionnaire is considered to be the archetypical example of quantitative methods (Payne and Payne 2004:186). The procedure involves systematically asking everyone in the sample the same questions, in the same order.

It is highly versatile in the sense that it can be filled by the respondent and returned to the researcher or administered immediately. It is a cheaper method of gathering information than personal interviews, which carry transport and/or accommodation expenses. The use of a questionnaire reduces biasing error that might result from the personal characteristics of interviewers and from variabilities in their skills (Nachmias and Nachmias 1982:180). There is greater anonymity associated with the use of online questionnaire, which is bolstered by the absence of the researcher.

The online questionnaire was also chosen because of its accessibility, that is, anyone with access to the Internet is able to participate. Since the study focused on academic libraries in South Africa, and academic libraries form part of university departments, Internet access was guaranteed. Certainly none of the respondents failed to participate in the study because of a lack of Internet connection.

Despite the numerous advantages of using questionnaires as a data collection tool, questionnaires are not void of disadvantages. Leedy and Ormrod (2005:185) caution that the major drawback of questionnaires is the low return rate and the fact that the people who actually return them might not necessarily be representative of the selected sample that was selected originally. That was not the case with this study. The researcher used mainly online questionnaires, in order avert this mishap. In cases where print questionnaires were used, they were handed out to participants, completed and handed back to the researcher on the same day or the following day. In order to improve the response rate, the researcher took advantage of forums such as the Sabinet

Conference (September 2015) and the LIASA Conference (October 2016) to distribute printed questionnaires.

The mail or email questionnaire can be used as a data collection instrument only in instances where the questions are straight-forward and unambiguous enough to be comprehended solely with the help of printed instructions and definitions (Nachmias and Nachmias 1982:180). The researcher can be oblivious to the errors in the development of the questionnaire, which makes pre-testing crucial to offset the possibility of gathering incorrect information arising from questionnaire errors.

This study made use of an electronic survey, the UKZN online survey service (https://surveys.ukzn.ac.za/index.php?r=survey/index&sid=15674&lang=en). In a computerized self-administered questionnaire (CSAQ), the respondent receives the questionnaire as a link and runs the software, which asks questions and accepts the respondents' answers. After completing the questionnaire, the respondent then returns the data file (Babbie and Mouton 2001:259). There are many benefits of using an online survey to collect data, such as, it can be accessed by respondents in distant locations, even those respondents who are difficult to contact, and the convenience of having automated data collection, which reduces researcher time and effort (Hoskins 2009:194). Such methods of data collection are more efficient than conventional techniques and they do not result in the reduction of data quality (Babbie and Mouton 2001:260). Great care was taken regarding the formulation of questions since the mailed/emailed questionnaire does not afford the researcher the opportunity to probe. Answers provided had to be accepted as final, without the luxury of clarifying ambiguous or unclear answers.

There are three basic types of questions, namely, closed-ended, open-ended or a combination of both (Dawson 2007:32). Other authors (Payne and Payne 2004:188; Babbie and Mouton 2001:233, and so forth), however, state that there are two main types of questions, which are open-ended and closed-ended questions. Therefore, questions in a questionnaire can be either

open-ended or closed-ended questions (Nachmias and Nachmias 1982:210). This is the view the study adopts as there is strong support for it in literature.

4.3.1.1 Closed-ended questions (forced choice)

A closed or forced choice question is one in which a number of alternative answers are provided from which respondents are required to select one or more (de Vaus 1996:86). A closed format offers a number of fixed answers from which respondents must choose (Payne and Payne 2004:188). Respondents are offered a set of answers from which they are asked to choose the one that most closely represents their views (Nachmias and Nachmias 1982:210).

The biggest disadvantage of closed questions is that they may introduce bias, for example, by either forcing the respondent to choose from the answers provided or by making the respondent select an alternative that might not have otherwise occurred (Nachmias and Nachmias 1982:211). To eradicate this bias, Dawson (2007:32) recommends that the format must include categories such as 'don't know' or 'other' so that all possible answers are covered.

A closed questionnaire is used to generate statistics in quantitative research (Dawson 2007:32). Questions follow a set or format and can be scanned into a computer to facilitate data analysis. Closed-ended questions are popular because they provide a greater uniformity of responses and are easily processed (Babbie and Mouton 2001:233). The biggest advantage of using closed-ended questions is that they are easily classified at the coding stage, or even pre-coded on the questionnaire (Payne and Payne 2004:188). Such questions are easy to ask and quick to be answered (Nachmias and Nachmias 1982:211). The researcher's objective in using closed questions is to lead the respondent to express agreement or disagreement with an explicit point of view (Nachmias and Nachmias 1982:212).

4.3.1.2 Open-ended questions (open questions)

An open-ended question is one for which respondents formulate their own answers (de Vaus 1996:86). An open-ended questionnaire does not contain boxes for the respondent to tick, but instead it has blank sections for the respondent to fill in answers. Open questions are not followed by any choice and the respondents' answers are written in full (Nachmias and Nachmias 1982:211). Open-ended questions leave the answer entirely to the respondent, "because the researcher either has little prior knowledge of possible responses, or feels that more detailed responses might add depth to the survey" (Payne and Payne 2004:188). Payne and Payne (2004:188) further advise that the layout of the questionnaire should leave sufficient space to record replies verbatim.

The advantage of open questions is that they do not force the respondent to adapt to any preconceived answers. The use of open questions gives the respondents the freedom to express their own thoughts freely and spontaneously (Nachmias and Nachmias 1982:211). The researcher's objective in using open questions it to learn about the process by which the respondent arrived at a particular point of view or to gain understanding of the respondent's experience of a phenomenon (Nachmias and Nachmias 1982:212). However, Dawson (2007:32) cautions that the absence of standard answers to questions makes data analysis more complex. Open questions are difficult to answer and still more difficult to analyze (Nachmias and Nachmias 1982:211).

The questionnaire used in the study shows a healthy balance of both types of questions. The biggest advantage of using both closed-ended and open-ended questions in one questionnaire is that it enables the researcher to find out how many people use a service and indicate their thoughts on the service in the same questionnaire and this is a trend most researchers follow (Dawson 2007:33). Therefore, the researcher was able to find out how many librarians used Web 2.0 technologies and indicated what their thoughts on the tools were. Contingency questions, that is, questions that applied to a subgroup of respondents (Babbie and Mouton 2001:240), were also

used. For example, there were questions that were aimed specifically at respondents who were not using Web 2.0 technologies in the libraries, which other respondents were not expected to answer.

4.3.2 Guidelines for questions

De Vaus (1996:83) cautions that as it is difficult to go back to the respondents to collect additional information, considerable care must be given to developing clear, unambiguous and useful questions. It goes without saying that questions must be easily understandable to all respondents (Payne and Payne 2004:186). If each question means the same to all respondents, it makes it easy for the researcher to obtain comparable answers.

De Vaus (1996:83), Payne and Payne (2004:186) and Babbie and Mouton (2001:233-238) provide the following guidelines that will help in avoiding the most obvious problems with question wording:

1. Use simple language. Avoid jargon and technical terms. The language should be simple, non-technical and unambiguous;

2. Use short questions. The shorter the question the less confusing and ambiguous it will be;

3. Avoid double-barreled questions. Do not ask more than one question at once. Two or more questions must not be combined into one;

4. Avoid leading questions. Questions that appear to expect a certain answer must not be used. Ensure that respondents can give any answer without feeling that they are giving the wrong answer or a disapproved of response. The problem with leading questions is that respondents are likely to agree with the sentiments expressed in such questions, believing there is a correct answer, rather than giving their own opinion;

5. Avoid negative questions. Questions which use 'not' can be difficult to understand;

6. Ensure that the respondent has the necessary knowledge before asking a question. Questions involving complex knowledge, mental arithmetic or that need detailed memory recall should be avoided as they might be sources of anxiety;

7. Words must have the same meaning for everyone;

8. Questions must be free of prestige bias;

9. The question must not be ambiguous. Use short, crisp and simple questions to avoid ambiguity;

10. Use of direct or indirect questions must be determined by the sensitivity of the subject the question deals with. Any question that is threatening or likely to arouse anxiety should be avoided by substituting indirect questions;

11. The frame of reference for the question must be sufficiently clear;

12. Questions should not artificially create opinions. Make provision for 'don't know' or 'no opinion' as some people will have no opinion on certain issues;

13. The use of personal or impersonal wording – this will be determined by what the information is wanted for; and

14. The question wording must not be unnecessarily detailed or objectionable. Respondents may be reluctant to give information about their precise age or income.

The researcher ensured that the following guidelines were adhered to with regards to questionnaires:

- The questionnaire asked only relevant questions.
- The questionnaire gave the researcher all the information he/she wished to obtain.
- The questions were clear and unambiguous.
- Clear instructions and introductory comments were given where appropriate (Hoskins 2009:193).
- Double-barreled questions were not used as such questions might cause some respondents to miss the second question altogether (Babbie and Mouton 2001:239).

4.3.3 Pre-testing the questionnaire

A number of authors (Babbie and Mouton 2001; Dawson 2007; de Vaus 1996; Leedy and Ormrod 2005, and so forth) believe that once the questionnaire has been constructed, it is very important to pre-test it to a group of people that share similar characteristics with the research group but are not part of the research population. The pre-testing is done to determine if the study yields the required results. De Vaus (1996:54) advises that it is wise to assess the reliability and validity of the instruments used to collect data before the survey is carried out. This process is called pre-testing. It is done by administering the questionnaires to a similar but smaller sample to that to be used in the actual survey.

According to Bless and Higson-Smith (1995:72) pretesting is done on two levels, which are:

- Ask fellow colleagues or experienced researchers to read through the questionnaire so that errors can be identified and rectified; and
- Administer the questionnaire to a pretest group.

The researcher gave the questionnaire to a colleague, who is a fellow PhD student in the same department to read through the questionnaire to check for errors. There were no errors identified. This could be due to the fact that when the proposal for the current study was made, the questionnaire was also submitted for scrutiny and any glaring errors would have been identified at that initial stage. Nevertheless, the second level of pre-testing was done on six Durban University of Technology (DUT) librarians, who shared the same characteristics as the study sample, but were not part of the sample. The pre-test group did not highlight any challenges with completing the questionnaire, which rendered the questionnaire fit for distribution and self-administration.

4.3.4 Interviews

Interviews afford the researcher direct personal contact with the participant who is asked to answer questions (Bless and Higson-Smith 1995:106). In social science there are many types of interviews, but the most common interviews are unstructured, semi-structured and structured interviews (Dawson 2007:28). Unstructured or in-depth interviews are also called life history interviews. Dawson (2007:29 explains that they are unstructured because the participant is free to talk about anything he/she deems important, with little directional influence from the researcher. In unstructured or nonscheduled interviews, no pre-specified sets of questions are employed, nor are the questions asked in a specified order (Nachmias and Nachmias 1982:190). It requires the researcher to establish rapport with the participant, which will in turn encourage the participant to reveal intimate life information. It also calls for the ability on the part of the researcher to tactfully steer the conversation away from irrelevant digression as it has the potential to generate a great amount of data, which might prove to be a challenge to analyze. Such unstructured interviews are used only for qualitative research.

In semi-structured interviews, which are also used in qualitative social research, the researcher seeks to obtain specific information which can be compared and contrasted with information received in other interviews. Although the researcher asks the same questions in each interview, he/she remains flexible as new important information can still arise. The respondent is given considerable liberty in expressing their definition of a situation that is presented to them (Nachmias and Nachmias 1982:189). The researcher uses an interview schedule, which may be a list of specific questions or topics to be discussed, to gather information. In this study the researcher used semi-structured interviews to collect data from library directors. The interview schedule is included as Appendix 7.

In structured interviews, which are used in quantitative research, the researcher asks a series of questions and ticks boxes with the responses. Leedy and Ormrod (2005:184) concur with this

statement when they state that in survey research interviews are fairly structured, that is, the researcher asks a standard set of questions with no deviations. The questions asked, their wording and their sequence are fixed and are identical for every respondent (Nachmias and Nachmias 1982:188). These interviews can be conducted face-to-face, over the telephone or by means of a laptop computer.

The study covered a very large geographical area, which is the whole of South Africa, as academic institutions exist in nearly all nine provinces. It was therefore not feasible to conduct face-to-face interviews with the different library directors, although such interviews tend to yield the highest response rates because in a face-to-face interview the researcher is able to establish rapport with the participants, thereby gaining their cooperation (Leedy and Ormrod 2005:184). The huge travelling expense proved to be prohibitive. Therefore, the researcher chose to conduct telephonic interviews, which are substantially more time and cost effective (Babbie and Mouton 2001:257). Furthermore, there is a possibility for bias in a personal interview due to the nature of personal interaction between the interviewer and the respondent (Nachmias and Nachmias 1982:180). In a telephone interview the appearance and demeanor of the interviewer have no effect on the questions posed to the respondents and the answers given. The researcher used telephonic interviews to mitigate against the possibility of a bias error.

Telephonic interviews typically yield lower response rates than face-to-face interviews (Leedy and Ormrod 2005:185). This is due to a number of factors, such as, people are too busy to participate, people are annoyed at being bothered or they are simply not interested in participating. To overcome this hurdle, the researcher scheduled periodic reminders with the participants and emphasized the importance of their participation. Telephone costs for the interviews were borne by the institution which endorsed the study, the same institution where the researcher was employed.

4.4 Sampling/Population

The driving factor behind collecting data is to make generalizations (Nachmias and Nachmias 1982:293). Generalizability is:

> "The methodological application of findings from one set of data, one piece of research, to other instances of the phenomenon. It is something done on the basis of statistical tests, 'scientific' rigour, systematic checking, etc. and tends to be associated with positivist kinds of research and the use of quantitative data (Denscombe 2002:150)".

Generalizations allow researchers to make statements about matters above and beyond what they have actually found through their empirical investigations. The researcher must be confident that "the findings have been based on samples that are either representative of, or have particular characteristics that are significant for the analysis of, the broader class of thing being investigated" (Denscombe 2002:141). Thus the researcher wanted to ensure that their findings will have relevance beyond their research site (Blaikie 2010:192). It is only in very rare occasions, such as in polls or censuses, that a study would include observations of all the respondents or all events that are defined by the research problem.

It is not always feasible, in terms of cost, time and resources, to study the entire population. De Vaus (1996:60) concurs with this sentiment, when he states that collecting information from everyone in the group, especially large groups, is prohibitively expensive and impractical. Alternatively, the researcher can collect information from only some people in the group in such a way that their responses and characteristics reflect those of the group from which they are drawn, a procedure called sampling. Sampling allows the researcher to draw conclusions from data and to rest his/her case on partial information, since it is not viable to study all possible respondents (Nachmias and Nachmias 1982:294). Sampling in quantitative research is undertaken in order to:

- Minimise the cost of collecting data (costs in terms of money, time and energy); and
- Increase precision in the data collected (Miller and Brewer 2003:268).

Payne and Payne (2004:200) define sampling as:

> "The process of selecting a sub-set, of people or social phenomena to be studied, from the larger 'universe' to which they belong, which process in the case of probability or representative samples, is based on the statistics of probability theory but can be reduced to a simple look-up table to decide how big a sample is needed".

The process of choosing a smaller, more manageable number of people to take part in the research is called sampling (Dawson 2007:49). A sample is a case or cases chosen for study, referred to collectively (Gerring 2001:160).

According to de Vaus (1996:60) and Nachmias and Nachmias (1982:298), there are two broad types of samples which are:

- probability – each person in the population has an equal, or at least a known, chance (probability) of being selected. In probability sampling one can specify for each sampling unit of the population the probability that it will be included in the sample. Probability sampling makes representative sampling designs possible. In probability sampling, which is also called scientific sampling, "each element within the population should have an equal and/or measureable chance of random selection" (Miller and Brewer 2003:268). A probability sample design also makes it possible for the researcher to estimate "the extent to which the findings based on one sample are likely to differ from what he or she would have found by studying the entire population" (Nachmias and Nachmias 1982:298); and
- non-probability – some people have a greater, but unknown, chance of being selected than others. According to Nachmias and Nachmias (1982:299) non-probability samples are divided into three major designs, which are:
  - convenience samples – a convenience sample is obtained when the researcher selects whatever sampling units are conveniently available. In convenience samples, it is not possible to estimate the representativeness of the sample since the researcher elicits information from respondents that are available;

o purposive samples – in purposive samples, also known as judgement samples, the sampling units are selected subjectively by the researcher, who attempts to obtain a sample that appears to him or her to be representative of the population; and

o quota samples – in quota samples, a sample that is as closely as possible a replica of the population is selected.

De Vaus (1996:60) states that the surest way of providing equal probability of selection is to use random selection, which involves listing all members of the population and "pulling their names out of a hat". Probability samples are preferable since they are more likely to produce representative samples and enable estimates of the sample's accuracy. These samples are used if the researcher wants to explain, predict or generalize to the whole research population (Dawson 2007:54).

Non-probability sampling techniques are used in situations where probability sampling techniques are either impractical or unnecessary, sampling frames are unavailable or the population is so widely dispersed that cluster sampling would be too inefficient (de Vaus 1996:77). The researcher will employ this technique if description rather than generalization is the goal (Dawson 2007:54).

De Vaus (1996:61) and Nachmias and Nachmias (1982:301) state that there are four main types of probability sample, which are:

- simple random sampling. This is the basic probability sampling design and it is incorporated into all the more elaborate probability sampling designs. It is a sampling procedure that gives each of the sampling units (N) of the population an equal and known non-zero probability of being selected (Nachmias and Nachmias 1982:301). It includes these five steps:
    o obtaining a complete sampling frame;
    o giving each case a unique number starting at one;
    o deciding on the required sample size;
    o selecting that many numbers from a table of random numbers; and

- o selecting the cases which correspond to the randomly chosen numbers.
- systematic sampling – To obtain a systematic sample, the researcher works out a sampling fraction by dividing the population size by the required sample size. Systematic sampling consists of "selecting every Kth sampling unit of the population after the first sampling unit is selected at random from the first K sampling units" (Nachmias and Nachmias 1982:301). This method is much simpler than simple random sampling;
- stratified sampling – This method is designed to produce more representative and thus more accurate samples by ensuring that the proportions of various groups in a sample are the same as in the population. Stratified sampling is used primarily to ensure that different groups of the population are adequately represented in the sample, so that the level of accuracy in estimating parameters is increased (Nachmias and Nachmias 1982:303); and
- multistage cluster sampling – which involves drawing several different samples in such a way that the cost of final interviewing is minimized. According to Nachmias and Nachmias (1982:305) "large-scale survey studies rarely make use of simple, systematic, or stratified random samples because of the enormous expense associated with them; instead, they make use of cluster sampling". The researcher selects a sample by first sampling larger groups, called clusters, which are selected by a simple or stratified sample.

It must be noted that the ability to generalize the findings to the whole study population is not the goal of qualitative research. The primary goal of qualitative research is to describe or explain what is happening within a smaller group of people, which provides insights into the behavior of the wider study population (Dawson 2007:49). Quantitative research, on the other hand, is concerned about collecting data which may be generalized to the entire population. Sampling allows the researcher to make an inference about a parameter that is unknown from a sample statistic that can be measured (Nachmias and Nachmias 1982:294).

Although the size of a probability sample directly relates to the accuracy and precision of the population estimates the researcher wants to make, in reality the selection of the sample size is determined by these factors, namely, the resources, planned analysis methods and the variability

of the population or universe from which a sample is drawn (Payne and Payne 2004:205). While it would have been ideal to include all academic librarians in all 17 research universities in the study, it was not feasible. Therefore, the researcher used the simple random sample technique to choose the sample to study because a probability sample is "better for making estimates about the 'universe' from which it was drawn" (Payne and Payne 2004:205). Random selection, as stated by de Vaus (1996:60) earlier, is the surest way of providing equal probability of being selected.

4.5 Sample size

A sample is a sub-set of the population. A population is the aggregate of all the cases that conform to some designated set of specifications (Nachmias and Nachmias 1982:294). The population refers to all the elements from which a sample is drawn (Miller and Brewer 2003:268).

De Vaus (1996:70) highlights two key factors to be considered:

- the degree of accuracy required for the sample; and
- the extent to which there is a variation in the population in regard to the key characteristics of the study.

According to Dawson (2007:54) the general rule in quantitative research is that the larger the sample, the more accurate the results. This view is echoed by de Vaus (1996:71) in his statement that when dealing with small samples a small increase in sample size can lead to a substantial increase in accuracy (de Vaus 1996:71).

In order for the researcher to make possible generalizations beyond the limited scope of the specific study, care should be taken to select the sample, using a sampling method that assures representation. Probability methods such as random sampling make generalizations to a larger and clearly defined population possible (Nachmias and Nachmias 1982:90).

The population for this study was made up of 17 research academic libraries in South Africa. The former technikons, as it was explained in Chapter One, did not form part of the study. The population size, according to the information gleaned from the LIASA Heads of Academic Institutions List, together with individual academic institutions' websites, is approximately 347 (see Appendix 3 – which was the number of research librarians in academic libraries in South Africa).

Out of the population of 347 librarians in research libraries, a total of 51 librarians were selected to participate in the study using the random selection method, which translated into 3 librarians per academic library. The selected number included library directors with whom semi-structured telephonic interviews were held. The random selection method ensured that "the sample group truly represented the population and was not distorted in any way by the nature of the selection process" (Locke, Silverman and Spirduso 2010:43). The random sampling technique was chosen because it provided equal opportunity of selection for each element in the population (Bless and Higson-Smith 1995:89). Table 4.2 below outlines how the sample size was determined.

Table 4.2: Random sampling procedure

Step	Procedure
One	Each unit (librarian) in the population was listed.
Two	A number was assigned to each participant from one to ten, depending on the number of librarians in each library.
Three	Every third number was drawn to constitute the sample.

Source: Field data (2016)

This method of selection, also called the lottery technique, is the most common technique of selecting randomly (Bless and Higson-Smith 1995:89).

4.6 Unit of analysis

The unit of analysis refers to the "what of the researcher's study, that is, the object, phenomenon, entity, process or event being investigated" (Babbie and Mouton 2001:84). It is the person or object from whom the researcher collects information (Bless and Higson-Smith 1995:64). It is the sort of phenomena (for example, countries, political parties, individuals) that constitute studies in a given research context (Gerring 2001:160). Babbie and Mouton (2001:85) further assert that "individual human beings are perhaps the most typical units of analysis for social scientific research". Elements are the units of analysis. Examples of units of analysis are persons, households, schools, and so forth (Miller and Brewer 2003:268).

The 17 academic libraries formed the unit of analysis in this study. The study investigated their use or non-use of Web 2.0 technologies to deliver library programmes in academic libraries in South Africa. Therefore, only academic librarians who provided user information services were studied. Acquisitions librarians, cataloguers, library assistants, circulation librarians, Inter Library Loans (ILL) librarians, Special Collections librarians and Digital Repository librarians did not form part of the study.

4.7 Sampling frame

Nachmias and Nachmias (1982:296) define a sampling frame as the list of sampling units that is used in the selection of the sample. Ideally, it should include all sampling units in the population, but in reality, this rarely happens. Examples of sampling frames are membership lists that are held by private or public organizations, telephone directories, institutional or organizational websites, and so forth. Nachmias and Nachmias (1982:296) warn that a sample can be only as accurate as the sampling frame from which it was drawn. It is therefore important before the sample selection is undertaken, the researcher must evaluate the sampling frame for possible faults. Typical problems in sampling frames include:

- Incomplete frames, when sampling units included in the population are missing from the list;

- Clusters of elements, when sampling units are listed in clusters rather than individually; and

- Blank foreign elements, when sampling units of the frame are not included in the original population.

The researcher used the LIASA Heads of Academic Institutions list (which was available at http://www.liasa.org.za/library-directors-in-public-and-academic-libraries/), together with the websites of the 17 research institutions in South Africa, as a sampling frame. The major challenge with information from individual library websites was inaccuracy, due to the failure to update the information on the website in case of changes in the staff complement (for example when librarians changed jobs, resigned, retired, and so forth). The LIASA list was used to obtain names and contact details of library directors and the library websites were used to obtain the contact details of academic librarians.

4.8 Response rate

The researcher must expect that some respondents will be uncontactable and others will be uninterviewable for a variety of reasons, which can lead to an unacceptable reduction of sample size and bias. The problem of sample size can be tackled by employing techniques that are designed to reduce non-response, such as paying attention to methods of collecting data, careful training of interviewers, use of interpreters and calling back at several different times of the day and week.

Nachmias and Nachmias (1982:181) warn that the typical response rate for a personal interview is about 95%, whereas that of a mail/email survey is between 20 and 40%. This warning became a cause for concern for the researcher since there were more respondents studied by means of

email survey than those of interviews, with the ratio of 70:30. Moreover, the interviews were conducted telephonically, due to the wide geographical dispersion of the respondents. The increased saturation in survey research could also be the cause for low response rates for mail/email questionnaires (Nachmias and Nachmias 1982:187).

The remedy for the low response rate of mail or email questionnaires is follow-ups (Nachmias and Nachmias 1982:184). Nachmias and Nachmias (1982:184) recommend sending weekly email reminders to those respondents who do not respond, along with replacement questionnaires and return envelopes, which was found to increase the return rate by more than 13%. Although periodic reminders achieved the purpose they were meant for, the identification of non-responding respondents compromises anonymity. In such cases the researcher needs to assure the respondents that their responses will be treated with strict confidence. The same strategy can be used with email questionnaires.

The researcher made use of an online questionnaire to collect information from academic librarians. The University of KwaZulu-Natal's survey software, called UKZN Surveys, was used to host the survey. Although there was a good response rate, there was no way of following up on non-respondents because responses could not be linked to individual respondents. It was encouraging to receive confirmation from certain respondents who confirmed their participation in the study, with some even venturing to highlight what they hoped the study would achieve.

It must also be noted that in some institutions library directors believed that if one librarian had participated in the study, there was no reason for the other subject librarians from the same institution to participate, seeing that their experiences of using Web 2.0 technologies would be the same. This meant that even if there were 12 subject librarians in a particular library, according to the library website, one response would be received, which greatly reduced the response rate. Also, some of the information on the different websites was not up-to-date. This translated to disproportionate numbers that were not truly representative of the librarian staff

component in those libraries. In those cases, (35%), the researcher had no option but to rely on verbal confirmation of librarian numbers employed. Nevertheless, the objective of the study, that is, to ascertain whether the academic librarians utilized Web 2.0 technologies to deliver quality services and the reasons for non-use, was achieved.

Scheduling interviews with library directors proved to be a challenge due to high levels of unavailability. Regular email and telephone reminders for interview requests yielded positive results in most cases. In some cases, (40%), the director/executive director delegated the responsibility of supplying the required information to a subordinate, who also occupied a top management position and who qualified to give the required information because of their area of responsibility. Such alternatives were accepted as they served the purpose.

In addition to sending the link to the online questionnaire and scheduling telephone interviews, the researcher made good use of forums such as conferences to distribute printed questionnaires. This strategy was effective as nearly all of the questionnaires that were handed out, were completed and returned to the researcher. The one questionnaire that was not returned was emailed a few days after the conference.

According to Babbie and Mouton (2001:261), the consensus in survey literature is that a response rate of 50% is adequate for analysis and reporting, a response rate of 60% is good and a response rate of 70% is very good. However, they caution that these are rough guides with no statistical basis. It is pleasing to note that the study achieved a response rate of 80.3%, which included both the questionnaire and interviews. It must be noted that this excellent response rate was achieved in spite of widespread student protests that rocked the country. The bulk of the data was collected in September/October 2016, at the height of the #FeesMustFall campaign in South African universities, which saw the majority of academic institutions closing their doors for extended periods of time due to violent protests. This in turn meant that many respondents could not be reached, or were frequently away from their workplaces. Constant follow-ups, using both

email and telephone, proved to be successful. Table 4.3 below shows the sample size of library directors and librarians.

Table 4.3: Sample size of library directors and librarians

Category	Sample size	Responses	Response rate
Library directors	17	14	82.3%
Research librarians	34	27	79.4%
Total	51	41	80.3%

Source: Field data (2016)

4.9 Data analysis

Survey analysis describes the characteristics of a set of cases (de Vaus 1996:5). Data analysis can take place as the study progresses (for qualitative data) or at the end of the data collection period (for quantitative data). It is more convenient for quantitative researchers to analyze data after the collection process has been completed as statistical software is used to analyze data and time needs to be set aside for data input into the programme to be used. Data collected in this study was analyzed on completion of the collection process.

Qualitative researchers rely on a variety of tools, such as the interview summary form or focus group summary form, transcripts from an interview or focus group, field notes, written answers on an open-ended questionnaire, and so forth, to capture the experiences of their participants (Dawson 2007:118). Data analysis in qualitative research is an on-going process that can take place throughout the data collection process and it can be in the form of:

- thematic content analysis (where themes emerging from the data rather than those imposed by the researcher are analyzed). Thematic content analysis involves content counting (Payne and Payne 2004:179);

- comparative analysis (where data from different people are compared and contrasted and the process continues until the researcher is satisfied that there are no new issues arising); and

- content analysis (where data is coded by content and discourse analysis, which involves scanning the collected data to identify patterns of speech, metaphors used, and so forth).

There are software programs that are available for researchers to use in order to analyze data.

Qualitative and quantitative data obtained from the online, printed questionnaires and semi-structured interviews was cleaned first before it was entered into the computer for analysis. This is because data produced by most methods of collection requires some manipulation to get it into a suitable form for analysis, using data reduction techniques (Blaikie 2010:208). The process of cleaning data entails checking for completeness, comprehensibility, consistency and reliability (Hoskins 2009:206). Simply put, data cleaning is about eliminating errors in the data as some errors are inevitable both in the data collection and input (Babbie and Mouton 2001:417). The researcher thoroughly and critically reviewed the data collected for the purpose of detecting any errors of measurement, bias and mistakes which could have distorted the description of the respondents' experiences of using Web 2.0 technologies in the academic libraries (Bless and Higson-Smith 1995:143).

Since the questionnaire used both open-ended and closed-ended questions, data analysis took place in two phases. After data was collected it was coded. Responses from open questions and interviews were analyzed using the thematic content analysis. Thematic content analysis is defined as

> "collecting and organizing information systematically in a standard format that allows analysts to draw a conclusion about the characteristics and meaning of recorded material (Babbie and Mouton 2001:383)".

Thematic content analysis involves making inferences by "objectively and systematically identifying specified characteristics of messages" (Babbie and Mouton 2001:492). This characteristic makes thematic content analysis very much like quantitative analysis. It is divided into two types, which are, conceptual analysis (also known as thematic analysis) and relational analysis (Babbie and Mouton 2001:492). Thematic content analysis was found to be the most appropriate method of analyzing qualitative data because it is "particularly well suited to the study of communications" (Babbie and Mouton 2001:384). Thematic content analysis addresses the why and with what effect, which is precisely what the study set out to ascertain. Responses from closed-ended questions were coded first and then converted to numerical codes so that they could be tabulated or tallied (Hoskins 2009:206).

There are a number of computer programmes that can be used to analyse quantitative data. The study used SPSS version 24, which is a statistical analysis programme, to analyse data. The major strength of SPSS is its ability "to perform intricate computations and provide sophisticated presentation of the results" (Babbie and Mouton 2001:411). SPSS provides a blank matrix of rows and columns, which allows the researcher to assign variable names to the columns and enter data for each case (Babbie and Mouton 2001:417). Furthermore, its ease of use and ready availability on the UKZN LAN (Kwanya 2011), made it a worthwhile option for the researcher.

According to Blaikie (2010:209), quantitative methods of data analysis fall into four main categories, which are:

- univariate descriptive methods which focus on single variables and are used to report the distributions of a sample or population using all four levels of measurement, which are frequency counts, measures of central tendency (such as mode, median and mean – depending on the level of measurement), and measures of the dispersion of a distribution (such as interquartile range and standard deviation);
- bivariate descriptive which are used to establish the degree to which two variables co-vary;

- explanatory analysis is used to establish the influence of one or more independent variables on a dependent variable; and

- inferential analysis which is used to make estimates of population characteristics from sample characteristics and also to establish whether differences or relationships within a sample can be expected to exist in the population from which the sample was drawn (Blaikie 2010:209).

Sayer (1992:190), on the other hand, maintains that there are two main types of statistics, which are description (for example measures of dispersion) and inferential (for example the chi square test). The various methods of data analysis in quantitative research are discussed in greater detail in Chapter Five.

4.10 Validity and reliability

"There is little point in research unless we can believe its results" (Payne and Payne 2004:196). Believing the results means having rational grounds for arguing that the results produced are an accurate reflection of what was studied. The researcher must be able to confidently declare that he/she "was faithful to the context and the individuals it is supposed to represent" (Denzin and Lincoln 1998:414).

According to Gerring (2001:193) the mark of a good research design is its ability to produce reliable results, that is, results that do not vary from iteration to iteration. Payne and Payne (2004:196) share the same view when they claim that there are two main questions about credibility of research. The first question is concerned with whether similar results would be obtained if the study were repeated and the second one is, even if the same results were obtained, would they be right, that is, has the study measured what it sought to measure. The two questions relate to validity and reliability respectively.

A valid measure is one which measures what it is intended to measure (Leedy and Ormrod 2005:28; de Vaus 1996:55; Blalock and Blalock 1968:13). Validity is concerned with addressing the question "Is one measuring what one thinks one is measuring?" (Nachmias and Nachmias 1982:138). According to de Vaus (1996:56) there are three basic ways to assess validity, which are:

1. Criterion validity – which compares how respondents answered new questions to measure a concept with existing, well-accepted measures of the concept;
2. Content validity – which emphasizes the extent to which the indicators measure the different aspects of the concept; and
3. Construct validity – which evaluates a measure by how well the measure conforms with theoretical expectations.

Nachmias and Nachmias (1982:139) also agree that there are three basic kinds of validity that can be distinguished, which are:

1. Content validity, which can be divided into face validity and sampling validity;
   a. Face validity is concerned with the extent to which the instrument measures that which it appears to measure according to the researcher's subjective assessment; and
   b. Sampling validity is concerned with whether a given population of situations or behavior is adequately sampled by the measuring instrument in question.
2. Empirical (instead of de Vause's criterion) validity, which consists of predictive validity. Empirical validity is concerned with the relations between the measuring instrument and the measurement results.
   a. Predictive validity is characterized by prediction to an external measure referred to as a criterion and by checking a measuring instrument against some outcome. It is the correlation between the results of a given measurement and an external criterion; and
3. Construct validity involves relating a measuring instrument to an overall theoretical framework in order to determine whether the instrument is tied to the concepts and theoretical assumptions that are employed.

Nachmias and Nachmias (1982:90) further distinguish between internal and external validity. Internal validity refers to the extent to which the research findings can be generalized to a larger population and applied to different socio-political settings. External validity, on the other hand, involves issues pertaining to the representativeness of the sample and the reactive arrangements in the research procedure.

A reliable measure is one which gives the same result on repeated occasions. Reliability concerns "the extent to which the measurement technique or strategy produces the same result on different occasions, for example when used by different researchers" (Hammersley 2008:43). Payne and Payne (2004:195) describe reliability as:

> "That property of a measuring device for social phenomena (particularly in the quantitative methods tradition) which yields consistent measurements when the phenomena are stable, regardless of who uses it, provided the basic conditions remain the same".

It is the "consistency with which a measuring instrument yields a certain result when the entity being measured hasn't changed" (Leedy and Ormrod 2005:29). The ability to produce the same result is considered important in quantitative research "because if researchers are using standard measurement devices, such as attitude scales or observation schedules, they need to be sure that these give consistent results" (Hammersley 2008:43). Simply put, reliability is about being confident that the way data were gathered could be repeated "without the methods themselves producing different results" (Payne and Payne 2004:196). It is:

> "An indication of the extent to which a measure contains variable errors, that is, errors that differed from observation to observation during any one measuring instance and that varied from time to time or a given unit of analysis measured twice or more by the same instrument" (Nachmias and Nachmias 1982:144).

According to de Vaus (1996:54) there are three aspects of reliability, which are:

1. Sources of unreliability – unreliability can arise from bad wording, gender, ethnic background and dress of the interviewer can influence responses, coding of responses;

2. Testing reliability – the use of test-retest method to check on the reliability of single questions; and

3. Increasing reliability – the use of multiple-item indicators, careful question wording, interviewer training and working out methods of coding help to improve reliability.

Hammersley (2008:43) asserts that "any measure that is not reliable cannot be valid, on the grounds that, if its results are inconsistent, the measurements it produces cannot be consistently valid". For Hammersley (2008:43), the key question in assessing the validity of quantitative research is: "were the measurement instruments reliable and valid?". It then becomes crucial that validity and reliability tests be conducted to ensure that the scores on these tests are high enough to warrant a positive evaluation.

4.11 Ethical considerations

This topic received a brief mention towards the end of Chapter One. However, there is a need to give a detailed account of how the researcher complied with the existing ethical code of conduct. The issue of ethics in research is about conducting social science research while being mindful of the rights and welfare of persons and communities that are the subjects of the studies of the researcher (Nachmias and Nachmias 1982:317). Research of any kind is concerned with obtaining information to develop a systematic and verifiable body of knowledge. In the research process, it is never the intention of the researcher to encroach upon the rights and welfare of research participants. According to Sekaran (2003:17) ethics refers to a code of conduct or expected societal norm of behaviour while conducting research. This section outlines measures the researcher put in place to protect the rights of the research participants in the research process.

To be an ethical researcher, one needs to be educated about ethical guidelines, carefully examine moral alternatives, exercise judgement in each situation and accept responsibility for his/her choice (Nachmias and Nachmias 1982:322). An ethical researcher is able to balance the potential benefits of the study with the cost to individual participants. It cannot be ethical therefore, to acquire knowledge at the expense of affronts to dignity, arousing anxiety, causing embarrassment, eroding trust in social relations, loss of autonomy and self-determination of study participants. The motivation for researchers to operate ethically is partly a matter of professional integrity since researchers also set themselves high standards and there are also sound practical reasons for operating in an ethical manner (Denscombe 2002:175). Denscombe (2002:175) further warns that research that does not adhere to ethical guidelines will damage the reputation of social research.

While writers on social science research ethics agree that:

> "it is not possible to provide a series of rules that should, or could, be applied to each and every instance of research because each new piece of research can give rise to its own special circumstances and these can call for different solutions" (Denscombe 2002:176),

the literature (Babbie and Mouton 2001; Cohen, Manion and Morrison 2000; Dawson 2007; Nachmias and Nachmias 1982, to name a few authors) stipulates that any research that is conducted should consider these ethical issues:

- protection from harm;
- informed consent;
- privacy and confidentiality of research data;
- honesty; and
- accuracy

The burden of responsibility for the moral conduct of research lies squarely with the researcher (Denscombe 2002:176). Any research that involves human participants must be conducted with the informed consent of the participants. This is especially essential when the study exposes the participants to substantial risks or if participants are required to forfeit personal rights. Nachmias and Nachmias (1982:323) further assert that the informed consent policy does not preclude the

126

conduct of social research that involves risk, but it does require the use of informed participants. It must be noted that regardless of the researchers' guarantees of confidentiality, the legal duty to divulge confidential information in a court of law overrides other considerations about the ethical conduct of research and prior commitments to confidentiality. This is due to the fact that researchers, unlike priests or physicians, do not have immunity with respect to disclosing privileged information (Denscombe 2002:180).

Informed consent is considered a benchmark for social research ethics (Denscombe 2002:183). Denscombe (2002:183) further states that it is a principle that is fundamental to notions of human rights and became enshrined in the Nuremberg Code in 1946. The need to develop an internationally recognized statement on the rights of individuals in relation to research, especially medical research, arose after the Second World War when many human rights abuses, including the use of prisoners of war for medical research, surfaced. An extract from the Nuremberg Code, which indicates its stance on the rights of the individual with regards to becoming a subject of research, is found below:

> "The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent, should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching or any other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision" (Denscombe 2002:183).

The principle of informed consent has since been embedded in numerous codes of ethics adopted by professional associations and institutions in various countries (Denscombe 2002:183).

Nachmias and Nachmias (1982:323) advise that participants should know that their participation in the study is voluntary at all times. If there are benefits, risks, rights and/or dangers attached to involvement in the study, these should be explained explicitly beforehand. In the informed

consent letter (Appendix 6) the researcher outlined the topic and purpose of the study, explained that there were no benefits to participation, advised participants of their rights to refuse to participate and to withdraw from the research project at any stage and for any reason without any form of prejudice and assured the participants of confidentiality and anonymity of data obtained.

Furthermore, the study adhered to the University of KwaZulu-Natal Research Ethics Policy. The University of KwaZulu-Natal Research Ethics Committee granted the researcher ethical clearance approval to conduct the research and the researcher complied with the University's Code of Conduct for Research throughout the study. Moreover, some of the institutions that were studied issued their own ethical clearance approval to the researcher prior to the commencement of research. Since research of any kind takes place within a social context (Denscombe 2002:177) the researcher conformed to the moral and legal climate of the time with respect to the choice of topic for investigation and the methods of investigation. Respondents participated voluntarily. The autonomy of respondents was protected through the use of the informed consent form mentioned above. The collected data was aggregated to reflect categories of responses, rather than individual responses in order to ensure confidentiality and the privacy of respondents.

The findings of a study can have consequences, either political, commercial or personal, which can invite the possibility of corruption (Denscombe 2002:177). Research that is sponsored by a company, for example, drug firms, the alcohol or tobacco industry, which produces findings that are contrary to the mission, vision and values of the sponsor, might invite unpleasantness for the researcher. If the findings are damaging to the company, it might cause embarrassment for the company, which might in turn put the researcher in a position of wanting to manipulate the findings or the reporting in order to save face. Denscombe (2002:178) recommends that researchers must be independent, objective and honest in the way they conduct and report the research, in order to counter any suspicion. The researcher wishes to report that this infringement of the integrity of the research was not a threat in her case. The researcher worked at the university, an institution that exists to generate and transmit knowledge. The findings were welcomed as an addition to the body of knowledge and also as a possible tool to influence both

policy and practice regarding the use of Web 2.0 technologies to provide improved library and information services.

4.12 Summary of the chapter

The research methods adopted by the study were discussed in detail in this chapter. The discussion also included the delineation of the two major research paradigms, namely, the quantitative and the qualitative paradigms. The major differences in the two research approaches, that is, in terms of data collection methods and analysis, sampling techniques employed, and so forth, were discussed. The choice of the research approach the research uses is influenced by a number of factors, such as what the researcher wishes to study and why. The data instruments used to collect data were described and the study population and sampling techniques were discussed. Finally, the validity and reliability of the study together with ethical considerations were highlighted.

Chapter 5: Results of the study

In the previous chapter, a detailed account of the research design the study employed, together with the research methods that were used to gather data, data analysis and ethical consideration, was provided. This chapter presents the data the study collected. The study sought to investigate the extent of the use and/or non-use of Web 2.0 technologies in academic libraries in South Africa and reasons for either choice. The online survey method was used to elicit information from academic librarians and telephone interviews were used to gather information from library directors of the 17 research academic libraries. The responses of various librarians and library directors are presented.

5.1 Introduction

Research is concerned with finding out about a phenomenon. It stimulates learning and enhances knowledge acquisition, while advancing knowledge. When data about a phenomenon has been gathered (data collection was discussed in the previous chapter – Chapter 4), it must be presented, analysed, conclusions must be drawn and implications for further study must be outlined. The data that was collected using a self-administered questionnaire and semi-structured interviews, are presented according to the research problem and the objectives of the research in this chapter.

5.2 The research objectives

The objectives of this research, as discussed in Chapter 1, were three-fold, namely:

- To determine the extent of use of Web 2.0 technologies by academic librarians to make information accessible to users;
- To ascertain the reasons for the adoption and/or non-adoption of Web 2.0 technologies by some academic librarians in South Africa; and
- To put forward remedial measures for adapting Web 2.0 technologies at the UKZN Library, drawing on the experiences of those academic libraries in South Africa which

have successfully implemented these technologies. This objective will be discussed in detail in Chapter 7, which outlines recommendations and conclusions.

Data is therefore presented under three broad themes which have been derived from the research objectives. These themes are:

- Extent of use;
- Reasons for adoption or non-adoption; and
- Remedial measures.

The responses to questions asked in the questionnaire and interviews are presented according to the themes mentioned above. The purpose behind each question that was asked is explained. Instances where the respondent did not provide an answer to a particular question, due to a lack of knowledge or understanding, are not always reported.

5.3 The response rate

As mentioned in Chapter 4, the sample consisted of 51 academic librarians, including library directors (see Appendix 4). Of the 17 library directors who were part of the study population, 14 participated in the study, yielding a response rate of 82.3%. The link to the online survey was sent to 34 academic librarians and 27 responses were received, yielding a response rate of 79.4%. The study yielded an overall impressive response rate of 80.3%, which is excellent for data analysis and reporting. Thus the results can be generalised for the entire population. The measures the researcher employed to improve the response rate, proved highly effective. These measures were discussed in Chapter 4.

All 17 research institutions, except two, were represented in the study. This good representation, despite the non-participation of two institutions, served to give credibility to the data that was collected and ensured that an accurate account of the use of Web 2.0 technologies in academic institutions in South Africa is presented. The responses of the various academic librarians and library directors or deputy directors are presented in the sections below.

5.4 Use of Web 2.0 technologies

Questions in this section aimed at ascertaining whether Web 2.0 technologies were used as well as the extent of use of Web 2.0 technologies in academic libraries in South Africa.

5.4.1 Librarians' views of Web 2.0 technologies

Question one was asked to determine whether Web 2.0 technologies, especially social networks such as Facebook, YouTube, Twitter, Flickr, LinkedIn, blogs and wikis, were used in libraries. An overwhelming majority of respondents, 34 (83%), which is made up of 22 academic librarians (54%) and 12 library directors (29%), confirmed that their libraries used Web 2.0 technologies. Of the 41 responses that were received, seven respondents (17%), which is made up of five academic librarians and two library directors, stated that Web 2.0 technologies were not used in their libraries. The results show that the majority of academic libraries in South Africa use Web 2.0 technologies.

5.4.2 Extent of use

Respondents mentioned a number of Web 2.0 technologies used by their libraries/institutions, which are presented in Figure 5.1 below:

Figure 5.1 shows the pie chart titled "Web 2.0 technologies used in libraries" with legend items: Facebook, Instagram, WhatsApp, LinkedIn, LibGuides, Chat services, Blogs, Twitter, Wikis, YouTube, RSS feeds.
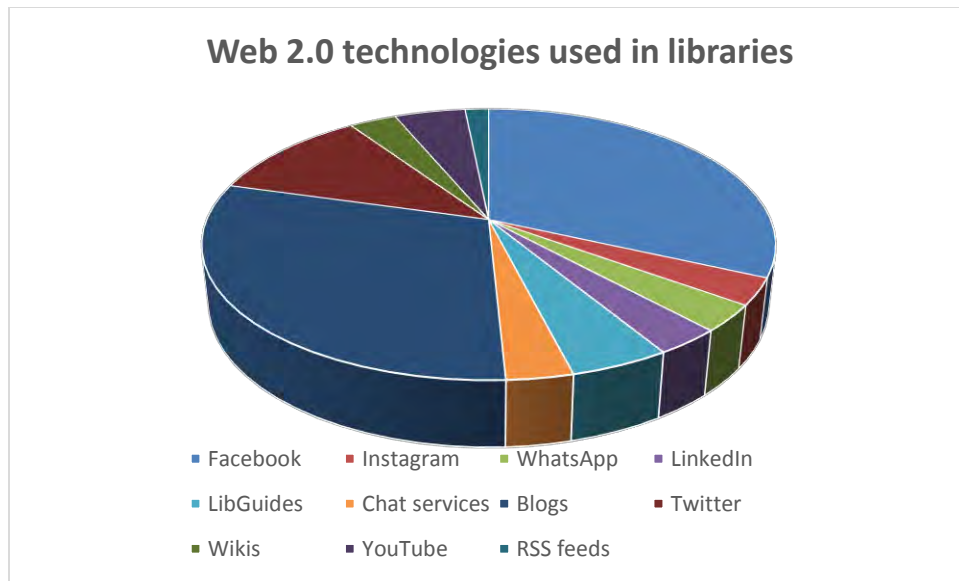
Figure 5.1: Web 2.0 technologies used in libraries

Source: Researcher

Facebook was found to be the most popular Web 2.0 technology in each of the respondents'
libraries, mentioned by 20 respondents (59%) of the 34 respondents which used Web 2.0
technologies in their libraries, followed by blogs, 19 (56%). The other Web 2.0 technologies
used are:

- Twitter, seven (21%);
- LibGuides and YouTube, three (9%) respectively;
- WhatsApp, Chat services, LinkedIn, Instagram, Wikis, two (6%) respectively; and
- RSS feeds, one (3%).

The results clearly indicate widespread use of Facebook and blogs in academic libraries in South
Africa.

5.4.3 Implications of use for library staff

The 12 library directors and deputy directors who had indicated that Web 2.0 technologies were used in their libraries, were then asked to explain the implications of the implementation of these technologies for library staff, and their multiple responses were as follows:

- staff had to be trained, three (25%);
- staff had to shed old ways of working and adopt new ways of interacting with users, four (33%);
- the responsibility for introducing and maintaining Web 2.0 technologies was assigned to specific staff with knowledge, skills or willingness to carry out the task, five (42%); and
- the introduction of Web 2.0 technologies was met with excitement and motivation in the library, one (8%).

Figure 5.2 below illustrates the implications of implementation of Web 2.0 technologies on library staff.

N=12
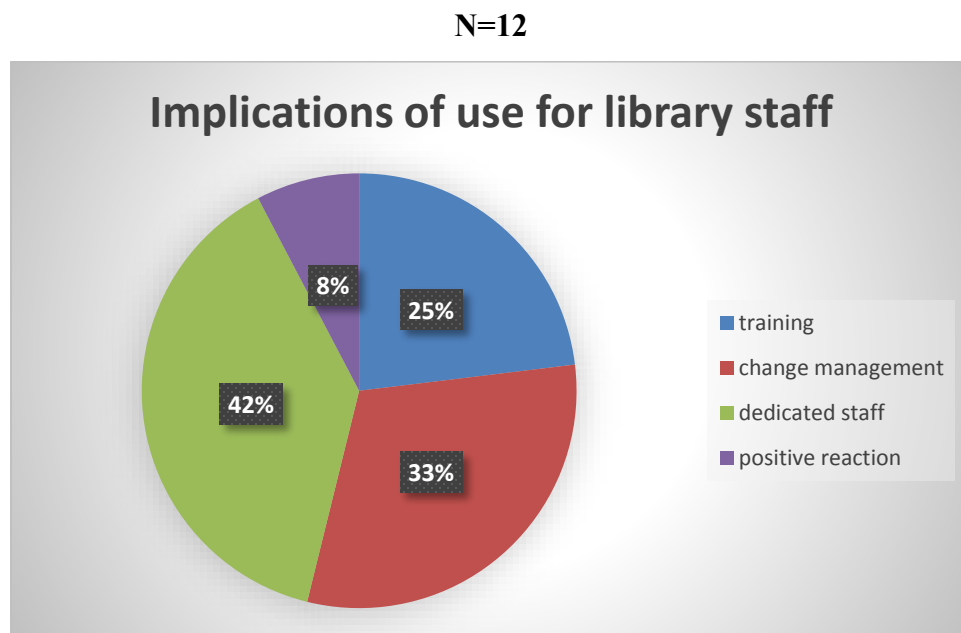
Figure 5.2: Implications of use for library staff

Source: Researcher

It is evident that the introduction of Web 2.0 technologies had an impact on library staff.

5.4.4 Use of Web 2.0. technologies to enhance services

This question sought to determine the use of any Web 2.0 technology to enhance library services, such as Selective Dissemination of Services (SDI) and user education.

5.4.4.1 Selective Dissemination of Information (SDI)

A large number of academic librarians, 17 (63%), reported on the use of these Web 2.0 technologies to deliver SDI, as depicted in Table 5.1 below:

Table 5.1: Web 2.0 technologies used to deliver SDI

N=27

Web 2.0 technology used	Frequency	Percentage
Facebook	7	26%
Blogs	6	22%
Twitter	4	15%
Web page	1	4%
LibGuides	1	4%
Wikis	1	4%

Source: Researcher

5.4.4.2 User education

The results show that YouTube videos were the preferred Web 2.0 tool used to deliver user education (six or 22%), followed by Facebook and the library website for three (11%) of the academic librarians respectively. Librarians are able to refer students to various Information Literacy tutorials which are available on YouTube. The Web 2.0 technologies the respondents used to deliver user education are presented in Table 5.2 below:

Table 5.2: Web 2.0 technologies used to deliver user education

N=27

Web 2.0 technology used	Frequency	Percentage
YouTube videos	6	22%
Facebook	3	11%
Library website	3	11%
Moodle	2	7%
LibGuides	2	7%
RSS	1	4%
Twitter	1	4%

Source: Researcher

5.4.5 Effectiveness of Web 2.0 technologies

Librarians were then asked to rate the effectiveness of the Web 2.0 technologies their libraries used. The options ranged from "very effective", "effective", "somewhat effective", "ineffective" to "very ineffective". The Web 2.0 technologies respondents were asked to rate were Facebook, YouTube, Twitter, Flickr, LinkedIn, blogs and wikis.

5.4.5.1 Facebook

When asked to rate the effectiveness of Facebook, the responses were as shown in Figure 5.3 below. There were more respondents who considered Facebook very effective, one (4%), effective, 11 (41%), and somewhat effective, five (19%), than those who considered it ineffective, four (15%). The respondents who rated Facebook very effective, effective and somewhat effective reported that it was used for marketing and for relaying regular updates in their libraries, whereas those respondents who did not value Facebook much attributed their views to non-availability, three (11%), and a lack of marketing, one (4%), citing that as

Facebook was new in their library, they still needed to overcome challenges such as the training of staff before they could see its value.

N=27
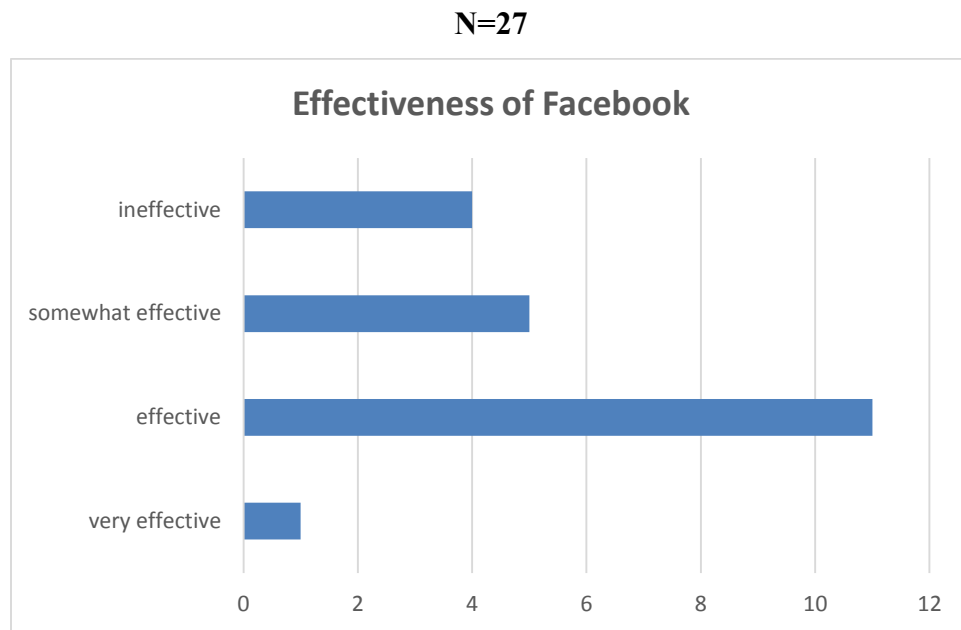
Figure 5.3: Effectiveness of Facebook

Source: Researcher

5.4.5.2 YouTube

Figure 5.4 below presents the respondents' views of the effectiveness of YouTube. YouTube was rated ineffective by a large number of respondents, 12 (44%), since it has not been explored as a vehicle for providing quality services in libraries. It was found to be effective by eight (30%) respondents, with one (4%) and three (11%) respondents rating it very effective and somewhat effective respectively.
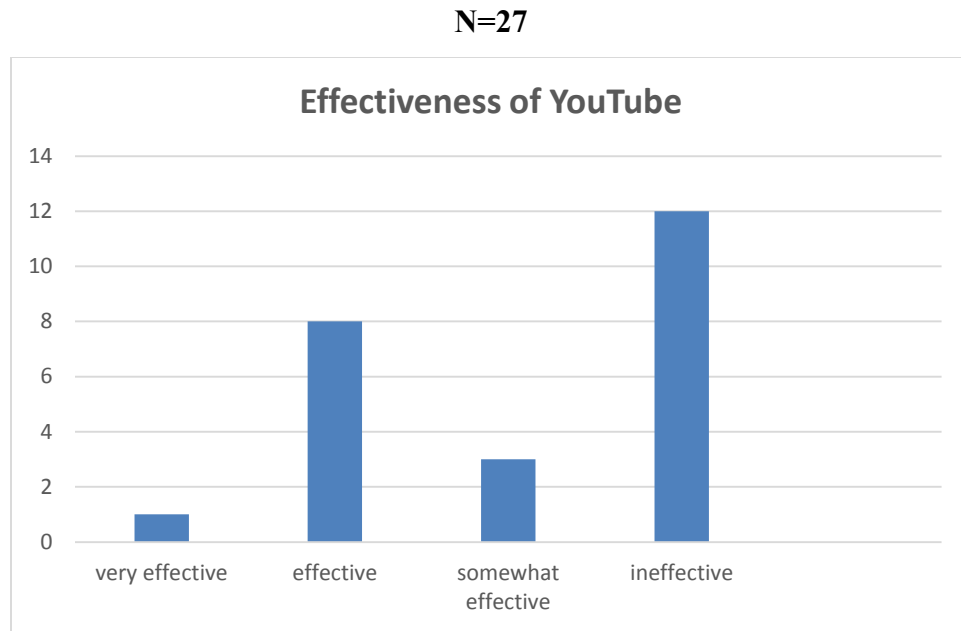
Figure 5.4: Effectiveness of YouTube

Source: Researcher

5.4.5.3 Twitter

Responses regarding the effectiveness of Twitter are presented in Figure 5.5 below. Figure 5.5 clearly shows that Twitter was perceived to be ineffective by the majority of the respondents, 21 (78%), not because it was useless as a marketing tool, but by virtue of non-use by the various libraries, as reported by the librarians who were studied. It was rated effective and somewhat effective by one (4%) and two (7%) respondents respectively.

Effectiveness of Twitter

■ ineffective   ■ effective   ■ somewhat effective
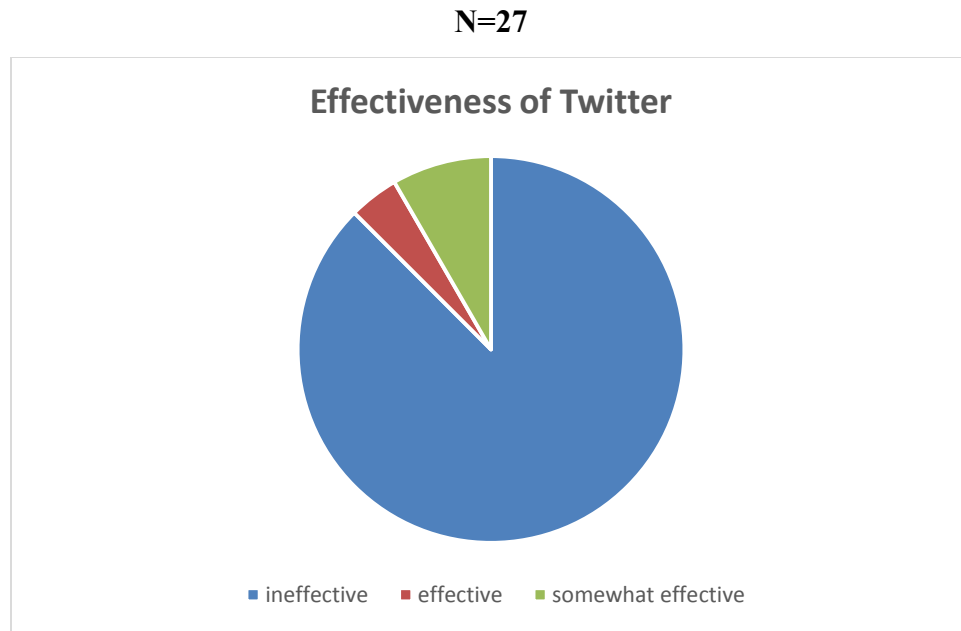
Figure 5.5: Effectiveness of Twitter

Source: Researcher

5.4.5.4 Flickr

None of the respondents used Flickr in their libraries and the reasons for the non-use were not provided.

5.4.5.5 LinkedIn

Academic librarians' views regarding the effectiveness of LinkedIn are presented in Figure 5.6 below. Both the respondents who rated LinkedIn very ineffective, two (7%) and ineffective, 16 (59%), cited the same reason for its ineffectiveness, that is, although it is not used by the library, it is used by librarians in their professional/personal capacity. Interestingly, that is the same reason academic librarians who considered it somewhat effective, five (19%), and one (4%), provided to substantiate their choices. These responses indicate that the effectiveness of LinkedIn is limited to professional use by librarians. It does not extend to the enhancement of library services.

Effectiveness of LinkedIn

somewhat effective	
effective	
ineffective	
very ineffective	
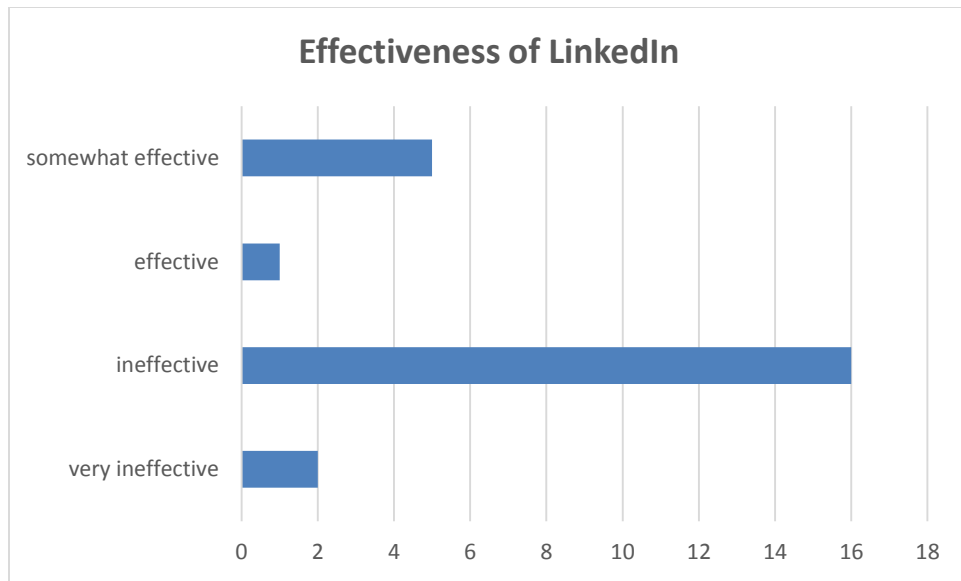
Figure 5.6: Effectiveness of LinkedIn

Source: Researcher

5.4.5.6 Blogs

Many academic librarians, 13 (48%), thought blogs were not effective in their libraries. The ineffectiveness of blogs was due to their non-use in respondents' libraries, 11 (41%), as well as outdated information posted on blogs, two (7%). Figure 5.7 presents the respondents' views on the effectiveness of blogs. A total of seven respondents (26%) rated blogs effective and four (15%) somewhat effective. Of the seven respondents who rated blogs effective, one respondent (14%) reported that blogs provided staff the platform to engage in Library and Information Services (LIS) matters.
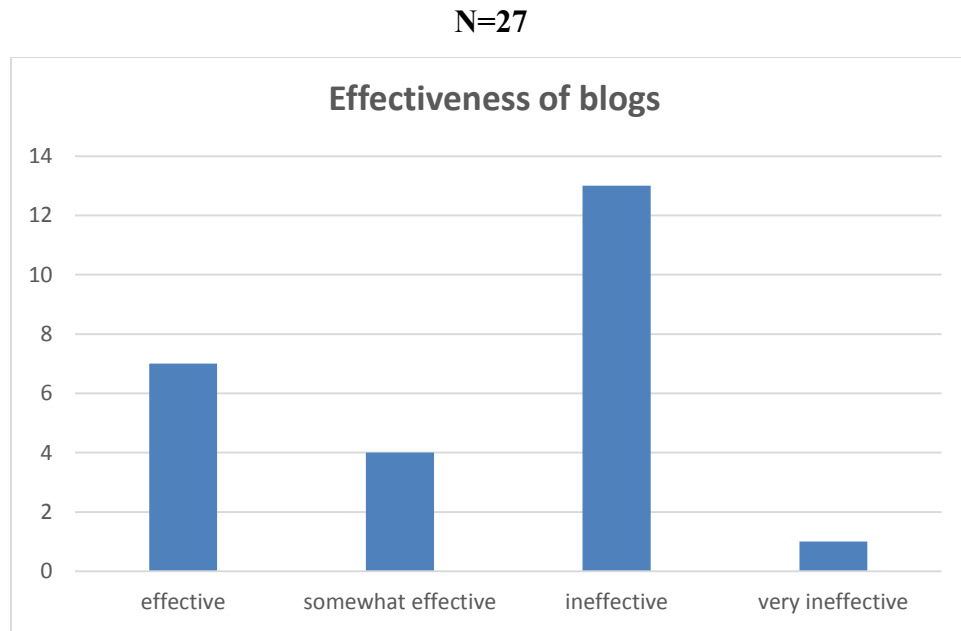
Figure 5.7: Effectiveness of blogs

Source: Researcher

5.4.5.7 Wikis

An overwhelming majority of respondents, 23 (85%) regarded wikis ineffective due to non-use in their libraries, with one respondent (4%) rating wikis somewhat effective. Some of the reasons for the non-use of wikis were:

- change of staff responsible for introducing and managing wikis due to retirement, one (4%);
- *the library has a wiki that is used by library staff, but it is hardly ever used*, one (4%); and
- *the library has a few erratic wikis*, one (4%).

Thus, wikis were the least used Web 2.0 technology in the academic libraries in South Africa.

5.4.6 Value of Web 2.0 technologies

The 12 library directors and deputy directors who had indicated that their libraries use Web 2.0 technologies were then asked whether the value of Web 2.0 technologies had been measured. Their responses are presented in Figure 5.8 below. Although nine (75%) of the library directors stated that these technologies had not been measured, they reported that they tracked the users' responses to library posts on the various Web 2.0 platforms and checked user stats regularly. The three library directors (25%) who stated that the value of Web 2.0 technologies was measured in their libraries mentioned statistics, surveys and quarterly reports as tools they used to measure the value of these technologies in their libraries.

N=12
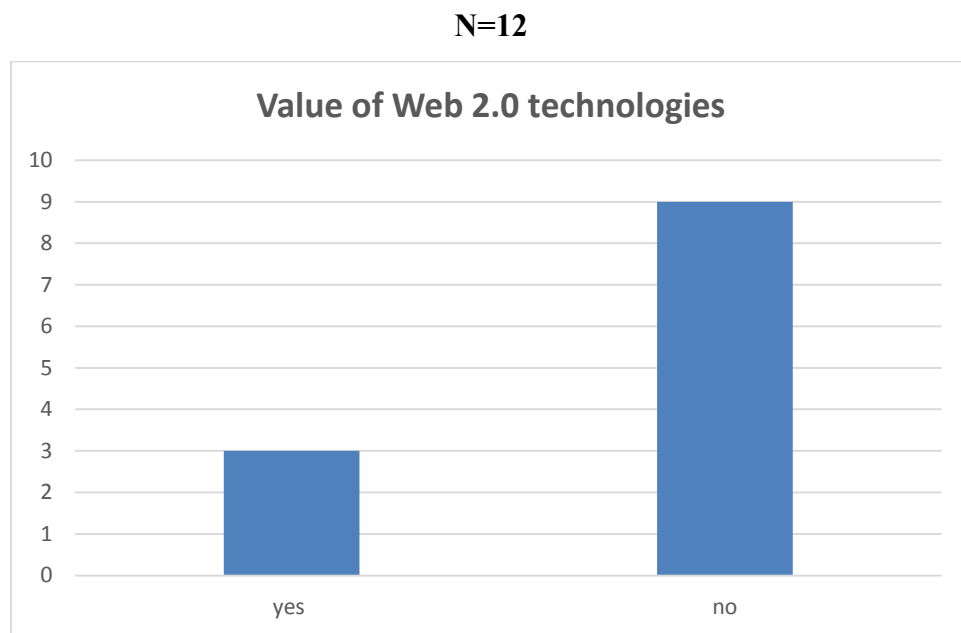
Figure 5.8: The value of Web 2.0 technologies

Source: Researcher

5.4.7 Impact of Web 2.0 technologies

The questions asked in this section focused on the impact of Web 2.0 technologies in libraries, for example, the users' views on these technologies, the preparedness of staff and plans to sustain the use of Web 2.0 technologies.
Academic librarians were asked if their libraries had gathered any information on the use of Web 2.0 technologies. They responded as follows:

Almost two thirds of academic librarians, 17 (63%) stated that the library had not gathered any information from users regarding the use of Web 2.0 technologies and only eight (30%) librarians responded that such input was solicited from users, with one librarian further stating that he/she drafted a survey to collect information on what users thought of the technologies.

5.4.8 Preparedness for use of Web 2.0 technologies

With regards to the preparedness of librarians (in terms of skills and knowledge) to use Web 2.0 technologies, almost two thirds of academic librarians, 17 (63%) agreed that librarians were indeed equipped in terms of skills and knowledge, to play an active role in the Web 2.0 arena. The preparedness was attributed to the training librarians received prior to the implementation of these technologies in their libraries and also their personal use of Web 2.0 technologies. This perspective was confirmed by 17 (63%) librarians in response to a question to determine whether training was provided prior to the implementation of these technologies. Nine (33%) respondents however, reported that librarians in their libraries are not equipped to play a meaningful role in the Web 2.0 arena as no training was given.

After indicating whether librarians in their libraries were equipped to use Web 2.0 technologies, academic librarians were then asked if their libraries experienced any challenges when Web 2.0 technologies were introduced.

The results show that implementation of Web 2.0 technologies was accompanied by challenges, as indicated by more than half of the libraries, 15 (56%). The challenges libraries faced were as follows:

- resistance to change, three (20%);
- lack of interest, two (13%);
- lack of staff, one (7%);
- lack of skills, two (13%);
- lack of support from the IT Department, one (7%); and
- university policy on social networks, one (7%).

Figure 5.9 below illustrates the multiple responses received from academic librarians. It is evident that the biggest challenge that was encountered was staff's reluctance to embrace new technologies, not wanting to change. However, some respondents, 10 (37%), reported that no challenges were experienced when Web 2.0 technologies were introduced in their libraries.

N=27
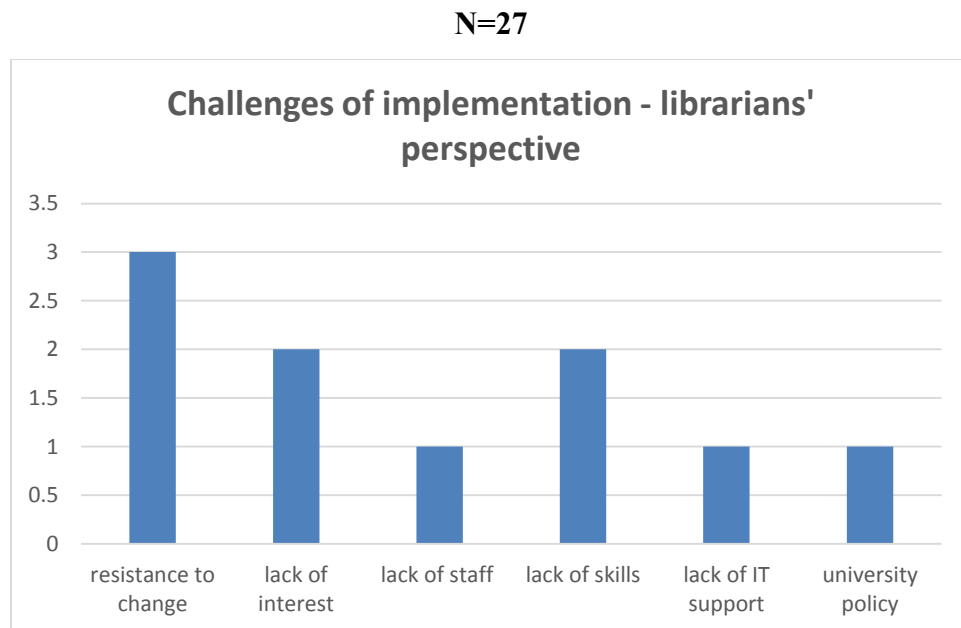
Figure 5.9: Challenges of implementation of Web 2.0 technologies – librarians' perspective

Source: Researcher

144

5.4.9 Sustainability of Web 2.0 technologies

An overwhelming majority of library directors, eight (67%) reported that there were plans in place to ensure the sustainability of Web 2.0 technologies in library programmes and activities. They cited a number of reasons to support that assertion, as per their multiple responses below:

- *A marketing team was set up to develop the marketing plan. Web 2.0 technologies are part of the marketing plan*, one (13%);

- *As users are already on these platforms, there is no going back. Web 2.0 is here to stay*, one (13%);

- *The use of Web 2.0 technologies is part of the library's long-term goals. The library is actively looking to improve how these technologies are used*, one (13%);

- *The responsibility for Web 2.0 technologies is no longer an add-on. It has been incorporated into the services the library offers*, one (13%);

- *The library intended to continue to grow its content on Facebook*, one (13%);

- *A computer centre had been established to ensure the sustainability of the use of Web 2.0 technologies*, one (13%);

- *As the library had adopted Web 2.0 technologies, it intended to keep using them and invest in improvements*, one (13%);

- *The Head of LIS is involved in the marketing plan. The marketing plan ensures that services remain relevant. The use of Web 2.0 technologies is incorporated into the marketing plan,* one (13%); and

- *There is close collaboration with the university's ICT services, who provide and improve the platforms and access*, one (13%).

Interestingly, even the directors, all four of them (33%), who stated there were no plans in place to ensure the sustainability of the use of Web 2.0 technologies in their libraries, provided explanations that clearly indicated their institutions' desire to improve the use of these technologies and ensure continued use, as per their multiple responses below:

- *There is an Assistant Director who is working with a committee to take Web 2.0 technologies forward*, one (25%);

- *The library is constantly on the lookout for new technologies that come up so that they can also be adopted*, one (25%);
- *The library advertises workshops on Facebook*, one (25%);
- *All items are sent to the marketing person*, one (25%); and
- *There needs to be rigorous marketing of these technologies*, one (25%).

These responses show that there are plans in place to ensure continued use of Web 2.0 technologies in academic libraries.

5.5 Reasons for implementation or non-implementation

This question sought to ascertain the reasons for implementing or not implementing Web 2.0 technologies.

5.5.1 Reasons for implementation

Library directors gave the following reasons for implementing Web 2.0 technologies in their libraries. The reasons provided were:

- The need to market services/communication tool, seven (58%);
- *Most libraries are using these technologies and the library had to be in line*, three (25%);
- *Web 2.0 is the buzzword in academic libraries. Users are using Web 2.0 technologies,* eight (67%); and
- *To be the library of the 21st century*, one (8%).

It is evident, from the reasons provided above, that the implementation of Web 2.0 was intended to keep abreast of trends and technological developments taking place in academic libraries and also to market services and communicate effectively with library users.

5.5.2 Reasons for non-implementation

The two library directors, who had indicated that their libraries do not use Web 2.0 technologies, gave the following reasons for not implementing Web 2.0 technologies:

146

- *University policy that prohibited the use of social media, one (50%). The ban on the use of social media was due to bandwidth restrictions*; and

- *The library lacked capacity, in terms of staff and skills, to play an active role in Web 2.0 platforms,* one (50%).

5.5.3 Impact of implementation

Library directors gave the following factors as advantages of using Web 2.0 technologies:

- Visibility, one (8%);

- Occupying the same space as users, five (42%);

- Effective, timeous communication, seven (58%);

- Ability to meet users' needs effectively, one (8%); and

- Keeping up with trends, five (42%).

Therefore, providing effective, timeous communication appears to be the primary benefit of using Web 2.0 technologies. The ability to share the same space that users of academic libraries occupy and the importance of keeping up with trends, which make libraries relevant to their users, have been identified as advantages of implementing Web 2.0 technologies.

5.5.4 Impact of non-implementation

Both library directors who reported that Web 2.0 technologies were not used in their libraries cited a lack of effective communication with users as the disadvantage of not using Web 2.0 technologies.

5.5.5 Processes for implementation

The responses library directors or deputy directors provided to the question of what processes were followed to implement Web 2.0 technologies included the following. The results are presented in Figure 5.10 below. The multiple responses received were as follows:

- *Policy – the library had to ensure adherence to the university's social media policy,* one (8%);
- *The responsibility for Web 2.0 technologies/Facebook was given to a skilled person/driver of Web 2.0 technologies,* three (25%);
- *The use of Web 2.0 technologies was incorporated into the strategic plan,* five (42%);
- *Collaborated with ICT,* one (8%);
- *Discussions between librarians and library management on devising ways of implementing Web 2.0,* one (8%);
- *It was initially adopted by the marketing team/part of the marketing plan,* three (25%); and
- *It was approved by senior personnel,* one (8%).

The responses provided clearly indicate that the decision to implement Web 2.0 technologies was a strategic initiative which was encapsulated in the libraries' strategic plan.

N=12
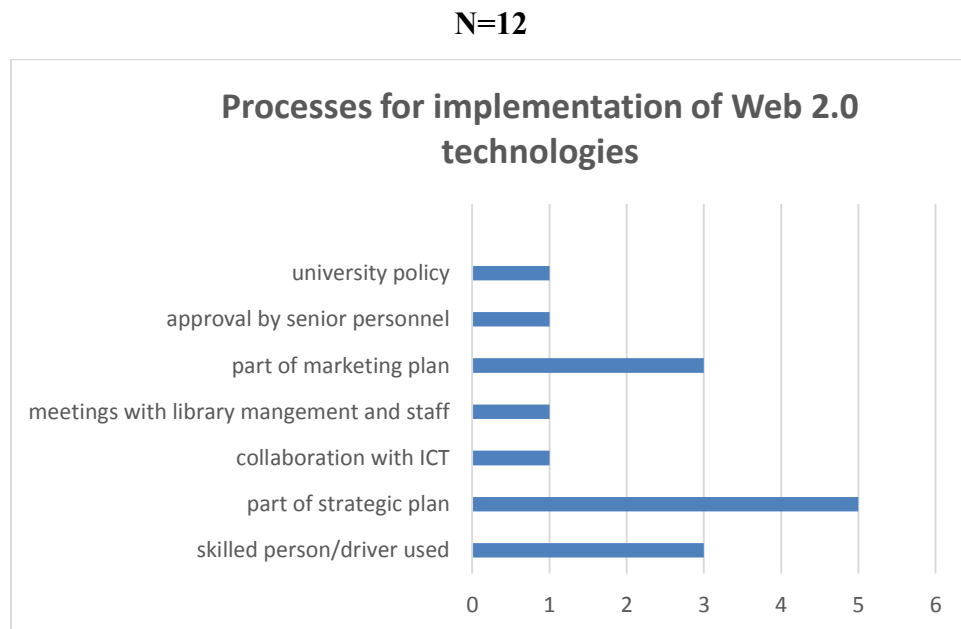
Figure 5.10: Processes for the implementation of Web 2.0 technologies

Source: Researcher

5.5.6 Challenges of implementation/non-implementation

The purpose of this question was to find out from library directors or deputy directors if libraries encountered any challenges when Web 2.0 technologies were implemented and what those challenges were. According to the responses to the semi-structured interviews with library directors, libraries which encountered challenges, seven (58%), were more than those that did not, five (42%). The challenges encountered were as follows:

- *Initially there was no dedicated person. People posted trivial information,* two (29%);
- *Monitoring Facebook is time-consuming if it is an add-on,* one (14%);
- *The uptake is not fast enough,* one (14%);
- *Resistance to change,* three (43%);
- *Lack of skills,* one (14%);
- *Had to experiment with a lot of Open Source software,* one (14%);
- *Fear of the unknown,* one (14%);
- *Financial resources,* one (14%); and
- *Lack of interest from students*, one (14%).

The five libraries (42%) that did not encounter any challenges when Web 2.0 technologies were implemented stated the following reasons:

- *Implementation was from ICT, not the library,* one (20%);
- *Implementation was handled by the Marketing Department,* one (20%);
- *Collaboration between the Library Project Team and ICT ensured a hassle-free implementation,* one (20%);
- *Because librarians used Web 2.0 technologies personally, they found it easy to use for work purposes,* one (20%); and
- *Although the uptake was slow initially, it is starting to pick up,* one (20%).

These responses clearly indicate that partnerships with other university departments such as Marketing and ICT enabled libraries to implement Web 2.0 technologies smoothly. Figure 5.11 below provides a graphic presentation of the multiple responses the library directors gave.
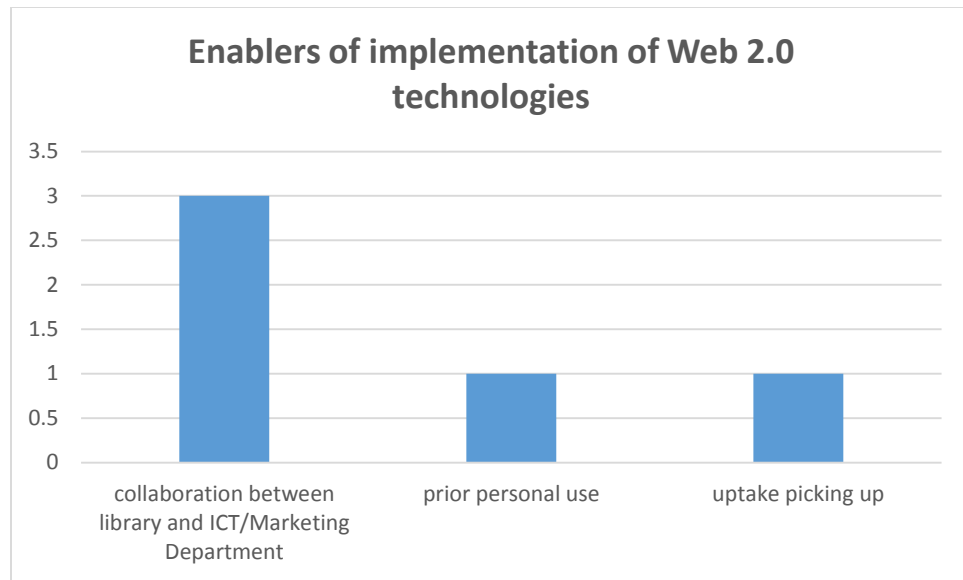
Figure 5.11: Enablers of the implementation of Web 2.0 technologies

Source: Researcher

It is interesting to note that there is agreement from both the librarians and library directors that challenges were experienced when Web 2.0 technologies were implemented, with both groups citing resistance to change as the major challenge libraries faced.

Figure 5.12 below illustrates the views of both groups of respondents regarding the challenges associated with the implementation of Web 2.0 technologies in academic libraries.
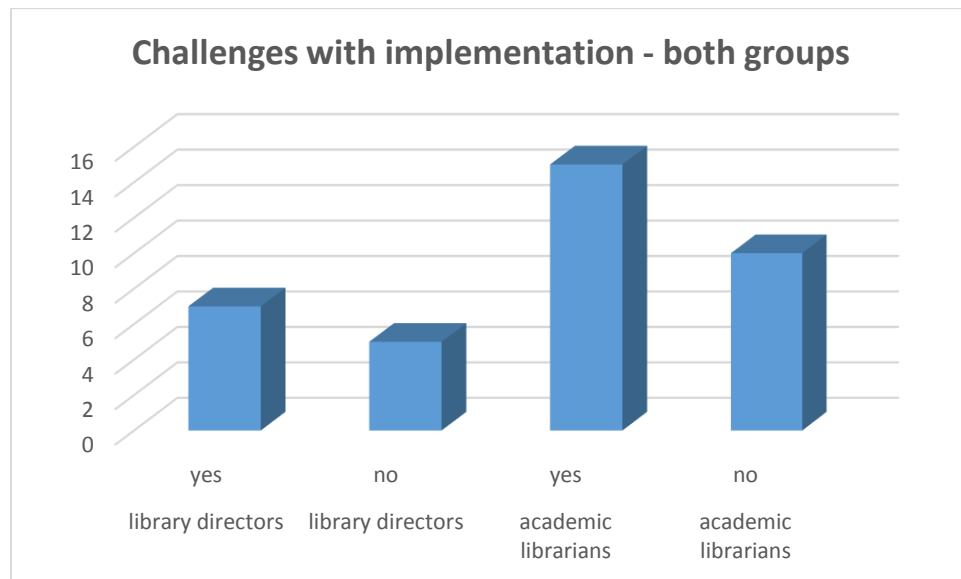
Figure 5.12: Challenges with implementation – both groups
Source: Researcher

Figure 5.13 below provides a combined tabulation of the types of challenges articulated by both groups. Resistance to change emerged as the major challenge that was encountered in libraries when Web 2.0 technologies were introduced.
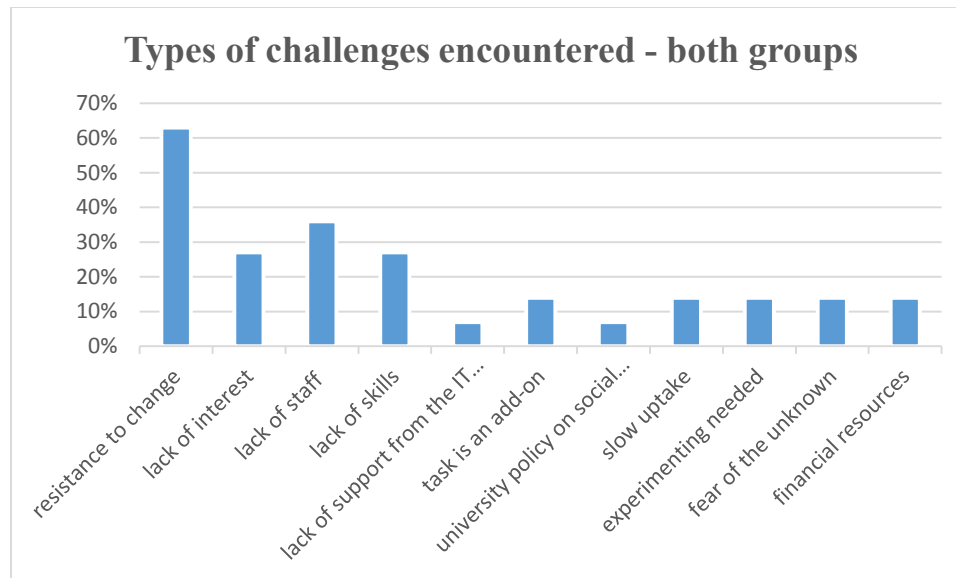
Figure 5.13: Types of challenges encountered – both groups

Source: Researcher

5.5.7 Strategies used to overcome challenges

Having listed the challenges libraries encountered with implementing Web 2.0 technologies, this question aimed at ascertaining how those challenges were overcome. The various strategies libraries used to overcome the challenges that were experienced with the implementation of Web 2.0 technologies were:

- Marketing, one (8%);
- Increased activity on the page, one (8%);
- Change management strategies, one (8%);
- Financial support from the university executive, one (8%);
- Re-allocation of resources, one (8%);
- Staff training, two (16%);
- Incorporated Web 2.0 in job profiles, two (16%);
- Have a dedicated person to edit submissions before they are uploaded, one (8%);
- Established a new portfolio responsible for Web 2.0 technologies, three (25%); and
- Created a library Facebook account, one (8%).

152

It is evident, from the responses given above, that a new portfolio dealing with Web 2.0 technologies had to be established in order to counteract the challenges that had been raised.

5.5.8 Future plans

This question applied to those libraries that did not implement Web 2.0 technologies only. The purpose of the question was to find out if the libraries that did not use Web 2.0 technologies had any plans to incorporate these technologies in future. Both libraries that had indicated earlier that they did not use Web 2.0 technologies reported that there were plans to incorporate these technologies in future. Their responses were as follows:

- *The university is extending bandwidth*, one (50%); and
- *The library will include social media in the new vacancies so that there will be social media champions*, one (50%).

The strategies put forward by the two library directors indicate a change of policy or procedures to accommodate the implementation of Web 2.0 technologies in the near future.

5.6 Remedial measures

Having shared their practices and experiences with Web 2.0 technologies in their libraries, academic librarians were finally asked to make any comment they wished to make on the use of Web 2.0 technologies in academic institutions in South Africa and the multiple responses received were as follows:

- *We want to introduce more social media tools,* one (4%);
- I*t is very important for the library to be up-to-date about such technologies, so as to be on par with the rest of the world,* one (4%);
- *The use of Web 2.0 is very important. Our libraries need to use them as our users are advanced and would love to interact through them,* one (4%);
- *The issue is the --- library especially in ------ does not show willingness to learn ICT-related matters. We always have or experience network problems but that does not mean we can use that as a scapegoat for not doing what librarians are supposed to do. In my*

campus, the big problem is that librarians are divided and do not support each other, one (4%);

- *There are too many social networks and keeping abreast of all of them is a challenge at times,* one (4%);

- *Libraries are still dependent on University Web 2.0 tools. As an employee of this Library, I feel that these tools could really benefit the library in engaging with our users efficiently,* one (4%).

- *The library needs to have a team of librarians that can work with each of the Web 2.0 technologies and determine their sustainability for LIS*, one (4%);

- *The library needs to ensure that librarians are given opportunities to communicate and disseminate information using the various Web 2.0 technologies,* one (4%);

- *Continuous training and development throughout the year, of library staff is a must. Also vendors of databases that are purchased should be obligated to offer free training of their websites, since we are subscribing to it anyway. Same goes for technology, new devices should be purchased and training should be offered to staff,* one (4%);

- *Librarians are not ahead with Web 2.0 and students are ahead,* one (4%);

- *In informal discussions with students, they feel social media is for personal connections. They are not interested in connecting with the library. They prefer different channels*, one (4%);

- *In my observation academic libraries are still having difficulty in academic engagement with users. The communication is mostly one way although it reaches the users. Academic librarians are not as enthusiastic as I would like to see in embracing Web 2.0 technologies. This could be because the efforts that they currently make with the technologies do not demonstrate return on the time and effort invested in them*, one (4%);

- *It takes dedication and commitment to make these tools successful in communicating with library clients*, one (4%);

- *We need to continue to grow with new trends and technologies,* one (4%);

- *As librarians we must brace ourselves for the changes in technology without compromising the library profession or promoting its demise,* one (4%);

- *Library Web 2.0 applications are interactive. However, many librarians are not equipped with the necessary skills to use these technologies. Ideally, this should be taught as a*

course in the LIS curriculum which will help upcoming librarians with skills to continue with contemporary user services. Librarians need to meet the demands of researchers for better access to library resources and make use of Web 2.0 technologies to deliver better services. It is critical for library management to appoint a librarian who will start the process and be responsible for updating all social media platforms, one (4%);

- *Technology is changing and is changing fast, the only constant is change and academic libraries need to change to remain current and relevant and Web 2.0 technologies can be a good starting point. Failure to remain current and relevant to provide the needs of the current users, academic library services will decline and eventually perish. When the environment is changing like a library environment more leaders are needed to implement change than managers who seek to manage the status quo*, one (4%); and

- *It is very important for the library to be up-to-date about such technologies, so as to be on par with the rest of the world*, one (4%).

The themes that emerged from the responses received are summarised in Figure 5.14 below.

N=27
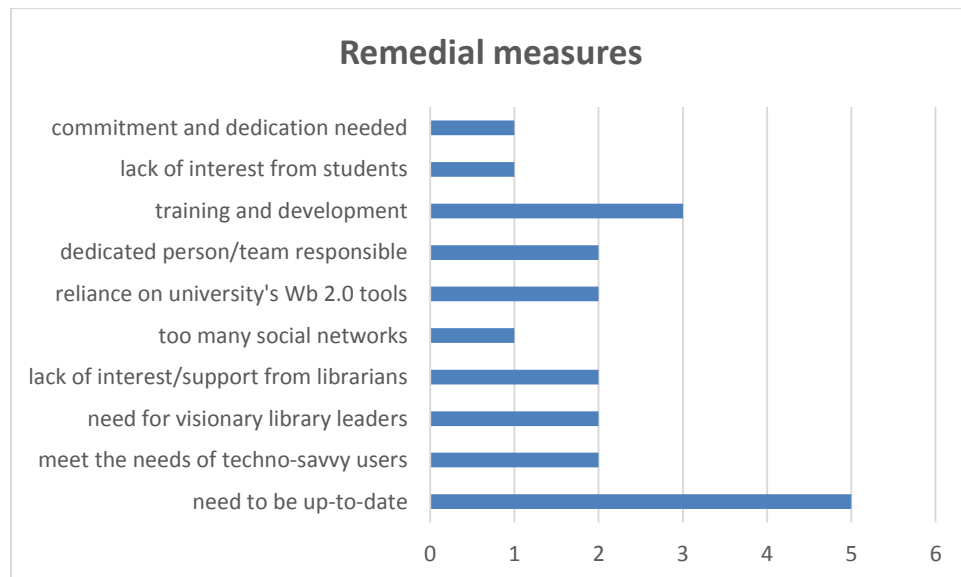
Figure 5.14: Remedial measures

Source: Researcher

155

The responses provided clearly show that the importance of Web 2.0 technologies cannot be ignored if libraries want to keep up-to-date with technological developments that are taking place locally and globally.

5.7 Summary of the chapter

The three research objectives, which were outlined in 5.2 at the beginning of this chapter, were used to present the data that was collected from the library directors and academic librarians. The data presented in this chapter was based on 41 responses from the 14 library directors and 27 academic librarians, who participated in the study. Telephone interviews were conducted with library directors and a link to the self-administered questionnaire was emailed to academic librarians.

The results showed that there were more libraries that used Web 2.0 technologies than those that did not. The results also showed that Facebook was the most commonly used Web 2.0 technology, followed by Twitter, blogs, Flickr, wikis, and so forth. This finding corroborates the literature presented in Chapter 3, in which Facebook was found to be the most popular Web 2.0 tool used in academic libraries in Africa, an assertion that was also confirmed by the usage statistics globally (presented in Figure 7 of Chapter 3).

The results further showed that even in those libraries that did not use Web 2.0 technologies, there were plans to incorporate these technologies in future. Study participants agreed on the importance of Web 2.0 technologies to provide relevant, high quality services to library users. The interpretation of the results of the data that was collected is presented in the next chapter, which is Chapter 6.

Chapter 6: Interpretation of the results

The primary focus of the previous chapter, Chapter 5, was to present the results of the study that was conducted. The study sought to determine the use of Web 2.0 technologies in academic libraries in South Africa. A total of 51 academic librarians, including library directors or deputy directors constituted the population of the study. Data was collected from academic librarians using an online questionnaire, together with a few print copies that were distributed during the LIASA and Sabinet Conferences, which were held in 2016 and 2015 respectively. Semi-structured interviews were used to collect data from library directors.

6.1 Introduction

The purpose of this research was to explore the use of Web 2.0 technologies in facilitating access to information to library users. Data about Web 2.0 technologies was collected from the study participants, using both the questionnaire and semi-structured interviews. The collected data was presented in Chapter 5. In this chapter, the results of the study are analysed, so that conclusions can be derived and recommendations made. The conclusions and recommendations are covered in the last chapter, Chapter 7.

To recap, there are three research objectives that underpinned the study, which are:

1. To determine the extent of use of Web 2.0 technologies by academic librarians to make information accessible to users;

2. To ascertain the reasons for the adoption or non-adoption of Web 2.0 technologies by some academic librarians in South Africa; and

3. To put forward remedial measures for adopting Web 2.0 technologies at the UKZN Library, drawing on the experiences of those academic libraries in South Africa which have successfully implemented these technologies. This objective will be discussed in detail in Chapter 7, which outlines conclusions and recommendations.

The research objectives were divided into three broad themes. As mentioned in Chapter 5, these themes are:

- Extent of use;

- Reasons for adoption or non-adoption; and

- Remedial measures.

Discussion of these themes addresses the key questions that emanated from the research objectives, which were mentioned in Chapter 1 under 1.4. These questions are:

1. What were the reasons for choosing to incorporate Web 2.0 technologies into library programmes and services?

2. What processes were followed in accomplishing this goal?

3. What were the implications of the implementation of Web 2.0 technologies for library staff?

4. What challenges were encountered in the implementation of Web 2.0 technologies?

5. How were these challenges overcome?

6. Has the value and impact of these technologies been measured?

7. Are there any plans in place to ensure the sustainability of these technologies in library programmes and services?

The study also answered the following questions in respect of institutions that have not embraced these technologies:

8. What were the reasons for not choosing to incorporate Web 2.0 technologies into library programmes and services?

9. What was the impact of this decision on the library service?

10. In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?

11. Were there any plans to incorporate Web 2.0 technologies in future?

This chapter reflects on the findings of the study, in the light of the key questions the study sought to answer regarding the use of Web 2.0 technologies in academic libraries in South Africa. The excellent response rate that was achieved (80.3%), makes it possible to make generalizations about the whole study population.

6.2 The use of Web 2.0 technologies in academic libraries in South Africa

Web 2.0 tools are rapidly gaining popularity in all walks of life (Mahmood and Richardson 2011:368). Individuals of all ages are increasingly using Web 2.0 technologies, especially young people and university students (Dickson and Holley 2010). Web 2.0 is becoming a central topic in our information world (Aharony 2009:29). According to the literature (Pienaar 2010; Han and Liu 2010; McManus 2009, amongst others), the benefits of using Web 2.0 technologies in libraries are numerous, for example:

- They enable libraries to involve faculty and students in their activities and solicit their feedback for improvement in services (Mahmood and Richardson 2011);

- They provide a potentially effective method of student outreach (Dickson and Holley 2010);

- They enable academic librarians to reach students in their preferred environments in order to extend library services beyond the traditional library walls (Farkas 2007a);

- They enable academic librarians to repackage their materials into an environment that is more familiar to library users (Mathews 2007);

- They enable librarians and library users not only to interact, but to share and change resources dynamically in an electronic medium (Maness 2006),

- They facilitate online collaboration and information sharing (Penzhorn and Pienaar 2009);

- They develop a rich user experience by allowing users to contribute content (Coombs 2007);

- The momentum of "academic research could benefit enormously from adopting Web 2.0 ingenuity and functionality" (Wusteman 2009:171); and

- The use of Web 2.0 technologies enables librarians to fulfil in particular the goals set forth in points 3 and 5 of the IFLA/UNESCO Public Library Manifesto (1994), which address the need of providing opportunities for personal creative development and promoting awareness of cultural heritage respectively (Koltay 2010).

It is pleasing to note that Web 2.0 technologies are used in the majority of academic institutions surveyed in South Africa, as indicated by the 78% of the respondents. This shows that academic

libraries are not lagging behind their counterparts internationally. They have adopted some Web 2.0 technologies to enhance the design and delivery of services provided to users, in line with the assertion made by Kwanya, Stilwell and Underwood (2012b:187), that "libraries have to serve the user communities where they (users) live, and how they (users) live".

The findings also show some commitment to provide up-to-date services in the platforms that library patrons use, since the literature (Penzhorn and Pienaar 2009; Pienaar 2010; Prensky 2004; Gardner and Eng 2005) clearly states that the use of Web 2.0 technologies ensures that libraries keep abreast of technological developments locally and globally by occupying the same space their predominantly techno-savvy users occupy. Providing innovative services and resources that are responsive to users' needs plays a crucial role in ensuring that academic libraries remain relevant, especially if one considers the threats to their existence, which libraries face currently.

According to Kwanya, Stilwell and Underwood (2012a) several studies, such as Rosenberg (1997); Kavulya (2004); and so forth, have been conducted which revealed that the library is no longer the first point of call when users require information. Users have adopted alternative strategies of obtaining information from other sources. The students' over-reliance on Google, rather than using library databases, which has the potential to weaken the visibility and necessity of the library (Michalko, Malpas and Arcolio 2010), has been lamented by librarians (Adams 2010; Pienaar and Smith 2008). Adoption of Web 2.0 technologies enhances the library's visibility and increases its relevance to its clientele. Coincidentally, an OCLC-initiated study of 15 ARL member libraries revealed that there was "a reduced sense of library relevance from below, above and within" (Michalko, Malpas and Arcolio 2010:9). Simply put, irrelevance could be synonymous with extinction.

The findings of the study corroborate the literature that although academic libraries in South Africa have adopted the use of Web 2.0 technologies to deliver quality services, the uptake has been slow (Olasina 2011; Pienaar 2010). They also revealed that some libraries have not created their own Facebook pages and are therefore dependent on the university's Facebook account to post library-related information. This arrangement has its pros and cons. While such an

arrangement ensures posts are moderated by a dedicated person appointed by the university before they are uploaded, it unfortunately diminishes the library's autonomy in terms of the nature of information to be posted and the duration of the posts.

This slow uptake clearly indicates that although there is a new version of Web 2.0, which is called the semantic web or Web 3.0 (Hendler 2009), migrating to this newer platform might not be ideal for academic libraries as there are a number of challenges such as staff training, lack of dedicated staff, the need to familiarise users, university policies that prohibit the use of social networks, such as Facebook during office hours, and so forth, that must be overcome before any migration to a much improved platform happens. All librarians across the age spectrum need to be au fait with the technologies and be at ease enough to encourage users to take advantage of the numerous benefits of these technologies before adopting the advanced form of the current platform.

6.3 What were the reasons for choosing to incorporate Web 2.0 technologies into library programmes and services?

The importance of using Web 2.0 technologies to enhance various library services and programmes has been highlighted by various authors. For example, Abram (2006); Wawrzaszek and Wedaman (2008); Miller (2005), and so forth, maintain that using Web 2.0 technologies enables libraries to:

- Share content and ideas (Miller 2005);
- Provide better library services, even for distance students (Tripathi and Kumar (2010);
- Improve communication with users and facilitate networking (Rethlefsen, Piorun and Prince (2009);
- Market library services, post announcements, photos, provide chat, reference and have a presence in the social networks (Hendrix, et al. 2009).

Technological developments, which also include the emergence of Web 2.0 technologies, have given rise to a new breed of library users, who are dependent on web-based resources for their information requirements (Gichora and Kwanya 2015). The versatility of web-based information

resources, in terms of accessibility and ease of use, make them the preferred methods of information provision to library users, especially the N-generation.

The findings of the study show that the desire to provide relevant services, just-in-time information, occupy the same technological space users occupy, the need to be a twenty-first century library and to be on par with other academic institutions nationally and globally, played a pivotal role in the decision to adopt these technologies. This was confirmed by the majority of the library directors to whom the question was posed. This is an indication of visionary leadership on the part of library directors, in spite of a number of uncertainties/severe constraints they have to contend with, in terms of staff and/or budget cuts, and so forth (Michalko, Malpas and Arcolio 2010). They are the people who have been entrusted with the responsibility of being vision-bearers for the different institutions that employ them. The ability to gauge the developmental and technological forces that are at play in higher educational institutions, matched with the ability to effectively mitigate those forces for the benefit of the user, is the necessary requisite for the provision of well-timed, relevant services that will ultimately keep libraries from extinction.

6.4 What processes were followed in accomplishing this goal?

According to Wawrzaszek and Wedaman (2008), services in academic libraries will continue to be crucial to the core processes of learning, teaching and research as long as key library structures, processes, services and staff roles evolve to accommodate the epochal changes occurring in the information environment. Web 2.0 is about change. A number of authors, such as O'Reilly (2005); Han and Liu (2010) and Miller (2005) define Web 2.0 as "a perceived second generation of web-based communities and host servers that facilitate collaboration and sharing between users, referring to a change in the way that the platform is used" (Harinarayana and Raju 2010:70).

For any change to be implemented successfully, careful planning is a pre-requisite. Otherwise, change will be haphazard and ineffective, thus defeating the purpose of its implementation. The implementation of Web 2.0 technologies in academic libraries in South Africa introduced a new

way of relating to library users, it necessitated a change of thinking for librarians, as mentioned by a number of library directors during the interviews.

The findings reveal that careful planning preceded the implementation of Web 2.0 technologies. The incorporation of Web 2.0 technologies into the library's strategic plan, as mentioned by 42% of library directors, clearly shows the value library executives saw in these technologies. As strategic plans are a result of extensive consultations with all key stakeholders, the commitment to get a buy-in from library staff cannot be ignored.

The findings of the study are in line with the literature. For example, Penzhorn and Pienaar's study (2009) confirms that reference librarians at the University of Pretoria (UP) were given training in a variety of Web 2.0 technologies, such as Facebook, Flickr, YouTube and Blogger, to prepare them for effective adoption, prior to the implementation of these tools. Training prior to the adoption of Web 2.0 tools was also recommended by respondents in the study conducted by Kwanya, Stilwell and Underwood (2012a).

In addition to capturing the implementation of Web 2.0 technologies in the strategic plan, the responsibility of managing the use of Web 2.0 technologies was assigned to the marketing team, which incorporated the use of these technologies into the library's marketing plan and a person with knowledge and skills was identified to drive the project, as stated by 25% of library directors respectively.

Other processes that were followed in the implementation of Web 2.0 technologies included ensuring adherence to the university's social media policy, obtaining approval from senior personnel, collaborating with ICT and holding ongoing discussions with library management and staff to devise ways of how best to implement Web 2.0 technologies, as stated by one respondent respectively. The results show that there were clearly defined and well thought-out plans to implement Web 2.0 technologies, which also points to a deep-seated commitment to the success of the implementation.

6.5 What were the implications of the implementation of Web 2.0 technologies for library staff?

The results of the study clearly indicate that the implementation of Web 2.0 technologies had an impact on staff. This view was expressed by all the library directors who had indicated that their libraries used Web 2.0 technologies. In some libraries, as indicated by 42% of library directors, a competent person with the necessary skills and knowledge, had to be identified in order to carry out the responsibility of managing Web 2.0 technologies for the library. Such a person was identified based on their interest and familiarity with Web 2.0 technologies, which included use of these technologies in their personal lives.

The implementation of Web 2.0 technologies called for a new way of functioning, that is, abandoning the old ways of interacting with users, and adopting new, effective ways of engaging users, as expressed by 33% of library directors. Since the use of Web 2.0 technologies was a new way of engaging with library users, 25% of library directors reported that it was vital for staff to be trained in order to enable them to participate actively in the Web 2.0 arena, with 8% indicating that the implementation was met with excitement in the library.

As stated earlier, Web 2.0 is about change. It involves a change in the design and delivery of library services and resources (Kwanya, Stilwell and Underwood 2012a). As user satisfaction levels deteriorate due to a lack of understanding of changing user needs (Michalko, Malpas and Arcolio 2010), academic librarians need to devise innovative ways of meeting user needs. The needs of today's users cannot be met using the outdated methods of information delivery. Moravec (2015) aptly captured this sentiment in Manifesto 15, when he said that "1.0 schools cannot teach 3.0 kids". The changing environment in which libraries operate makes library service tools seem outdated and less satisfying to users (Sadeh 2007:314).

6.6 What challenges were encountered in the implementation of Web 2.0 technologies?

The question of whether there were any challenges that were encountered when Web 2.0 technologies were implemented was asked of both groups of respondents, that is, academic librarians and library directors, in order to ascertain the views of both groups on this issue from two perspectives. Academic librarians provided their views from the operational standpoint as people who had to implement the idea, whereas the library directors' input was from a strategic viewpoint as they are decision makers responsible for introducing new ideas and methods of operations.

It is interesting to note that both groups agreed that there were challenges that the libraries encountered when Web 2.0 technologies were implemented, although the percentages vary slightly. For example, 56% of academic librarians and 58% of library directors stated that challenges were experienced when these technologies were introduced in their libraries. It can be deduced, from the responses of library directors and academic librarians, that the introduction of Web 2.0 technologies was not a hassle-free process. It was accompanied by various challenges which library directors and librarians had to grapple with.

Furthermore, both groups agreed that the main challenge was resistance to change, that is, staff's reluctance to embrace the new way of engagement, as expressed by 20% of the academic librarians and 43% of library directors. This lack of enthusiasm was due to a lack of skills (13% of academic librarians) to participate effectively in Web 2.0 platforms and a lack of interest (13% of academic librarians) in using the new technologies. Lack of staff to drive the introduction and implementation of Web 2.0 technologies, lack of support from the IT Department and university policy that prohibited the use of social media, were each mentioned by 8% of the academic librarians respectively.

Resistance to change was perceived by both the library directors and academic librarians as the main challenge that was experienced when Web 2.0 technologies were introduced. Lack of interest, lack of dedicated personnel and lack of skills also featured prominently in the list of challenges libraries had to contend with.

It must be noted the challenges faced by the South African academic libraries when Web 2.0 technologies were introduced are not unique. Other academic libraries, especially in Africa, experienced similar challenges when they adopted Web 2.0 technologies. For example, Kwanya, Stilwell and Underwood (2012a:14) reported that academic libraries in Kenya had to grapple with these challenges when Web 2.0 technologies were adopted:

> "inadequate ICT infrastructure; inadequate, unstable bandwidth; lack of technical skills amongst the librarians and library users to make the best use of the tools; conservative culture and natural lag in adopting new technology; ignorance or lack of appreciation of the potential of Web 2.0 tools especially amongst the older users; lack of supportive policies, strategies and plans; perceived low credibility of Web 2.0 content; and inadequate financial resources".

Academic libraries in Tanzania also experienced similar challenges. The challenges experienced included poor technological infrastructure, such as low internet bandwidth, prohibitive cost of educational technologies, lack of technical support, high cost of internet connectivity and low awareness of Web 2.0 technologies (Lwoga 2012).

Although challenges were experienced in many libraries that were studied, as indicated by 56% of the academic librarians and 58% of library directors respectively, there are libraries that did not encounter any challenges when these technologies were introduced in their libraries (40% combined). A number of factors which contributed to a smooth implementation, were put forward. These factors were presented in Figure 5.11 of Chapter 5. However, it must be noted that collaboration between the library and other university departments such as the ICT and Marketing Department, coupled with librarians' individual skills of using Web 2.0 technologies and enthusiasm with these technologies, facilitated a relatively problem-free implementation of Web 2.0 technologies in libraries. These are the lessons that can be learned that might benefit those institutions that are contemplating implementing Web 2.0 technologies.

6.7 How were these challenges overcome?

It must be noted that although academic librarians had highlighted a number of challenges they encountered with the implementation of Web 2.0 technologies, no strategies for overcoming these challenges were put forward. Library directors, on the other hand, provided a number of strategies their libraries employed to combat the challenges that arose. At least three libraries (25%) established a portfolio dedicated to managing Web 2.0 technologies and one (8%) assigned the responsibility of editing submissions before they were uploaded to a dedicated person. In two libraries (16%), Web 2.0 technologies were incorporated into people's job profiles. Staff training was used in two libraries (16%) to familiarise librarians with Web 2.0 technologies. The other strategies libraries used to overcome challenges were:

- Marketing, one (8%);
- Increased activity on the page, one (8%);
- Change management strategies, one (8%);
- Financial support from the university executive, one (8%);
- Re-allocation of resources, one (8%); and
- Created a library Facebook account, one (8%).

The findings show that assigning the responsibility of managing Web 2.0 technologies as well as including the responsibility for Web 2.0 technologies in staff' job profiles was effective in ensuring the successful implementation of these technologies in academic libraries. Literature advocates the use of existing skills, interest and appointment of champions to lead the implementation of Web 2.0 technologies in libraries (Adams 2010; Linh 2008; Prensky 2004; Xu, Ouyang and Chu 2009; Ahmed 2015).

6.8 Has the value and impact of these technologies been measured?

Despite the nine library directors' responses to the contrary, the findings indicate that the value of Web 2.0 technologies is measured in various ways. The usefulness of these technologies is measured by means of user statistics, tracking users' responses to posts, surveys and reports.

These methods of measurement provided a clear picture of how useful the technologies are to library users.

As Web 2.0 is about change, it is generally accepted that any change that is introduced must be monitored to evaluate its effectiveness. In fact, monitoring is part of the change management process which completes the change management cycle. Similarly, having introduced new technologies which prompted new ways of information delivery, it was necessary to measure the effectiveness of these technologies (Aharony 2009; Shoniwa and Hall 2007).

6.9 Are there any plans in place to ensure the sustainability of these technologies in library programmes and services?

All library directors mentioned the plans that have been put in place to ensure the sustainability of Web 2.0 technologies. The plans reported are wide ranging. These plans are presented in section 5.3.9 in Chapter 5. The plans reported on attest to the library directors' commitment to ensure continued use of Web 2.0 technologies. This commitment emanates from the benefit these technologies carry. As mentioned earlier, there is abundant literature that highlights the benefits of using Web 2.0 technologies (Minocha 2009; Anderson 2007; Mahmood and Richardson 2013).

The study also answered the following questions in respect of institutions that have not displayed eagerness to embrace these technologies:

6.10 What were the reasons for not choosing to incorporate Web 2.0 technologies into library programmes and services?

The findings of the study revealed that 17% of the respondents, which is made up of five academic librarians and two library directors, reported that Web 2.0 technologies are not used in their libraries.

An equal number of respondents, two (29%), cited the following reasons for not implementing Web 2.0 technologies in their libraries:

- University policy which prohibits the use of social media during working hours;
- The library is considering using Web 2.0 technologies in future; and
- The library does not have its own Facebook page. It uses the university's one.

Only one respondent (14%) cited a lack of capacity, both in terms of staff and skills, as the reason for the library's non-use of Web 2.0 technologies. The results of the study corroborate with the literature. The challenges experienced by academic libraries in South Africa resemble the challenges that were experienced in other countries, including Africa. The common challenges were prohibitive policies (Olasina 2011; Lwoga 2012), inadequate internet bandwidth (Kwanya, Stilwell and Underwood 2012a), lack of information about Web 2.0 (Penzhorn and Pienaar 2009; Pacheco, Kuhn and Grant 2010).

6.11 What was the impact of this decision on the library service?

Libraries that use Web 2.0 technologies reported the following factors as advantages of using Web 2.0 technologies:

- Visibility, one (8%);
- Occupying the same space as users, five (42%);
- Effective, timeous communication, seven (58%);
- Ability to meet users' needs effectively, one (8%); and
- Keeping up with trends, five (42%).

The ability to relay effective, timeous information to users is of paramount importance, especially in times of crisis such as during the recent FeesMustFall protest campaign. At least three library directors mentioned that the library made good use of social media platforms such as Facebook, Twitter and WhatsApp to disseminate pertinent information to both library staff and library users. It can be deduced, therefore, that the non-use of Web 2.0 technologies severely hampers the library's ability to communicate effectively and timeously with the clients/users, as pointed out by the two library directors. The two library directors further stated that it also diminishes the library's ability to occupy the same technological space library users are active in.

169

In addition to enhancing library services and resources, Web 2.0 in the educational context exhibits three advantages that are associated with problem-based learning, which are:

- It engages students in learning to learn by having them assume some of the responsibility for integrating and maintaining the social software systems that allow learning to happen;

- It promotes the benefits of working co-operatively with tools that facilitate the aggregation and organisation of knowledge while at the same time demonstrating that the diversity of individual research interest enhances learning for all; and

- It helps students develop practical research skills that they need in a world where knowledge construction and dissemination make increasing use of online information networks (Virkus 2008:264).

Therefore, use and experimentation with Web 2.0 technologies needs to be encouraged and supported as these technologies are suitable for educational and lifelong learning purposes in our info-sphere society. Failure to implement these technologies in libraries, especially in academic libraries which exist to produce knowledge and disseminate information, would have adverse effects on the educational endeavors of students.

6.12 In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?

Both directors acknowledged the tremendous disadvantage caused by their libraries' non-use of Web 2.0 technologies on the service the library provides. One mentioned that they hope to start using Web 2.0 technologies soon but while the process of migrating to these technologies is underway, librarians are making use of the LIASA list-serve to keep abreast of developments in the LIS sector locally and globally. The other director pointed out the importance of appointing a person who will be responsible for Web 2.0 technologies since the library is sadly lagging behind in this area. This new position is expected to be advertised in the near future as the library is in the process of reconfiguring its structure. Meanwhile, librarians are using library journals to keep updated of trends in LIS.

6.13 Were there any plans to incorporate Web 2.0 technologies in future?

There was agreement among both library directors that there are plans in place to incorporate Web 2.0 technologies, which include:

- Extending bandwidth so that the library can begin to participate actively in Web 2.0 technologies; and
- Using the 'ask the librarian' facility to encourage engagement with library users.

The plan also includes efforts to tackle apathy from the parent institution, which will hopefully enable the library to become a role-player in the Web 2.0 arena.

6.14 Facebook: the most widely used Web 2.0 technology in South African academic libraries

The findings of the study indicate that Facebook is the most widely used Web 2.0 tool in academic libraries in South Africa, as evidenced by the largest number of respondents (59%). It is also the most popular Web 2.0 tool in the world and is uniquely recognised as a resource for locating people (Scale 2008). Facebook was created in 2004 by Harvard student Mark Zuckerberg and some of his contemporaries and originally permitted only users with a college email address to register (Chu and Meulemans 2008; Hendrix, et al. 2009). It then expanded to regional universities, the Ivy League and further universities before opening up to high school students and global users aged 13 or over. As of the third quarter of 2016, Facebook had 1.79 billion monthly active users (that is, users who have logged on to Facebook in the last 30 days) and 1.57 billion mobile users, according to the Statistical Portal (Statista n.d.: par.1 under the heading Number of monthly active Facebook users worldwide as of 3rd quarter 2016 (in millions)).

With a user base of such gigantic proportions, the potential for outreach and marketing of library services cannot be underestimated. For example, academic libraries use Facebook to:

- Market library services;
- Advertise library hours, activities and events; and

171

- Act as a portal to the library by linking Facebook to the library's web site (Farkas 2007a).

Facebook provides a flexible space to interface with a large number of students (Hendrix, et al. 2009). For libraries serving a multi-dispersed user population, Facebook offers several opportunities for outreach and library instructions that are targeted specifically for widely-dispersed and long distance students. Other potential uses of Facebook include the following:

- Libraries can create event invitations for special programmes such as information literacy classes and other important library events (Chu and Meulemans 2008);
- Librarians can use Facebook pages as a marketing tool for the services available to students at the library;
- As an academic librarian herself, the researcher has observed over the years that students tend to consult outside search engines for academic research first before they use any of the various databases libraries subscribe to. Farkas (2007a) therefore asserts that even a basic Facebook page can serve as a reminder to use the resources available at an academic library;
- Librarians can embed library services within the Facebook page itself to enhance visibility;
  - Innovative academic librarians can, using Facebook applications, embed the library catalogue to allow students to access the library catalogue on Facebook without actually visiting the library's web site (Farkas, 2007b);
  - Libraries that are using LibGuides can embed subject guides within the Facebook page using a LibGuides application (iLibrarian 2007);
  - Academic libraries can also embed the 'ask-a-librarian' feature within the Facebook page. This will allow students to access the library's reference services through Facebook, a social networking medium they are actively engaged in, thus enabling the library to occupy the same space its techno-savvy users occupy (iLibrarian 2007 and Adams 2010); and
- Finally, using Facebook for the purposes mentioned above enables the library to provide customized library services within Facebook itself rather than merely redirecting users to the official library web site (Dickson and Holley 2010).

As pointed out earlier, the use of Facebook, as with any Web 2.0 tool calls for a paradigm change in how library services are packaged for the benefit of students. Unless academic librarians realize that the traditional role of the library has changed and adapt to the changes that characterize the current information era, they run the risk of being obsolete.

6.15 Blogs

The findings of the study indicate that blogs are the second most popular Web 2.0 tool used in South African academic libraries, as stated by 56% of respondents. There are several potential uses and benefits of blogs in academic libraries, such as:

- Blogs are interactive. Because blogs have a comment feature, this encourages students to provide feedback regarding the information provided and the library itself (Dickson and Holley 2010;
- Academic librarians can post news about the library as well as events occurring at the library (Koltay 2010);
- Blogs can be used to create subject guides as they can be easily updated to reflect the most current sources for a particular class or department (Kim and Abbas 2010);
- If the library is embarking on any important project, librarians can create a blog detailing the progress of the project to keep library users updated on the progress (Linh 2008);
- Librarians can create blogs to disseminate important information to library users and students can give feedback by commenting on the information included in the blog (Dickson and Holley 2010).

The major drawback of blogs, however, is that traditional blogs still require the student to come to it rather than the library going to the users.

There is a newer form of blogging, called Microblogging, which is a combination of blogging and Instant messaging (Dickson and Holley 2010). It allows users to create short messages to be posted and shared with online audiences. It was made popular by Twitter.

6.16 Twitter

Twitter was found to be the third most popular Web 2.0 tool used in South African academic libraries, as reported by 21% of the respondents. According to the Statistical Portal (Statista Portal n.d.: par.1 under the heading Number of monthly active Twitter users worldwide from 1st quarter 2010 to 3rd quarter 2016 (in millions), as of the third quarter of 2016, Twitter had 317 million monthly active users. This figure includes celebrities and heads of states who have turned to Twitter as their preferred communication tool. With so many registered active users, it was imperative for academic libraries to exploit the popularity of Twitter for the benefit of library users.

Like Facebook and blogs, Twitter also has potential uses for academic libraries. For example:
- Twitter is interactive – it allows registered users to post brief messages for other users who follow the account and to comment on other user posts (Shoniwa and Hall 2007);
- It allows librarians to go where the students are already located (Serantes 2009);
- It allows librarians to post important information such as changes in operating times, events, new resources available, links to the library web sites, responses to student comments, and news that is important to students without requiring students to visit the official library web site (Dickson and Holley 2010).

Milstein (2009) cautions though that for it to truly be an effective method of interaction, librarians must be quick to respond to any questions or queries posted to the library's account.

6.17 YouTube

YouTube is another Web 2.0 tool used in academic libraries in South Africa, as reported by 9% of respondents. According to Douche (2016), YouTube was launched on 14 February 2005 by Steve Chen, Chad Hurley, and Jawed Karim. It boasts 1.3 billion users, making it the third most visited web site in the world. Academic libraries are leveraging the popularity of YouTube in various ways, such as:

- In addition to allowing individuals and organizations to post original videos, YouTube also enables users to embed their videos onto other web sites, including other tools such as Facebook, blogs, Wikis, or the library web site (Stephens 2006).
- Academic libraries currently post videos of library tours as well as bibliographic instruction or user education videos for students (Kroski 2007). For example, librarians at UKZN have created a video on how to use databases, which is expected to be posted on YouTube and the library web site.

Although creating a video is time-consuming, librarians continue to use this platform because the videos can be versatile in their use.

6.18 LibGuides

As with YouTube, LibGuides were reported by 9% of respondents as another Web 2.0 tool used in academic libraries in South Africa. LibGuides allow librarians to post various subject guides, research assistance and other resources in order to support teaching, learning research.

6.19 Wikis

Wikis are another Web 2.0 tool used by 6% of the respondents. The advantages of wikis are:
- They are primarily used for the creation of collaborative subject guides (Dickson and Holley 2010);
- Librarians can create subject wikis with links to resources on a chosen topic or for a particular class, including information regarding relevant databases and search tips tailored to that subject (Kroski 2007).
- Students conducting research on a topic can use the resources provided as well as edit the wiki to include additional information (Stephens and Collins 2007).

6.20 Instagram

At least 6% of respondents indicated that they used Instagram as a Web 2.0 tool in their libraries. Instagram, which is a mobile social network that allows users to edit and share photos as well as videos, is used by 500 million monthly active users as of June 2016, according to Statista (The Statistical Portal n.d.: par.1 under the heading Number of monthly active Instagram users from January 2013 to June 2016 (in millions)).

6.21 LinkedIn

LinkedIn was also mentioned by 6% of respondents as a Web 2.0 tool used by some academic libraries in South Africa. LinkedIn is used by 450 million worldwide, as of the third quarter of 2016, according to Statista (The Statistical Portal n.d.: par.1 under the heading Numbers of LinkedIn members from 1st quarter 2009 to 3rd quarter 2016 (in millions)).

6.22 Chat services

The findings showed that 6% of respondents use chat services in their libraries. Chat services afford librarians the opportunity to respond timeously to queries from users.

6.23 WhatsApp

WhatsApp was mentioned by 6% of respondents as another Web 2.0 tools used in academic libraries in South Africa. According to the WhatsApp blog (2016: par.1), WhatsApp had one billion users as of 1 February 2016.

6.24 RSS feeds

A small percentage of respondents (3%) indicated that they used RSS feeds in their libraries.

6.25 Use of key Web 2.0 tools worldwide

Figure 3.7 in Chapter 3, clearly shows Facebook's dominance as the most popular Web 2.0 used worldwide, with a large number of mobile users, that is, people who access Facebook from mobile devices, followed by YouTube and WhatsApp. It would therefore be in the academic libraries' best interest to make use of these tools for the benefit of library users. It is pleasing to note that information on the use of popular Web 2.0 tools resonates with both the literature which listed Facebook, blogs, wikis, RSS, Twitter, YouTube, and so forth, as the prominent Web 2.0 tools for academic libraries (Tripathi and Kumar 2010; Scale 2008) and the findings of the study.

While some authors (Sekyere 2009) maintain that the use of Web 2.0 technologies by academic librarians is an ineffective use of librarian time and effort, a review of recent literature (Dickson and Holley 2010) shows that the use of Web 2.0 technologies by academic librarians provides a potentially effective method of student outreach and marketing of library services, as the findings indicate. Wawrzaszek and Wedaman (2008) aptly captured the vital role Web 2.0 technologies play in libraries when they asserted that "libraries must actively embrace the changes in the information environment to stay relevant in the 2.0 world". They further cautioned that librarians and library services must transition from their inherited position of being

> "mediators of a print-focused, highly controlled environment to become collaborators in a multimedia-rich, user-empowered, disintermediated free-for-all where their value will be proven only be demonstrably improving outcomes in learning, teaching, and research" (Wawrzaszek and Wedaman 2008:3).

The ACRL Research Committee in its 2007 Environmental Scan (2007:4), affirmed the above assertion in its declaration that:
> "Students and faculty will continue to demand increasing access to library resources and services, and to expect to find a rich digital library presence both in enterprise academic systems and as a feature of social computing".

While the use of Web 2.0 technologies is applauded, due to the numerous benefits these technologies carry, it would be remiss to overlook the inherent risks of using these technologies. The risks associated with using Web 2.0 technologies were discussed in Chapter Three. Libraries would do well to have clearly defined terms and conditions that govern the use of social media in libraries and institutions. South African media was abuzz recently with unpalatable reports of people who disregarded the rules of engagement, and consequently found themselves in violation of the law and became subjects of public scorn. There is literature available which educates people about the legal, disciplinary and reputational risks that exist in the use of social media.

6.26 Summary of the chapter

In this chapter, the results of the study which was conducted on academic librarians and library directors of academic libraries in South Africa were analysed. The analysis addressed the key questions that emanated from the research objectives of the study, while identifying similarities and/or differences to the findings in the literature. The interpretation of the results revealed many similarities to the literature which were highlighted in this chapter.

The findings of the study revealed that academic libraries were also leveraging the power of Web 2.0 technologies to deliver improved services to their users, in line with other academic libraries in the African continent and globally. South African academic libraries experienced challenges similar to those of their counterparts in Africa and effective strategies were employed to mitigate the challenges. It also emerged from the literature that the current study is the first of its kind in terms of scope to study the use of Web 2.0 technologies in academic libraries in South Africa, which therefore means that it carries the potential to inspire change of policy and practice in academic libraries, in addition to contributing to filling the gap that currently exists in the literature on this topic and contributing to the body of knowledge.

Chapter 7: Summary of the findings, conclusions and recommendations

In the previous chapter, Chapter 6, the results of the study were analysed. The results are based on the data that were collected by means of a semi-structured interview which was conducted with 14 library directors, as well as an online questionnaire which was completed by 27 academic librarians. The data collection tools aimed at gathering data about the use of Web 2.0 technologies in academic libraries in South Africa.

7.1 Introduction

As mentioned in Chapter 5, the purpose of conducting research is to study a phenomenon. The research process involves collecting data about the phenomenon under study, presenting and analysing the data collected and finally drawing conclusions and making recommendations. This chapter presents the conclusions and recommendations of the study and also identifies issues for possible further research. As the research process is ultimately concerned with generating knowledge, it is in this chapter where the contribution to the body of knowledge will be presented, which is the final step that completes the research process.

To recap the previous chapters – In Chapter 1 the concept of Web 2.0 technologies and their use in academic libraries was introduced. This was followed by the conceptual framework which underpinned the study in Chapter 2, whereas Chapter 3 provided a literature review on the subject of Web 2.0 technologies, drawing on various studies that have been conducted in academic libraries worldwide. A detailed explanation of the research methodology of this study was provided in Chapter 4. The study employed both qualitative and quantitative research paradigms in the quest to gather data presented in Chapter 5, on the use of Web 2.0 technologies in academic libraries in South Africa, while Chapter 6 gave an interpretation of the results of the study.

In this final chapter, the conclusions the researcher made on key issues the study investigated, are presented. These issues are the academic libraries and use of technology, the current users of academic libraries and their changing needs, collaborations with other university departments and the impact of those collaborations on the implementation of Web 2.0 technologies in libraries. It was evident that such partnerships are beneficial to the library in many ways. For example, in cases where such partnerships existed, the implementation of Web 2.0 technologies went smoothly, whereas some libraries experienced challenges as the implementation of these technologies was the sole responsibility of the library. This chapter also includes the contributions this study makes, together with the originality of the study. The study's recommendations, which were based on its findings, are also presented. Finally, the suggestions for further study conclude the chapter.

7.2 Conclusions

The study sought to answer a number of research questions about the use of Web 2.0 technologies in academic libraries in South Africa, which were outlined in Chapter One. To recap, the research questions the study set out to answer were as follows:

12. What were the reasons for choosing to incorporate Web 2.0 technologies into library programmes and services?
13. What processes were followed in accomplishing this goal?
14. What were the implications of the implementation of Web 2.0 technologies for library staff?
15. What challenges were encountered in the implementation of Web 2.0 technologies?
16. How were these challenges overcome?
17. Has the value and impact of these technologies been measured?
18. Are there any plans in place to ensure the sustainability of these technologies in library programmes and services?

The study also answered the following questions in respect of institutions that have not yet embraced these technologies:

19. What were the reasons for not choosing to incorporate Web 2.0 technologies into library programmes and services?

20. What was the impact of this decision on the library service?
21. In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?
22. Were there any plans to incorporate Web 2.0 technologies in future?

Conclusions drawn based on the above-mentioned research questions, are presented in this section.

7.2.1 What were the reasons for choosing to incorporate Web 2.0 technologies into library programmes and services?

Library directors provided a number of reasons for the adoption of Web 2.0 technologies in their respective libraries, such as:

- The need to market services/communication tool;
- Most libraries are using these technologies and the library had to adapt to using the technologies to be in line;
- Web 2.0 is the buzzword (sic) in academic libraries. Users are using Web 2.0 technologies; and
- To be the library of the 21st century.

It can be concluded, then, that the desire to occupy the same technological space occupied by their techno-savvy users in order to ensure relevance, was the motivating factor in deciding to adopt Web 2.0 technologies. The decision to implement Web 2.0 technologies in academic libraries in South Africa stemmed from the desire to keep abreast of various technological developments that are taking place in the information world, for the purpose of providing up-to-date services that meet the needs of library users, as well as the need to market services and act as a communication tool.

7.2.2 What processes were followed in accomplishing this goal?

The results of the study indicate that there were processes that were followed in the implementation of Web 2.0 technologies, which included the following:

- Policy – the library had to ensure adherence to the university's social media policy;
- The responsibility for Web 2.0 technologies/Facebook was given to a skilled person/driver of Web 2.0 technologies;
- The use of Web 2.0 technologies was incorporated into the strategic plan;
- Collaborated with ICT staff;
- Discussions between librarians and library management on devising ways of implementing Web 2.0;
- It was initially adopted by the marketing team/part of the marketing plan; and
- It was approved by senior personnel.

Since less than half of the academic librarians (42%) reported that the use of Web 2.0 technologies was incorporated into their libraries' strategic plans, it can then be concluded that the inclusion of the use of Web 2.0 technologies served to articulate the importance of the use of Web 2.0 technologies to library staff and also to portray the importance of these technologies to library management. Another conclusion that can be drawn from the findings is that the identification of champions to oversee and manage the implementation of Web 2.0 technologies enhanced the adoption of these technologies in academic libraries in South Africa. This can be attributed to the fact that it is easier for a person who possesses the passion and skills to set a trend that others can follow than the one who is devoid of passion and skills. Enthusiasm is contagious, and conversely, so is the lack thereof.

Furthermore, working together with the marketing team and/or including the use of Web 2.0 technologies in the marketing plan had a positive impact on the adoption of these technologies by academic libraries.

7.2.3 What were the implications of the implementation of Web 2.0 technologies for library staff?

The findings of the study indicate that librarians were equipped, in terms of skills and knowledge, to use Web 2.0 technologies effectively. It can be concluded that the majority of libraries provided training for librarians to prepare them to play a meaningful role in the Web 2.0 arena, before the Web 2.0 technologies were implemented in their libraries. Conversely, in libraries where training was not provided, librarians were less prepared to use Web 2.0 technologies effectively.

7.2.4 What challenges were encountered in the implementation of Web 2.0 technologies?

The findings of the study indicated that libraries experienced a number of challenges when Web 2.0 technologies were implemented, such as the following:

- Initially there was no dedicated person. Staff posted trivial information;
- Monitoring Facebook is time-consuming if it is an add-on;
- The uptake is not fast enough;
- Resistance to change by staff and some users;
- Lack of skills of staff and users;
- Had to experiment with a lot of Open Source software;
- Fear of the unknown and the services offered were new;
- Financial resources; and
- Lack of interest from students.

The findings also indicated that there were more libraries that experienced challenges when Web 2.0 technologies were implemented than those that did not. It can be deduced then that challenges were experienced when Web 2.0 technologies were implemented. Less than half the library directors (43%) cited resistance to change as the major challenge experienced, it can be concluded that sufficient preparation for the implementation of Web 2.0 technologies was not done. A further 29% of the library directors reported that there was no dedicated person in their libraries to manage Web 2.0 technologies, which compromised the postings (both the timing and

quality). Therefore, it can be concluded that the lack a dedicated person to handle Web 2.0 technologies had a negative impact on the implementation of Web 2.0 technologies.

7.2.5 How were these challenges overcome?

Libraries employed a number of strategies to overcome the challenges that were experienced, which included the following:

- Marketing;
- Increased activity on the page;
- Change management strategies;
- Financial support from the university executive;
- Re-allocation of resources;
- Staff training;
- Incorporated Web 2.0 in job profiles;
- Used a dedicated person to edit submissions before they are uploaded;
- Established a new portfolio responsible for Web 2.0 technologies; and
- Created a library Facebook account.

It can be concluded, based on the findings, that the establishment of a dedicated portfolio alleviated the challenges libraries experienced when Web 2.0 technologies were implemented. It can also be concluded that staff training, together with incorporating Web 2.0 technologies into staffs' job profiles, were used to combat the challenges that arose.

7.2.6 Has the value and impact of these technologies been measured?

The findings of the study indicate that the value and impact of Web 2.0 technologies was measured in academic libraries, using various methods, such as:

- Checking user statistics regularly;
- Surveys; and
- Quarterly reports.

Therefore, it can be concluded that libraries which implemented Web 2.0 technologies measured the value and impact of these technologies on services.

7.2.7 Are there any plans in place to ensure the sustainability of these technologies in library programmes and services?

The results of the study indicate that libraries put various plans in place to ensure the sustainability of Web 2.0 technologies in library programmes and services. These plans included:

- Developing a marketing plan, which incorporated the use of Web 2.0 technologies;
- As users are already on these platforms, there is no going back. Web 2.0 is here to stay;
- The use of Web 2.0 technologies is part of the library's long-term goals. The library is actively looking to improve how these technologies are used;
- The responsibility for Web 2.0 technologies is no longer an add-on. It has been incorporated into the services the library offers;
- The library intended to continue to grow its content on Facebook;
- A computer centre had been established to ensure the sustainability of the use of Web 2.0 technologies;
- As the library had adopted Web 2.0 technologies, it intended to keep using them and invest in improvements;
- The Head of LIS is involved in the marketing plan. The marketing plan ensures that services remain relevant. The use of Web 2.0 technologies is incorporated into the marketing plan;
- There is close collaboration with the university's ICT services, who provide and improve the platforms and access;
- There is an Assistant Director who is working with a committee to take Web 2.0 technologies forward;
- The library is constantly on the lookout for new technologies that come up so that they can also be adopted;
- The library advertises workshops on Facebook;
- All items are sent to the marketing person; and
- There needs to be rigorous marketing of these technologies.

185

The existence of the plans to sustain the use of Web 2.0 technologies in academic libraries in South Africa is an indication of the value libraries place on these technologies and the intention to ensure their continued use in libraries.

7.2.8 What were the reasons for not choosing to incorporate Web 2.0 technologies into library programmes and services?

Libraries which had not adopted Web 2.0 technologies gave the following reasons for not implementing Web 2.0 technologies:

- University policy that prohibited the use of social media. The ban on the use of social media was due to bandwidth restrictions; and
- The library lacked capacity, in terms of staff and skills, to play an active role in Web 2.0 platforms.

Therefore, prohibitive policies, together with shortages in terms of bandwidth, staff and skills, had a negative impact on the adoption of Web 2.0 technologies in some academic libraries in South Africa.

7.2.9 What was the impact of this decision (not to implement Web 2.0 technologies) on the library service?

The results of the study indicated that the decision not to implement Web 2.0 technologies meant that libraries could not communicate effectively with their users. Therefore, non-implementation had a negative impact on the libraries' ability to communicate effectively with their users.

7.2.10 In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?

The findings of the study indicate that libraries used the LIASA listserv and library journals to keep abreast of developments in the profession. This clearly indicates that the failure to use Web 2.0 technologies hampered the libraries' technological advancement.

7.2.11 Were there any plans to incorporate Web 2.0 technologies in future?

The libraries that did not use Web 2.0 technologies in their libraries indicated that there were plans to implement Web 2.0 technologies in future. These plans included:

- Extending bandwidth; and
- Incorporating social media in the new vacancies so that there will be social media champions.

Therefore, it can be concluded that even libraries that did not implement Web 2.0 technologies had plans in place to adopt these technologies in future, which is an indication of the value these technologies carry.

7.3 Academic libraries in South Africa and their use of technology

Academic libraries exist for the purpose of serving the university community's information needs. Hence all the funding requirements pertaining to libraries, such as materials budget, staffing budgets, and so forth, are met by the parent institution. Library organograms typically consist of library directors, managers/heads of different sections, such as information services, ILL, circulation, technical services, IT, finance and so forth, information librarians, acquisitions librarians, cataloguers, shelvers and processing staff, who work together to meet the needs of library users. In most academic institutions the library falls under the research portfolio, with the library director reporting to the Deputy Vice- Chancellor or Dean of Research.

Academic libraries, as entities that support the learning, teaching and research endeavours of their institutions, in addition to acquiring print and electronic collections, employ various technologies to meet the needs of their users. The technologies chosen vary according to the availability of financial resources, human resources and the strategic objectives of the institution. There is no doubt that academic libraries are operating in a changing environment. The library must navigate both internal (within the library itself) and external (outside the library and the institution in which the library exists) changes in order to survive and become the library of the twenty first century, making maximum use of various technologies to deliver high quality,

relevant and up-to-date services to their users. The internal and external changes affecting the library include the following:

- The nature of today's library users and their changing needs; and
- Technological advances such as the rise of Web 2.0.

7.3.1 Today's library users and their changing needs

The current generation of students, referred to as digital natives, the net generation, generation Y or Web generation, is much more technologically advanced than previous generations (Adams 2010 and Virkus 2008). This is a generation that was born from roughly 1980 to the turn of the millennium (Burhanna, Seeholzer and Salem 2009). Academic libraries serve this generation of users that "considers social networking tools such as Facebook, Flickr, Twitter, and YouTube a necessity for daily life" (Rod-Welch 2012:139).

In order to meet the information needs of these users effectively, there needs to be a review of the manner in which library services are delivered. While the old method of providing library services was sufficient ten years ago, for example, putting all important information in the library website, expecting students to visit the library website in order to get the required information, that method of providing library services has become obsolete. Today's library users are constantly on the move and they require up-to-date information quickly and in the platforms of their preference, without necessarily visiting the library. The library needs to be taken to the same platform where these 'techno-savvy' users are. Library services must be repackaged and made available on the same platforms used by the current net generation.

Libraries need to constantly evaluate their services to ensure relevance. The needs of users cannot be assumed; they have to be ascertained. Frequent surveys that are aimed at determining user needs and satisfaction levels must be the standard practice so that services and products are adjusted to suit the needs of today's users. As their needs are constantly changing, relying on user surveys that were done five years ago will not yield the desired outcome. More frequent surveys, for example, bi-annually, or better yet, quarterly, need to be undertaken if libraries intend to offer relevant services that respond to the needs of their users.

7.3.2 Technological advances such as the rise of Web 2.0

Advances in technologies, leading to the rise of Web 2.0, have impacted on all spheres of human existence, such as business, health, education, and so forth. Institutions of higher education have not been left untouched by this wave of developments in technology. It is understood from IT literature that different versions of technology, such as Web 2.0, Web 3.0, Web 4.0, denote improvements and enhancements which have been made in each particular version, with the highest number being the most improved. Hence, Web 2.0 is an improvement over Web 1.0 and so forth.

Academic libraries in South Africa that have implemented the various Web 2.0 technologies must be commended for taking the library to platforms where the users are, rather than passively waiting for users to come to libraries. The findings showed that Web 2.0 technologies are used in many academic libraries in South Africa, with each library using at least one or more Web 2.0 tools. With large sectors of the world's population actively engaged in social media platforms, it is good to note that libraries have also taken advantage of these social media platforms to provide enriched user experiences. The many benefits of using Web 2.0 technologies were highlighted in the previous chapter, Chapter 6.

Nevertheless, despite the numerous benefits of using Web 2.0 technologies, the uptake of these technologies has been largely slow, not only in South Africa, but in other countries as well. Xu, Ouyang and Che's study (2009) found that Web 2.0 technologies were adopted by only 42% of ARL academic libraries, compared to 58% that showed no evidence of adoption. A study by Garoufallou and Charitopoulou (2012) found that the Greek universities, libraries and library science departments are still in the early stages of Web 2.0. Much work needs to be done to expedite the adoption of Web 2.0 technologies in academic libraries worldwide.

The unintended consequence of the slow uptake is the delay in adopting improved versions that are already being used in other sectors. For example, there is talk of Web 3.0 at present, that is, what it looks like and what it entails. It is crucial for librarians to familiarize themselves with the current version (Web 2.0) before any migration to an advanced version can be contemplated.

Ignoring facts does not change the facts. Similarly, ignoring the many technological developments taking place in the world will not cause them to disappear. As a matter of fact, choosing to ignore these changes might prove to be detrimental for libraries. Libraries therefore need to be able to adapt to these changes to ensure not only their survival but also relevance in terms of services they provide.

7.3.3 Partnerships with university departments

The saying that goes "no man is an island" rings very true with regards to the relationship between the library and other university departments, such as IT, Marketing/Corporate Relations, and so forth. The findings of the study clearly indicated the importance of partnerships with other university department to ensure a successful implementation of Web 2.0 technologies in academic libraries. Libraries must actively foster these collaborations in order to implement these technologies successfully.

7.4 Contribution to theory and practice

The study has contributed in the body of knowledge in the field of LIS by producing knowledge about the use of Web 2.0 technologies in South African academic libraries, whereas previous studies focused on individual institutions in South Africa. Therefore, the study has provided a global, rather than individual, perspective on the subject. The study presented a balanced view of the use of Web 2.0 technologies in academic libraries in South Africa. Both the advantages and disadvantages of using Web 2.0 technologies were presented in this study.

Furthermore, the study proposes a model for the successful introduction and implementation of Web 2.0 technologies in academic libraries in South Africa. This model can be adapted to suit other types of libraries as well.
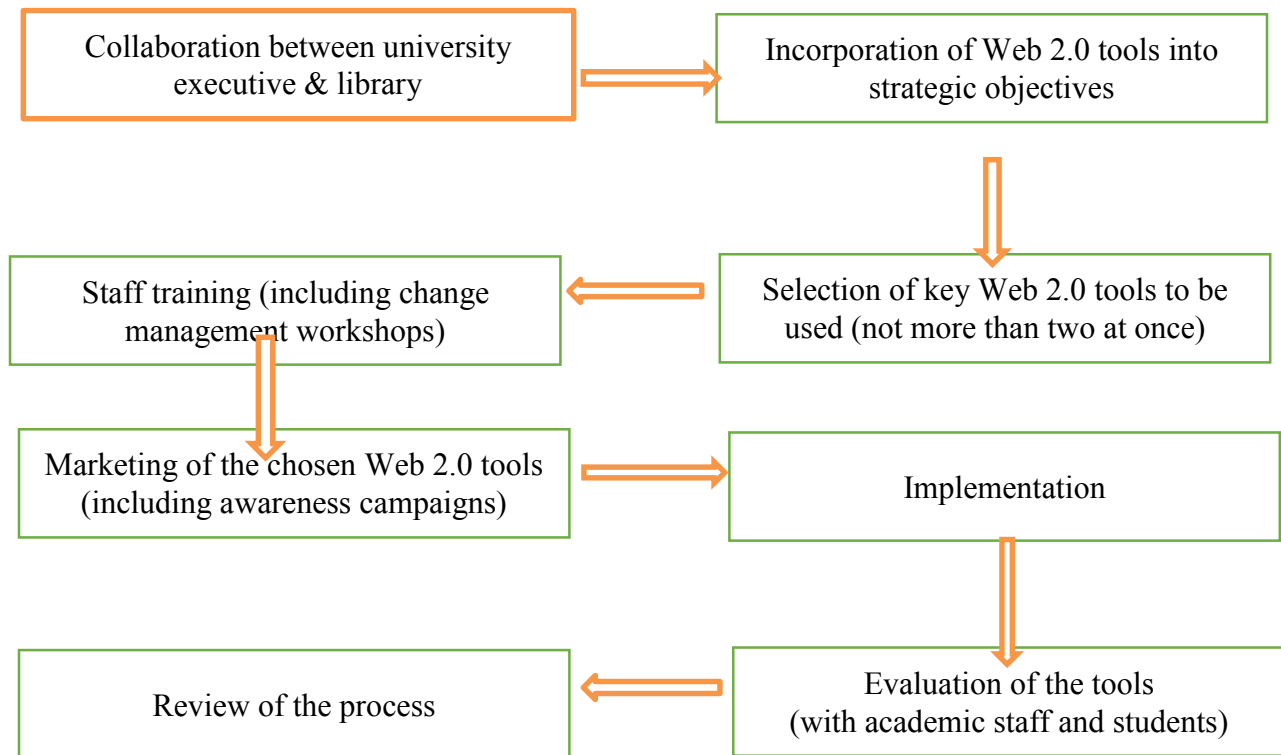
Figure 7.1: Proposed model of the successful implementation of Web 2.0 technologies in academic libraries in South Africa

Source: Researcher

Collaboration between the university executive, that is the Vice Chancellor, the Deputy Vice-Chancellor- Research, and other key stakeholders and the library is important in order to ensure the successful implementation of Web 2.0 technologies in academic libraries. The findings of the study revealed that in libraries where there was no collaboration between the university executive management and the library, the implementation of Web 2.0 technologies was hampered. There are libraries which have failed to implement Web 2.0 technologies because this collaboration did not exist. Therefore, collaboration played a vital role in the successful implementation of Web 2.0 technologies. Collaboration between two stakeholders also enhances the development of policy regarding the use of Web 2.0 technologies in the institution.

Strategic objectives – the operation of academic libraries, as vital support systems for academic institutions, is undergirded by the existence of crucial plans, such as strategic plans, marketing

191

plans, and so forth, that govern the strategic and operational directives of the library. The implementation of Web 2.0 technologies cannot be haphazard – it must flow from careful planning in order to be successful. Hence, capturing the use of Web 2.0 technologies in strategic objectives, such as the e-strategy, job profiles and so forth, helps to convey the importance of these tools to all library personnel and ensures willing participation in the use of these tools since e-strategies, strategic plans are produced as a result of wide-ranging consultations and input from all staff.

Furthermore, articulating the use of Web 2.0 technologies in individual staff's job profiles eliminates the risk of voluntary participation and encourages staff to devote time and skills to the successful implementation and continued use of Web 2.0 technologies. The findings of the study indicate that this was the case in some of the libraries that reported successful implementation of Web 2.0 technologies – the use of Web 2.0 technologies was incorporated into strategic plans, e-strategy for the library, marketing plans and staff's job profiles. Therefore, the said incorporation strengthened the implementation of Web 2.0 technologies. The incorporation also helps in ensuring continuity, in the event of the absence of the designated staff member or members. The results of the study indicated that in some libraries, the use of Web 2.0 ceased when the person who acted as a champion for the use of Web 2.0 technologies left the employ of the institutions.

Selection of key Web 2.0 tools to be used is important for the successful implementation of these tools. Choosing too many Web 2.0 tools to be implemented at any given time might sabotage the implementation. Staff might find it daunting to learn too many Web 2.0 tools at once. Web 2.0 technologies must be implemented gradually and incrementally, as was revealed by the findings of the study. Therefore, the selection of not more than two Web 2.0 technologies decreased the levels of anxiety associated with the adoption of Web 2.0 technologies.

Staff training – when Web 2.0 technologies the library will adopt have been chosen, staff must be trained on the use of the chosen technologies before they can be expected to start using them. As the use of Web 2.0 technologies entails a different way of delivering user services, library management must schedule change management workshops to facilitate transition to a new way of meeting user needs. The findings clearly indicate that prioritising staff training and equipping

192

staff with change management strategies, facilitated a hassle-free implementation of Web 2.0 technologies in academic libraries in South Africa.

Marketing of the chosen Web 2.0 technologies must then follow once staff have received the necessary training. Staff need to then embark on vigorous user awareness campaigns to instill awareness and generate interest in the Web 2.0 technologies to be used. Academic librarians reported that marketing of Web 2.0 technologies before implementation was beneficial. Therefore, marketing enhances the uptake of these technologies, which in turn, encourages their use.

Implementation of the chosen Web 2.0 technologies is the culmination of collaboration with crucial stakeholders, articulating the use of Web 2.0 technologies in strategic objectives, selecting the Web 2.0 technologies to be adopted, providing staff with the skills required to use Web 2.0 technologies effectively and intense marketing of Web 2.0 technologies. It is a planned, well-thought out and well-executed operation. These are the prerequisites for a successful implementation of Web 2.0 technologies. The implementation of Web 2.0 technologies is not a spur of the moment decision. This stance was reported by a number of academic librarians who reported a smooth implementation in their libraries. Therefore, the implementation of Web 2.0 technologies is enhanced by careful planning that entails the five stages mentioned above.

Evaluation of the effectiveness of the chosen tools must always be done with academic users and students after the tools have been implemented. Evaluation helps to identify any shortcomings that might have evaded consideration during the planning process. It puts the chosen Web 2.0 technologies under scrutiny so that the necessary improvements or changes can be made. The findings of the study indicate that successful implementation of Web 2.0 technologies was accompanied by the constant evaluation of the chosen Web 2.0 technologies to ensure effectiveness.

The **review of the entire process** of selecting Web 2.0 technologies must be undertaken as an on-going exercise. This step will also include scanning the horizon for newer, more improved technologies that emerge in the info-sphere, so that if found relevant, they can be adopted to

enhance the design and delivery of improved user services. The findings of the study revealed that including the review of the process of selecting Web 2.0 technologies helped libraries to identify new technologies to adopt, while reviewing current ones for effectiveness and relevance. Therefore, the sustainability of the use of Web 2.0 technologies depends on making use of technological advances to provide improved and user-centred services.

7.5 Originality of the study

The study reviewed a number of studies on the use of Web 2.0 technologies that have been conducted in different countries in the world, including Africa. These studies were discussed in detail in Chapter 3, the literature review. Locally, there are studies on the use of Web 2.0 technologies at UP (Penzhorn and Pienaar 2009). However, the review of the literature revealed a scarcity of studies done on other academic libraries in South Africa. Therefore, the current study is the first one to be conducted on all academic libraries with a research focus in South Africa. The study has successfully filled the gap that existed in the literature previously as it did not focus on one or two academic libraries, but a large number of academic libraries in South Africa. Data were collected from 14 library directors and 27 academic librarians representing 15 academic libraries in South Africa.

7.6 Recommendations

The study investigated the use of Web 2.0 technologies in academic libraries in South Africa. Based on the conclusions made from the research questions, the study makes the following recommendations, which are presented in this section in point form.

- The findings of the study indicate that the implementation of Web 2.0 technologies failed where there are was no coherent plan for the implementation. The study therefore recommends the formulation of an e-information strategy by library management and staff to underpin the implementation of Web 2.0 technologies in academic libraries in South Africa. In the absence of a succinct e-strategy for the library, other notable strategic drives of the institution can be used, such as the library's strategic plan, the marketing plan, and so forth. This recommendation is endorsed by Kwanya, Stilwell and

Underwood (2012a) who advised that libraries seeking to harness the power of Web 2.0 tools to deliver services should first develop the requisite standards, policies, strategies and plans. The introduction and implementation of Web 2.0 technologies must be the result of careful planning and deliberation. Incorporating the use of Web 2.0 technologies into the library's strategic plan and also into librarians' job profiles, sends a very strong message to stakeholders. It helps to relay the important role of these technologies in achieving strategic objectives. Unfortunately, if the use of these technologies is perceived to be optional, interest and participation dissipates.

- The findings of the study indicate that the desire to occupy the same technological space the users occupy, in order to provide relevant services, informed the adoption of Web 2.0 technologies in academic libraries in the study. As libraries serve user populations with a heavy use of social media, it is important that the design and provision of library services is adapted to adequately meet the needs of users. This recommendation is also echoed by Farkas (2007a:36), an academic librarian and a strong advocate of reaching library users where they are, when she asserts that:

> "If libraries are not the first place our prospective users go to do research, they will likely miss any marketing we do on our own web sites. This is why we must start looking beyond these sites and toward putting our content where our users actually are".

Scale (2008) further points out that services in tomorrow's libraries will be geared towards creating guides, indexes, annotations and other tools to meet the needs of users. Therefore, libraries need to leverage the use of Web 2.0 technologies to reclaim their position as providers of relevant, timely and high quality services and resources. Therefore, it is vital that services and programmes are aligned to the needs of today's users.

- An integrated approach to the use of Web 2.0 technologies must be adopted. Xu, Ouyang and Chu's study (2009) of 81 ARL library websites found that the effectiveness of blogs on library websites was adversely affected if blogs were a stand-alone on the websites. Therefore, a combination of at least two complementary Web 2.0 applications, such as

blogs and RSS feeds, is recommended for the South African academic libraries as this encourages more active user participation.

- The study found that the introduction of too many Web 2.0 technologies at once can be daunting on library staff, especially Web 2.0 technologies such as Facebook that require constant attention. The enthusiasm to introduce these technologies needs to be carefully controlled so that it does not lead to a situation where staff are feeling overwhelmed by what is expected of them, hence the recommendation to limit the introduction to not more than two technologies at any given time as proposed by Kwanya, Stilwell and Underwood (2012a). Libraries that are considering the adoption of Web 2.0 technologies must select the Web 2.0 technologies to adopt carefully and incrementally.

- It is important that academic librarians must be equipped with the skills needed to function effectively in the info-sphere. A number of strategies can be used to achieve this objective in the academic libraries, for example:
  - Peer training – making use of the skills and knowledge of librarians that are familiar with Web 2.0 technologies in order to transfer skills. Libraries need to start using librarians to introduce and implement Web 2.0 technologies.
  - Tapping into existing talent within or outside the library to equip staff.
  - Benchmarking and adopting best practice – this involves learning from institutions that have successfully implemented Web 2.0 technologies to avoid 're-inventing the wheel'. It helps to determine what worked, what did not work and to avoid pitfalls. Furthermore, if linkages with other libraries are encouraged, this will enhance the multiplier effect (Kwanya, Stilwell and Underwood 2012a).
  - The importance of making librarians Web 2.0 compliant cannot be over-emphasized. Librarians must be equipped, in terms of skills and knowledge, to function effectively in the Web 2.0 arena. Librarians cannot be expected to offer relevant services using Web 2.0 platforms if they are not Web 2.0 compliant, that is, well-versed in the use of Web 2.0 applications.

- Review of the LIS curriculum – Education serves to prepare students to function effectively in the world of work. As users of academic libraries are using Web 2.0 technologies in their daily lives, the LIS curriculum must be reviewed to include Web 2.0 strategies. The curriculum must be able to produce librarians with relevant skills that are required to provide a service that responds to the needs of library users.

- Use of Web 2.0 must be encouraged and supported from the top. It was unfortunate to note that some academic libraries lamented the lack of support for the implementation of Web 2.0 technologies. Library management should lobby the executive management in their institutions for the support of these technologies.
  - Libraries exist to promote access to collections and services. Accessibility is synonymous with libraries. This is evidenced by the libraries' involvement in the Open Access campaign, which aims to make research publicly available in order to promote scholarship. Web 2.0 technologies enhance access. They encourage user participation, thus contributing to the creation of rich user experiences. Therefore, the use of Web 2.0 must be encouraged and supported by senior university personnel.
  - Any barriers to accessibility must be removed. In cases where internet access is a challenge, this needs to be attended to. Broadband access to the internet must be increased to enable the use of Web 2.0 technologies in libraries. There is a need for increased global broadband access to the Web in order to connect to a fibre optic network as asserted by Scale (2008) and Kwanya, Stilwell and Underwood (2012a). Furthermore, policies that prohibit the use of Web 2.0 technologies/social media during work hours should be reviewed.

- Just as it is important to constantly determine the needs of users to ensure the provision of relevant services, it is equally important to evaluate the effectiveness of the chosen Web 2.0 tools periodically. The evaluation will assist in identifying ineffective tools and inform future planning.

- Paradigm shift. There is a need to understand that technology is for us, not against us. Technology is not something to be wary of, but something that is worthy of experimentation for the purpose of benefitting from its use. Therefore, academic libraries in South Africa need to undergo such a paradigm shift.

- Adoption of Web 2.0 technologies is inspired by the desire for change, a change in the design and delivery of academic library services and resources, in order to adequately meet the expectations and needs of users, and innovation. It is change for the betterment of the service the library provides. Change must be managed well by library management and librarians in the academic libraries of South Africa for it to be effective. Library managers are therefore encouraged to arrange change management workshops for library staff to alleviate any misgivings staff might have about the new way of service delivery. Devising innovative methods of designing and delivering quality information services is crucial as studies show that the library is no longer the first point of call for information. It has to compete with other popular sources of information. Being innovative in delivering services will increase the library's visibility and relevance to its clients, which will then help the library to reclaim its position as the information hub of the institution. The importance of reaching users where they are cannot be overemphasized.

7.7 Suggestions for further research

This study covered the use of Web 2.0 technologies in academic libraries in South Africa, focusing on long-standing research institutions only. Former technikons, currently known as universities of technology (UoT), fell outside the scope of this study. The exclusion from the study was due to their technical focus. One of the UoT was chosen for the pre-testing of the questionnaire, since the UoT were excluded from the study. Further studies on this topic must include UoT in order to get an overall understanding of the use of Web 2.0 technologies in all academic libraries in South Africa.

The purpose of this research was to study the use of Web 2.0 technologies by academic libraries and librarians to make information accessible to patrons. The variously named

reference/subject/information librarians and library directors were selected as study participants. Future studies might include other information specialists that are based in different sections of the library, such as ILL, IT, Circulation, Acquisitions, Cataloguing, and so forth.

Finally, the study covered the use of Web 2.0 technologies in academic libraries in South Africa only. The other types of libraries were beyond the scope of this research. Therefore, future studies might be conducted on the use of Web 2.0 technologies in public, special and school libraries.

7.8 Summary of the chapter

The study proposed a model for successfully implementing Web 2.0 technologies in academic libraries in South Africa, a model that can be easily adapted to fit other library typologies. Furthermore, the study proposed comprehensive training for librarians to make them Web 2.0 compliant. In addition to on-the-job training, training on the use of Web 2.0 technologies must be incorporated into the LIS curriculum so that library schools produce graduates that have the skills and knowledge required to function effective in the info-sphere. Technological developments are here to stay. Libraries need to start using Web 2.0 technologies to reclaim their authority and position as information providers. This chapter also provided the contributions this study has made and highlighted its originality. The suggestions for further research concluded the chapter.

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APPENDICES

APPENDIX 1: WEB 2.0 APPLICATIONS

18. Blogs – or web-log, a simple web page which consists of brief paragraphs of opinion, information, personal diary entries or links, called posts. The posts are arranged chronologically with the most recent first. Library web sites, as information dissemination spaces, provide information services to their users and act as a library promotional mechanism. A blog is the best information communication channel to extract latent feedback information from library users to enhance the quality of library services. Blogs are the most widely used Web 2.0 feature (Harinarayana and Raju 2010).

19. Wikis – a web page or a set of web pages that can be easily edited by anyone who is allowed access. Librarians can create wikis to manage electronic and physical library collections reserved for university courses.

20. RSS – a simple lightweight Extensible Markup Language (XML) format to share web site content. It resembles current awareness and selective dissemination of information (SDI) service. The purpose of providing an RSS news feed in university library web sites is to publish library news (for example, announcements, events, exhibitions, and so forth), provide information about information literacy/retrieval classes and to subscribe to RSS feeds for podcasts.

- Podcast – Audio content that is available on the internet that can be automatically delivered to a personal computer or MP3 player. It is audio on the web. Podcasts and vidcasts (video content that is available on the internet) can be used to deliver library web-based services.

21. Instant messaging – a live online synchronous channel which facilitates online interaction between two people. It can be used to replace the traditional e-mail and form-based reference services.

22. Folksonomies - also known as collaborative tagging, social indexing and social tagging, allow users to tag online content. It is open and informal method of categorising that allows users to associate keywords or 'tags' with online content. Like-minded users can easily create their own community with the same subject interest.

23. Social Networking Sites (SNS) – for example, Facebook, YouTube, Flickr, and so forth, allow information ranging from highly personal to academic interests of the participants to be shared among users.

24. Social bookmarking/user tagging – social bookmarking sites such as del.icio.us, furl, dig, Flickr, connote, CiteUlike, and so forth, allow like-minded users to easily create their own community with the same subject interest.

25. Mashups – hybrid applications where two or more technologies or services are conflated into a completely new, novel service (Maness 2006).

APPENDIX 2: LIST OF RESEARCH UNIVERSITIES IN SOUTH AFRICA

26. Nelson Mandela Metropolitan University

27. North West University

28. Rhodes University

29. University of Cape Town

30. University of Fort Hare

31. University of Free State

32. University of Johannesburg

33. University of KwaZulu-Natal

34. University of Limpopo

35. University of Pretoria

36. University of South Africa

37. University of Stellenbosch

38. University of Western Cape

39. University of Witwatersrand

40. University of Venda

41. University of Zululand

42. Walter Sisulu University

APPENDIX 3: NUMBER OF RESEARCH LIBRARIANS IN ACADEMIC LIBRARIES IN SOUTH AFRICA

No.	University	No.of librarians
1.	Nelson Mandela Metropolitan University	9
2.	North West University	24
3.	Rhodes University	24
4.	University of Cape Town	45
5.	University of Fort Hare	14
6.	University of the Free State	5
7.	University of Johannesburg	21
8.	University of KwaZulu-Natal	30
9.	University of Limpopo	20
10.	University of Pretoria	43
11.	University of South Africa	16
12.	University of Stellenbosch	17
13.	University of Western Cape	13
14.	University of the Witwatersrand	23
15.	University of Venda	6
16.	University of Zululand	9
17.	Walter Sisulu University	28

Total = **347**

APPENDIX 4: NUMBER OF ACADEMIC LIBRARIANS THAT WERE STUDIED IN EACH ACADEMIC LIBRARY

No.	University	No. of librarians
1	Nelson Mandela Metropolitan University	3
2	North West University	3
3	Rhodes University	3
4	University of Cape Town	3
5	University of Fort Hare	3
6	University of the Free State	3
7	University of Johannesburg	3
8	University of KwaZulu-Natal	3
9	University of Limpopo	3
10	University of Pretoria	3
11	University of South Africa	3
12	University of Stellenbosch	3
13	University of Western Cape	3
14	University of the Witwatersrand	3
15	University of Venda	3
16	University of Zululand	3
17	Walter Sisulu University	3

Total = 51

APPENDIX 5: A LIBRARIAN'S 2.0 MANIFESTO

Source: Cohen (2007:46)

• I will recognize that the universe of information culture is changing fast and that libraries need to respond positively to these changes to provide resources and services that users need and want.

• I will educate myself about the information culture of my users and look for ways to incorporate what I learn into library.

• I will not be defensive about my library, but will look clearly at its situation and make an honest assessment about what can be accomplished.

• I will become an active participant in moving my library forward.

• I will recognize that libraries change slowiy, and will work with my colleagues to expedite our responsiveness to change.

• I will be courageous about proposing new services and new ways of providing services, even though some of my colleagues will be resistant.

• I will enjoy the excitement and fun of positive change and will convey this to colleagues and users.

• I will let go of previous practices if there is a better way to do things now, even if these practices once seemed so great.

• I will take an experimental approach to change and be willing to make mistakes.

• I will not wait until something is perfect before I release it, and I'll modify it based on user feedback.

• I will not fear Google or related services, but rather will take advantage of these services to benefit users while also providing excellent library services that users need.

• I will avoid requiring users to see things in librarians' terms but rather will shape services to reflect users' preferences and expectations.

• I will be willing to go where users are, both online and in physical spaces, to practice my profession.

• I will create open websites that allow users to join with librarians to contribute content in order to enhance their learning experience and provide assistance to their peers.

• I will lobby for an open catalog that provides personalized, interactive features that users expect in online information environments.

• I will encourage my library's administration to blog.

• I will validate, through my actions, librarians' vital and relevant professional role in any type of information culture that evolves.

APPENDIX 6: INFORMED CONSENT

University of KwaZulu-Natal Library

Medical Library

Private Bag X7

Congella

4013

Telephone: 031 -260-4373

Fax: 031- 260- 4426

Email: ngcobon15@ukzn.ac.za

26 March 2012

Dear Respondent

Informed Consent Letter

Researcher: Nonhlanhla Ngcobo

Institution; University of KwaZulu-Natal

Telephone number: 031 260 4373

Email address: ngcobon15@ukzn.ac.za

Supervisor: Prof Ruth Hoskins

Institution: University of KwaZulu-Natal

Telephone number: 033-260 5093

Email address: hoskinsr@ukzn.ac.za

I, Nonhlanhla Ngcobo, Campus Librarian at the Medical Library of the University of KwaZulu-Natal, kindly invite you to participate in the research project entitled **"The use of Web 2.0 technologies in academic libraries in South Africa.**

This research project is undertaken as part of the requirements of the PhD, which is undertaken through the University of KwaZulu-Natal, Information Studies Department.

The aim of this study is to ascertain the value of Web 2.0 technologies in enhancing South African academic libraries' ability to make information accessible to library users. The study further aims to ascertain whether libraries are using Web 2.0 technologies to make their services accessible to their users or not, to find out reasons for not using the technologies and also to determine what impact the use or non-use of Web 2.0 technologies has on information literacy programmes.

Participation in this research project is voluntary. You may refuse to participate or withdraw from the research project at any stage and for any reason without any form of disadvantage. There will be no monetary gain from participating in this research project. Confidentiality and anonymity of records identifying you as a participant will be maintained by the Department of Information Studies, at the University of KwaZulu-Natal.

If you have any questions or concerns about participating in this study, please feel free to contact myself or my supervisor at the numbers indicated above.

It should take you about 15 minutes to complete the questionnaire.

Thank you for participating in this research project.

Nonhlanhla Ngcobo

26 March 2012

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Signature   Date

I .... hereby consent to participate in the above study.

Name: .... Date: .... Signature: ....

Supervisor's details   **Student's details**

Prof Ruth Hoskins   Mrs Nonhlanhla Ngcobo

Tel: 033-2605093   Tel: 033-2605096

Email: hoskinsr@ukzn.ac.za   email: ngcobon15@ukzn.ac.za

APPENDIX 7: INTERVIEW SCHEDULE FOR LIBRARY DIRECTORS

Title of research: The use of Web 2.0 technologies in academic libraries in South Africa.

Student's name: Nonhlanhla Ngcobo

Please note: If your library is using Web 2.0 technologies such as blogs, wikis, social networks (e.g., Facebook, Twitter, LinkedIn, etc.), please answer Questions 3 to 12.
Questions 13 to 17 are for libraries that are not using Web 2.0 technologies.

The initial interview schedule for library directors will cover the following broad areas:
1. Policy
2. Infrastructure
3. Funding

The library directors will be asked the following questions:

1. Institution

…………………………………………………………………………………………….

2. Does your library use Web 2.0 technologies, such as blogs, wikis, social networks, etc.?

Yes	No

Section A: Extent of use of Web 2.0 technologies

3. What were the implications of the implementation of Web 2.0 technologies on library staff?

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4. Has the value of these technologies been measured?

Yes	No

5. Please explain your answer to Question 4.

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……
……

6. Are there any plans in place to ensure the sustainability of these technologies in library programmes and services?

Yes	No

7. Please explain your answer to Question 6.

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Section B: Reasons for adoption of Web 2.0 technologies

8. What were the reasons for choosing to incorporate Web 2.0 technologies into
    library programmes and services?

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9. What processes were followed to accomplish this goal?

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10. Did the library encounter any challenges in the implementation of Web 2.0
    technologies?

Yes	No

11. Please explain your answer to Question 10.

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12. How were these challenges overcame?

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Section C: Reasons for non-adoption of Web 2.0 technologies and remedial measures

13. What were the reasons for not choosing to incorporate Web 2.0 technologies into
library programmes and services?

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14. What is the impact of this decision on the library service?

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15. In view of the non-use of Web 2.0 technologies, how does the library plan to keep abreast of technological developments locally and globally?

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16. Are there any plans to incorporate Web 2.0 technologies in future?

Yes	No

17. Please explain your answer to Question 16.

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……………………...

Thank you for participating in this survey.

APPENDIX 8: QUESTIONNAIRE FOR ACADEMIC LIBRARIANS

Title of research: The use of Web 2.0 technologies in academic libraries in South Africa.

Student's name: Nonhlanhla Ngcobo

Questionnaire for academic librarians

1. Institution

   …………………………………………………………………………….

2. Does your library utilise Web 2.0 technologies, especially social networks such as Facebook, YouTube, Twitter, Flickr, LinkedIn, blogs and wikis?

Yes	No

3. Please explain your answer.

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

4. Please explain the use of Web 2.0 technologies at your library with regards to these services:

4.1 Selective Dissemination of Information (SDI)
   ……………………………………………………………………………
   …………………………………………………………………………….

…………………………………………………………………………………………..

4.2 User education

…………………………………………………………………………………………

…………………………………………………………………………………………..

…………………………………………………………………………………………..

5.   Please rate the effectiveness of these tools as used by your library:

5.1 Facebook

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.2 Please explain your choice for question 5.1.

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

5.3 YouTube

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.4 Please explain your choice for question 5.3.

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…………………………………………………………………………………………

…………………………………………………………………………………………

5.5 Twitter

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.6 Please explain your choice for question 5.5.

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

5.7 Flickr

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.8 Please explain your choice for question 5.7.

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

5.9 LinkedIn

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.10 Please explain your choice for question 5.9.

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……………………………………………………………………………………………

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

5.11 Blogs

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.12 Please explain your choice for question 5.11.

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

5.13 Wikis

Very effective	Effective	Somewhat effective	Ineffective	Very ineffective

5.14 Please explain your choice for question 5.13.

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

6. Has your library gathered any information from users regarding the use of these technologies?

Yes	No

7. If "Yes", what was the response from users?

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…………………………………………………………………………………………
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8. Are librarians in your library equipped (in terms of skills and knowledge) to play an active role in the Web 2.0 arena?

Yes	No

9. Please explain your choice.

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

10. Did librarians receive training before these technologies were introduced in your library/institution?

Yes	No

11. If you answered "Yes" to question 10, please explain.

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

12. Did your library encounter any challenges when these technologies were introduced?

Yes	No

13. If you answered "Yes" to question 12, please explain.

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

14. Any comments you would like to make on this subject are welcome.

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

Thank you for participating in this survey.

APPENDIX 9: ETHICAL CLEARANCE

UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI
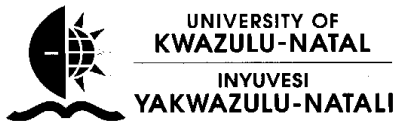
Research Office, Govan Mbeki Centre
Westville Campus
Private Bag x54001
DURBAN, 4000
Tel No: +27 31 260 8350
Fax No: +27 31 260 4609
snymanm@ukzn.ac.za

30 May 2012

Mrs EN Ngcobo (882222908)
School of Social Sciences

Dear Mrs Ngcobo

Protocol reference number: HSS/0196/012D
Project title: The use of Web 2.0 technologies in academic libraries in South Africa

In response to your application dated 26 March 2012, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steven Collings (Chair)
Humanities & Social Science Research Ethics Committee

cc Supervisor: Dr Ruth Hoskins
cc Academic Leader: Professor Victor Muzvidziwa
cc Mrs B Jacobsen

1910 - 2010
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Founding Campuses: ■ Edgewood   ■ Howard College   ⸱ ⸱ Medical School   ■ Pietermaritzburg   ■ Westville