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Developing information literacy skills within a virtual reference system

By

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DISSERTATION

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MAGISTER PHILOSOPIAE

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UNIVERSITY OF JOHANNESBURG

SUPERVISOR: Dr. Paul Laughton

March 2016
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- To everyone who assisted me, God bless you!
Dedication

I dedicate this work to my late elder brother Mr. Immanu Kamanya-Johannes for encouraging me to build the family legacy and more importantly for spending his last moments with me and making my birthday a memorable family day. I also dedicate my work to my beautiful daughters Knowledge-Emilia Fillemon and Mweneni-Martha Chanti Anghuwo, my siblings, especially Mr. James Mwiyyale and Mrs. Evi-Diina Ileka-Amupolo, for always putting the family’s interests at heart.

To my father Mr. John Jacob-Mwiyyale and my late mother Mrs. Hileni Immanuel-Amupolo your inspirational words at a tender age remain a legacy. As you say “choose to sleep less because sleeping is a nature call and cry with your eyes open and always be responsible”. This product is a result of the value you added on my childhood work.
Declaration

I, Jakobina Mweshininga Mwiiyale, hereby declare that this dissertation is my own, unaided work and any assistance that I have received has been duly acknowledged. It is submitted in the fulfilment of the requirements for the degree of MAGISTER PHILOSOPIAE: Information Management at the University of Johannesburg.

Jakobina M. Mwiiyale
Signature………………

March 2016
Abstract

The purpose of this study was to instigate the development of information literacy skills within a Virtual Reference System at the University of Namibia (UNAM) Library. An empirical survey was carried out between February and March 2015 using a quantitative approach to investigate how the UNAM Library could improve undergraduate students’ information literacy training using Web 2.0 tools. The author’s insights and understanding of the phenomenon studied was guided by a positivism paradigm and educational learning theories. Data was collected using a close-ended questionnaire, administered to a sample of 352 undergraduate students registered for more than 12 months at all UNAM campuses. An IBM SPSS statistical data analysis version 22 was used to analyse the collected data. Findings showed that although enquiries related to circulation co-activities; access to lecture’s notes and course materials dominated Reference Desk. A total of 36.9% possessed “a fair to moderate” knowledge and skills in searching the library bibliographic system (OPAC) and e-resources databases particularly those at third and fourth year level of study. The study also showed that there is a greater usage of laptops and mobile phones to access internet-based information at the university. Findings revealed that instant interactive services such as WhatsApp, Facebook, Wikipedia and YouTube were the most used Web 2.0 tools by undergraduate students. The study therefore recommends that UNAM Library should integrate these Web 2.0 tools into the information literacy program to add value to undergraduate students’ academic knowledge acquisition and skills development processes. The study further recommends that future studies need to evaluate the usability and impact of the UNAM Library Website as well as Web 2.0 tools on students’ undergraduate academic performance.
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<th>Description</th>
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<tbody>
<tr>
<td>AACR2</td>
<td>Anglo-American Cataloguing Rules 2</td>
</tr>
<tr>
<td>ACRL</td>
<td>Association of College Research and Libraries</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>Compact Disc-Read Only Memory</td>
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<tr>
<td>CoI</td>
<td>Community of Interest</td>
</tr>
<tr>
<td>CoP</td>
<td>Community of Practice</td>
</tr>
<tr>
<td>E-BOOK</td>
<td>Electronic book</td>
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<tr>
<td>E-CONTENT</td>
<td>Electronic content</td>
</tr>
<tr>
<td>E-JOURNAL</td>
<td>Electronic journal</td>
</tr>
<tr>
<td>ESRC</td>
<td>Economic Social Research Council</td>
</tr>
<tr>
<td>ILL</td>
<td>Interlibrary Loan</td>
</tr>
<tr>
<td>IM</td>
<td>Instant Messaging</td>
</tr>
<tr>
<td>LANs</td>
<td>Local Area Networks</td>
</tr>
<tr>
<td>LIBQUAL</td>
<td>Library Service Quality measurement tool</td>
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<tr>
<td>LIS</td>
<td>Library and Information Science</td>
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<td>MARC</td>
<td>Machine Readable Cataloguing</td>
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<td>MIS</td>
<td>Management Information Systems</td>
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<tr>
<td>OPAC</td>
<td>Online Public Access Catalogue</td>
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<td>RSS</td>
<td>Real Simple Syndicated</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>RUSA</td>
<td>Research and User Services Association</td>
</tr>
<tr>
<td>VR</td>
<td>Virtual Reference</td>
</tr>
<tr>
<td>VRS</td>
<td>Virtual Reference Service</td>
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<tr>
<td>ULM</td>
<td>University of Namibia Library Management</td>
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<tr>
<td>UNAM</td>
<td>University of Namibia</td>
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<tr>
<td>URPC</td>
<td>University of Namibia Research and Publications</td>
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<tr>
<td>WorldCat</td>
<td>Universal Online Catalogue</td>
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<td>WWW</td>
<td>World Wide Web</td>
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CHAPTER 1
INTRODUCTION

1.1 Introduction and background to the study

Throughout the evolution of Internet technologies, the process of accessing information has improved tremendously due to the increasing capacity of digital users and improvements in intuitive understanding (Younie & Leasky 2013:8). People have been widely acknowledged as unique contributors to technological innovation and social change. Meyers, Erikson and Small (2013) highlight the argument that the introduction of instant messaging and user-generated platforms influenced digital natives to better embrace digital technologies to co-create digital-based content. Due to the demand of analytical and critical thinking as well as digital literacy skills required to utilise scientific information more meaningfully, it has become apparent that the evolution of Internet resources demands every digital user to possess adequate knowledge and the skills required to effectively retrieve and apply information profoundly.

A notable underuse of library scientific-based databases by undergraduate students has become a challenge which has prompted academic libraries to reinvigorate their generic reference services approaches within a virtual environment to reach out to digital natives needs. In a study by Becker (2012:474) it was found that, the structural and contextual operation of academic library reference and research services is shaped by the presence of the millennial students on the Internet, following a dominant use of Web 2.0 tools and virtual-based resources. Another study by Andrews and Haythornthwaite (2007:205) also states that like energy, information is a powerful source of personal growth, social change and, if used effectively and purposefully can add value to “the lives of individuals”.

Undeniably, time, communicating value, and personal interaction are the key measures and critical drivers of social change and technological development.
Influenced by the dominant use of Web 2.0 tools accustomed with undivided multi-sensory calibre, a higher usage of digital communication and instant messaging interfaces across profit-driven environment is noted (Phil 2013). It is becoming a trend in academia, particularly in the developed nations to highlight the importance of Web 2.0 social networking platforms and human-mediated systems in connecting and exchanging ideas, creating content, building a knowledge sharing society collectively and rendering virtually based services to undergraduate students (Young & Rossmann 2015; Glassman & Burbidge 2014; Phil 2013). With the custodial role of equipping millennial students, who embrace technology on a regular basis in their academic engagement, rendering instant solutions via a virtual-based environment has also become a social scrutiny for many academics and scholars (Meyers et al., 2013; Johnson 2011; Dunaway 2011; Denison & Montgomery 2012).

However, slow progress in implementing library-user based services within a Virtual Reference Service (VRS) has also been noted in academic libraries in the developing nations, particularly in Africa (Kwanya, Stilwell & Underwood 2011:152; Raju & Schoombe 2013:27). As signified by Maness (2006:10); Kwanya et al., (2011:152); Wu Song (2010:249) as well as Fernandez-Villavicencio (2010:125), a mere analysis of user behaviours, values and expectations does not fulfil the call of building a knowledgeable and competent society, equipped with lifelong learning skills.

Accordingly, the following major commitments were made by the University of Namibia (UNAM) Library Management (ULM) in the past few years, to improve quality of library services as stipulated in the UNAM Library 5-year Strategic plan 2011-2015:

- Reintroduction of a Reference Desk in 2008 at the main library to assist in providing human-interaction services in meeting undergraduate students’ daily queries
- Restructuring of UNAM Library organogram in 2009 to dedicate to each faculty a Subject Librarian in order to address students’ information needs, improving the process of acquiring library resources and strengthening the relationship with academic teaching staff
Enhancing of in-house knowledge sharing and staff exchange training programs via a Human Capacity Development collaboration project with information specialists from Helsinki University Library and Tampere Library, Finland carried out in 2012/2013

The high demand of academic related queries by undergraduate students at library user-based services points has resulted in the need to develop human-to-human relationships via a virtual-based environment which includes Reference Services Desk, Student Computer Help Desk and Subject Librarians offices. The UNAM Library Quarterly Business Review statistics of 2010, 2011, and 2012 further reports that, students and teaching academics often send their reference queries through emails, personal mobile phones as well as via the UNAM Library Website and Facebook page. In addition, the inauguration of a new UNAM Southern campus in 2014 has amplified the need for expanding reference services via the Web, to deliver online and virtually-based assistance to students.

In this context, UNAM Library “had” a challenge to investigate pragmatic and current issues associated with the use of Web 2.0 technology instructional tools in order to improve undergraduate students’ information literacy skills. To meet such comprehensive and underlying responsibilities there was a need to invigorate academic libraries’ generic user-based support services and training. A thorough analysis of undergraduate students learning needs and technological preferences was required to achieve this goal. A specific research problem was formulated.

1.2 Research problem

A recent LibQual Assessment Report of 2012 revealed a poor rating of the adequacy and relevance of UNAM Library services. In addition to poor retrieval of bibliographic records via library-based systems; statistics show low library visits and limited support from the library staff. The report has put pressure on UNAM Library to seek for innovative ways to respond to undergraduate queries at a higher level. Due to an increase in the number of undergraduate students registered for distance and part-time studies each year, improving quality services is a critical strategic focus area.
Between 2008 and 2013, following the reintroduction of the Reference Desk, no study was done to assess the effectiveness of reference services and their effect on meeting undergraduate students’ academic information needs and preferences. The main question is: *What Web 2.0 tools and reference instructional services can the UNAM Library use to improve undergraduate students’ information literacy training within a Virtual Reference environment?*

### 1.3 Research objective (s)

Scientific evidence generated from this study is required to improve information literacy; and library orientation training session and guide the planning of the integration of a Virtual Reference Service (VRS) envisioned to address undergraduate students’ academic needs via the Library Website. Therefore, the research objective of this study is to assess undergraduate students’ usage of library-based resources and reference services in order to determine the types of Web 2.0 desired to address their academic gaps/needs within a virtual reference environment at UNAM Library.

### 1.4 Research questions

To address the main research question the following sub-problems are identified:

i. To what extent do undergraduate students use library user-based services and resources?

ii. What kind of reference instructional services do undergraduate students require to meet their information and academic needs?

iii. What types of Web 2.0 technology tools are currently used by UNAM undergraduate students?

iv. What kind of barriers are being faced by undergraduate students in obtaining information and academic assistance from the library?
1.5 Significance of the study

It is apparent that Web 2.0 social networking tools present an opportunity for academic libraries to respond to undergraduate students enquiries instantly. The UNAM Library is an integral part of the university and the largest academic library in Namibia, but is faced with a mammoth task to provide equitable access, and deliver quality services that support teaching, learning and research activities (UNAM Library Management Report 2013/2014). At present, the university has 12 satellite campuses, and 9 regional centres located hundreds kilometres away from each other across the country. These satellite campuses are at Windhoek Main Campus, Oshakati, Hifikepunye Pohamba, Rundu, Khomasdal, Katima Mulilo, School of Medicine, Ogongo, Jose E. Dos Santos, Neudamn, Sam Nujoma and Southern Campus. Each satellite campus has a fully furnished library, equipped with Internet resources, including wireless-access hubs, and student-support computers.

Thus, a Virtual Reference System (VRS) would be designed to implement appropriate information literacy instructions using Web 2.0 social networking technologies to attend to a reasonable number of reference enquiries from undergraduate students registered to pursue their studies through full-time, part-time and distance learning. In order to answer the above-mentioned research questions, a list of key variables and pragmatic issues were extracted from various literature. The review guided the methodology used for the data collection process as described in the next section.

1.6 Brief methodology

A questionnaire was employed to gather data from the study population of undergraduate students registered across the 12 UNAM Library satellite campuses countrywide. A positivism paradigm was adapted to select the study participants using a convenience sampling technique from a sample population of undergraduate students who have been at the university for more than 12 months. The sample consisted of a total of 352 undergraduate students who were found in the library enquiring about library services at four user-centric areas: the Reference Desk,
Circulation Counter Desk, Student Computing Services area and Subject Librarians offices. The study was carried out over a 6 weeks period.

1.6.1 Brief summary of empirical findings

Following a thematic view of socio-technological and cultural practices associated with the accessing and retrieving of scientific information and digital communication tools via academic multifaceted sources, a summary of some of the findings are presented:

i. A total of 58.6% of the participants’ fall within the age category of 20-24, 35.5% of the participants were in their second year level of study. Despite the availability of UNAM Library user-centric support services, facilities and resources at each campus, only 51.0% of participants visited the library premises more than once a week.

ii. 39.2% did not attend any library user-based training activities earmarked to equip them with appropriate information seeking strategies and knowledge on the use of library-subscribed academic-based databases via the Library Website.

iii. Findings also shows that 39.8% of participants needed assistance regarding WiFi-connection settings, which was equivalent to the percentage who seek assistance related to OPAC (39.8%).

iv. A total of 23.9% participants frequently required help with e-journals and e-books, while 22.2% needed assistance regarding assignment and research query.

v. Despite the availability of Internet learning facilities at each UNAM Library, only 16.4% relied on the library-based computer leaving a relatively higher percentage of undergraduate students to access online and digital-based resources via Internet wireless access points or mobile data networks, using handheld communication devices like laptops (54.1%) and cellular phones/smartphones (39.7%).

vi. Those who consulted the Reference Deck frequently (39.5%) and occasionally (39.5%) used their cell phones and smartphones to access the
Internet. The correlation indicates a positive outcome which added value to the integration of self-discovery information designed with instant messaging interfaces.

vii. Despite the use of library information fact sheets and subject toolkits available on the Library Website to guide access to scientific resources, it was discovered that 58.2% of respondents admitted that they were struggling to utilise these information sources effectively.

viii. Although 58.5% of participants were knowledgeable in accessing lecturers’ notes and subject course materials via the Student portal, a total of 32.7% and 29.8% stated that they lacked adequate knowledge and skills to download e-content such as e-books, e-journals or to retrieve bibliographical records via OPAC.

ix. A total of 36.1% of undergraduate students at fourth year level of study felt they were constrained by limited knowledge and skills regarding the use of library resources. However, it was also found that 55.4% of fourth year students had not attended any library-user based training and only 14.5% seek assistance from the Reference Desk regularly.

x. WhatsApp and Hangouts (49.1%) gained a monumental value and were clearly the most frequently used instant messaging chat applications. Undergraduate students used Facebook (47.4%), YouTube (33.0%) and Wikipedia (12.2%) most frequently to engage with UNAM Library. The library uses these platforms to deliver news feeds and exchange ideas by posting them on networking platforms. The platforms can be used to connect undergraduate students with appropriate information, and learning artefacts instantly with the relevant information to be provided being indicated by their degree subject and course choices.

1.7 Limitations and delimitations

Significantly, this study was limited to undergraduate students who have been at the university for more than 12 months and who are primary users of UNAM Library resources. Since the study employed a quantitative based approach within the parameters of positivism paradigm; which seeks to construct meaning objectively,
the reasons influencing undergraduate students to consult (or not consult) library expertise when confronted with academic problems were not exhausted. Due to the higher demand for academic information support services by undergraduate students within the library, a convenience sampling techniques was used which might have limited the involvement of average undergraduate students who were not using the library during the data collection process.

The limited time and limited budget available confined this study to undergraduate students visiting the libraries at each UNAM campuses, leaving students at postgraduate level left out of the study. This was because this study sought to seek for innovative ways of equipping undergraduate students with appropriate information searching techniques and knowledge development practices within a virtual dominant era. Retrospectively, it is apparent that the study findings substantiate the need to implement Web 2.0 tools to enable library staff to equip undergraduate students’ academic needs via information literacy training.

Based on that outcome, the study’s theoretical position was grounded in educational learning theory; a critical distinctive which was not reflected on the questionnaire. The use of information seeking behavior models within a Library and Information Science (LIS) context was also delineated due to the notable use of a multidimensional approach in creating a Virtual Reference Service (VRS) into the context of a network of academic libraries. As such, learning theories were revisited to guide the process of developing knowledge and skills using human-mediated services using the most used Web 2.0 tools as commonly cited in the literature.

Although undergraduate student’s learning needs, social expectations and values indicated on this study may not be comprehensive, it is argued that the sample size is sufficient for the study’s empirical findings to be generalised to the entire undergraduate student population of UNAM.
1.8 Clarification of key terms

The following operational terms are used in this study:

**Academic literacy:** the ability to carry out academic work using appropriate sources and scientific resources ethically (Khan 2007).

**Collective intelligence:** a term used to emphasise the need to connect undergraduate students with a variety of academic sources instantly and intelligently (Wu Song 2010).

**Digital literacy:** a concept used in this study to describe the ability to understand and utilise scientific based information stored across various digital formats using a computer (Meyers et al., 2013).

**Information literacy:** a set of abilities required by individuals to recognise, find, evaluate, use, communicate and appreciate any form of information produced in its various formats (Eisenberg et al., 2004).

**Information seeking habits:** a term used to describe the general usage of library services, collections, facilities and electronic resources by undergraduate students (Kuhlthau 1989).

**Library 2.0:** a library-based strategy of attracting the use of library-based resources via Web 2.0 tools and instant communication systems (Kwanya et al., 2010).

**Millennial/millennium generation:** a generational term used to describe a dominant use of technology and its associated communication devices by undergraduate students who are pursuing their studies at university level (Meyers et al., 2013; Bladek & Okamoto 2014).
**Reference instructional services**: a term used to describe library user-based training; user—education and information literacy instructions aimed to equip undergraduate students with appropriate academic skills (Solorzano 2013)

**Social technology**: an adopted term used to describe the integration of Web 2.0 social innovative tools in order to invite and teach undergraduate students information literacy skills as proposed by Arya and Mishra (2011)

**Virtual reference system**: a service-oriented model integrated in academic libraries to enable reference librarians to interact with, guide and respond to undergraduate students’ academic queries instantly (Arya & Mishra 2011)

**Web 1.0**: a term used to classify the evolution of online information and resources from the initial phase of the World Wide Web (O’Reilly 2005)

**Web 2.0**: a term used to classify the evolution of user-generated content and social networking applications from its predecessor Web 1.0 (O’Reilly 2005)

**Web 3.0**: an advanced term used to describe the evolution of Web 2.0 in connecting digital users with information intelligently (Aghaei et al., 2012)

1.9 **Structure of the thesis**

This study is divided into five main chapters, whereby Chapter 1 deals with the research background, and its orientation, as well as the significance value of the study in addressing pertinent issues facing UNAM Library at present.

Chapter 2 provides a theoretical review of pragmatic issues associated with the accessing and retrieval of scientific information and digital communication tools. It considers the factors impeding academic libraries from equipping undergraduate students with valuable knowledge and adequate skills using instructional reference services and information literacy training activities. Five educational learning theories and common styles associated with the development of knowledge and skills
processes via human-mediated systems and instructional learning artefacts were revisited.

Chapter 3 explains the research design and methodologies employed to gather data in support of the research key questions via a questionnaire. A manipulation of empirical data is done in Chapter 4, which focuses on analysing and discussing the relationship between key variables using IBM SPSS statistical data analysis version 22. Graphs, tables and cross-triangulation are used to signify key aspects and a summary of the study findings is provided to answer the sub-questions.

Chapter 5 draws conclusions and presents the recommendations of the study. The study’s ultimate objective being to quantify and provide scientific evidence regarding the library plan of improving the current state of information literacy and library orientation training sessions. The common ground from Bandura social learning theory and Connectivism learning models was intercepted with the study findings. This was done to address pragmatic issues associated with technological instructions, access to information learning patterns, digital skills and academic proficiencies.

A summary of recommendations is given and areas that need further investigation are guided within the context of Library and Information Science (LIS). Despite a set of inextricable academic learning dilemmas facing undergraduate students at UNAM, the study outcome can be generalised to the entire undergraduate student population.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter’s central focus is to examine the strategies of academic libraries for adding value to students’ academic competencies using appropriate technological systems and human-mediated services. As far back as 1940, efforts to magnify the power to use information to identify, control, and manage social change via the Internet has been documented in various personal records and anecdotal memoirs (Younie & Leask 2013:12). Subsequently, various communication and networking mechanisms for sharing data and information in a unified process has been introduced since 1969 (Hall & Tiropanis 2012).

As shown in Figure 2.1 (page 13), the Internet evolution can be analysed from the period of computer-based, to the convention of static Websites, online documents and content, to web-based information services and digital-born content, to user-participatory and human-mediated systems (Hall & Tiropanis 2012). Presently, the Internet is known as “the world wide networks of networks connected by telephone communication systems to enable the transfer of information in a consistent and logical manner” (Younie & Leask 2013:215).
In order to assess the impact of the Internet advancement and digital communication on building human capacity and new knowledge, particularly in an academic environment, a multi-dimensional approach is undertaken to review numerous anecdotal literatures that describe the development of information literacy skills within a virtual environment. This is done to determine the extent to which undergraduate students can utilise digital-based resources using Web 2.0 technologies as a library support system within a Virtual Reference Service (VRS).

To achieve this, the evolution of networked-based information; digital communication; user-based applications and online resources in the academic domain is reviewed under the following Headings:

Heading 2.2 discusses the evolution of user-based services and systems in academic libraries in order to understand the irreversible power of creating, controlling and availing access to digital-based information across computer networks using appropriate user-based services. Thus, a general history of academic libraries and their custodial role in providing access to scientific information stored across various knowledge repositories is discussed first. An explanation is also provided of the key phases in the development of technological tools and user-based systems in academic libraries. The section provides a retrospective view of the adaptation of the web-based resources in modern
academic libraries. The section also reviews the evolution of digital services in academic libraries during the era of the World Wide Web (WWW), classified as Web 1.0.

Heading 2.3 assesses evolution user-generated content, collaborative services and multi-sensory applications connoted as the second phase of the Web or Web 2.0. As described in O’Reilly’s work (2005:1), Web 2.0 is “encompassed with a set of principles and practices that tie together a veritable solar system of sites that demonstrate some or all of those principles, at a varying distance from that core” (O’Reilly 2005:1). The section further explores the features of Web 2.0 and the tools most commonly used by millennial students’ and the implications of the use of these tools for academic libraries co-services.

Academic literacy being a critical and prevailing factor that adds value to student’s flexible learning (Khan 2007:3), a brief historical development of information literacy program in academic libraries is discussed under Heading 2.4. This section analyses the evolution of user-based training and reference instructional services in order to understand the dialectic impact of information evolution and technological innovation in undergraduate students’ information seeking processes. Since an individual’s ability to access, retrieve and anticipate academic based databases and virtual learning management systems is a central demand in academic libraries, a retrospective view of key events that spearheaded the development of information literacy skills within a virtual environment is elaborated. This is done to showcase issues that are impeding academic libraries to equip undergraduate students with appropriate information searching and retrieving skills into a 21st century Web 2.0 using learning trend.

As conceptualised by Kwanya et al., (2010), Library 2.0 tools are designed to invite, anticipate and promote the use of library-based resources via a variety of web-based technological tools and communication systems’. Objectively, the embedding of Web 2.0 tools in academic libraries signifies the integration of innovative services as an effort at enhancing student’s capacity building and knowledge development in a library environment. Notably, various operational concepts such as social networking; social bookmarking; social media and participatory technologies have
been used interchangeably. These concepts are adopted in describing innovative ways of sharing information and exchanging tacit knowledge residing in human minds and databases repositories systems via a defined system (Kwanya et al., 2011; Maness 2006; Dunaway 2011).

Based on that notion, a term social technology is adopted in this study to signify the value of facilitating access to academic resources whilst addressing students’ academic information needs via a human-mediated system as proposed by Jane and McMillan (2003:240). Therefore, in this study, social technology refers to “the integration of social innovative tools, undertaken by teaching and learning institutions to impart students with multi-literacy skills and hybrid academic support services as an effort to meet students’ ambiguity needs”. To assess the impact of Web 2.0 applications as instructional tools and virtual-participatory services into academic libraries reference services, the section summarises key aspects that needs to be taken into consideration in addressing undergraduate students’ academic needs and gaps via Virtual Reference Services (VRS).

To address the complexity of developing instructional learning tools and knowledge dissemination systems within Library and Information Science (LIS), Heading 2.5 extracts basic pragmatic issues associated with the application of technological tools and web-based instruction services in education. Using the evolution of technology as a key influencer of social practices and human processes in society at large, a glimpse from the following education philosophical views and learning approaches is taken into consideration:

- Behavioural/Instructional Learning Approach;
- Constructivism Learning Theory;
- Vygotsky Learning Theory and
- Connectivism as a digital age Learning Theory.

The above-mentioned theories are revisited to achieve the following objectives:

- Firstly, to understand the rationale behind the integration of technological-based instructions in education
• Secondly, to determine the extent to which academic libraries instructional programs (information literacy) and human-mediated services (reference services) have been invigorated to fit student learning style.

Based on the above structure, Heading 2.2 introduces readers to logical issues undertaken by early thinkers as an effort to enhance access to digital information, communication devices and knowledge repositories in a computerised era.

2.2 Evolution of user-based services in academic libraries

Since the destruction of the Great Library of Alexandria in Egypt, preserving humankind’s artefacts and cultural practices remains a custodial role in academic libraries (Kwanya et al., 2011:155; Brophy 2005:7). In the 18th century, academic libraries contributed to the development of social relationships and social practices between individuals and learned societies (Brophy 2005:31; Lloyd 2010:56). Sharing analogous functions with non-academic libraries and archives, initially, academic libraries specialised in collecting and preserving scholars’ manuscripts. Lloyd (2010:56); Brophy (2005:24); Li (2009:5) as well as Bailinn and Grafstein (2005:317) cited resources, user services and human capital as three key aspects that form an academic library domain.

Subsequently, various literatures indicated that in the early 19th century, academic libraries were classified into three main sections, namely the physical collection (library holdings), the space, and the public outreach and/or user services (Hossain 2014:463; Kwanya et al., 2011:155; Li 2009:144). As re-emphasised in the American College of Research and Libraries (ACRL) (2010), academic libraries are mandated to acquire, preserve, disseminate and safeguard information sources and knowledge repositories. Thus, each of the parts identified played a major role in ensuring that academic library clientele are provided with adequate space and resources to support access to scientific information and knowledge artefacts. Brophy (2005:6) also documented that until the 1950s, academic libraries were known as university libraries, tasked to manage and preserve scholars’ manuscripts, teaching materials and lecture series for reference purposes.
In light of the above, academic communities, especially students and researchers, were able to borrow and consult reference materials within the library premises (Brophy 2005:6). Following an increase in the use of mass media, computer networks and the diffusion of digital technologies in higher education back in the 1950s, academic libraries began to play a major role in identifying, maintaining, preserving and controlling books and knowledge sources across tons of mass media (Hossain 2014:463). Retrospectively, some academic libraries, particularly in the developed nations were no longer seen as a place filled with a physical collection, but viewed as an integral learning space where knowledge is reconstructed, mounted and distributed for better use (Li 2009:144; Kwanya et al., 2011:12). As further noted by Kwanya et al., (2009:70) and Brophy (2005:29) serving users with the right resources, using a variety of support services, ranging from print to handheld computing tools should become a service philosophy in many academic libraries.

Noting the evolution of mass media applications, academic libraries are now defined as a system or entity that functions as an integral gateway providing access to online information stored in numerous heterogeneous applications, databases, network platforms and systems (Li 2009:247; Brophy 2005:1). With hindsight, the analysis of Johnson (2011:93) and Solorzano (2013:90) divided the history of academic libraries into two sections:

- The public or user services; which dealt with rendering of multifaceted services to library users using different techniques such as circulating materials and resources, user education training and reference instructional services
- The acquisition and technical section; which dealt with library technical issues such as materials selection and cataloguing, budgeting, resource allocations including the acquiring of technical equipment, systems and computer networks

Faced with a societal role of adding value to people’s lives, academic libraries in the developed nations began to computerise their print-card directory to an online catalogue (Solorzano 2013:89). This was mainly done to expand access to
bibliographic records and library holdings to improve productivity, library statistics as well as building institutional repositories (IR) (Hossain 2014:463). Notably, various scholars categorised the diffusion of innovation according to the following six main phases (Dupuis 1999; Lynch 2000; Bailinn & Grafstein 2005; Li 2009; Kwanya et al., 2011):

- Introduction of computerised collections and services
- Digitisation of rare and unique collections
- Conversion of electronic resources and digital-based systems Web 1.0
- Embedding of Web 1.0 information and learning commons
- Integration of user-generated content and Web 2.0 applications
- Application of Web 2.0/Library 2.0 into Virtual Reference Services (VRS)

Debatably, each transformation phase is associated with unique contingency factors. In order to demonstrate how each phase contributed to the current predicaments facing academic libraries in imparting undergraduate students effectively, the following action was undertaken:

- Firstly, a review of the effects of the automation age on academic library users as well as the factors that contributed to the digitalisation of rare and unique collections and creation of digital library services within an academic library setting (this is highlighted under Heading 2.2.1).

- Secondly, the usage of library-subscribed resources (electronic resources) and digital-based systems are identified as key issues that influenced the creation of information and technology learning commons and virtual-based information which is analysed using Web 2.0 as a contemporary learning trend (under Heading 2.3).

- Thirdly, a historical review of reference services, instructional user education and the integration of human-mediated applications and systems is discussed within the rhythm of information literacy plethora and the Library 2.0 trend (under Heading 2.4).

Based on the above structure, Heading 2.2.1 (page 19) elaborates how the automation of library holdings and operational processes was one of the key events
that has augmented the development of information literacy skills amongst undergraduate students.

2.2.1 Computerisation of academic library collections and services

Signified as the early adopters of technology, the automation of library operations is dated back to the early 1960s; a period dominated by the traditional standalone computers, anchored to acquire, manage and control the entire library physical collection (Dupuis 1999:288; Li 2009:5; Kwanya et al., 2011:147). Between the 1960s and 1970s, machine-readable cataloguing (MARC) were noted as first bibliographic databases and electronic resources adapted in universities libraries (Baillinn & Grafstein 2005:317; Beetham & Sharpe 2007:35). Initially, science and technology dominated CD-ROMs until the evolution of newer shelf-packed commercial products in the 1980s. As documented by Lynch (2000:63), a number of library operational systems and shared resources were acquired via library consortia in the late 1980s.

Li (2009:22) notes that the library automated systems were programmed mainly to perform conventional tasks like capturing, classifying and indexing all library holdings according to its content and format. Sullivan (2011:2) also noted that during the automation of the library print collections; many academic libraries were operating under a restricted budget. In order to centralise the process of creating and assigning bibliographic records (metadata) across different publishers, academic libraries within European and American continent adapted a traditional model of acquire-catalogue-circulate (Kwanya et al., 2011:147). To create uniformity amongst library holdings worldwide, a standardised library-based scheme, developed with subject classification rules and cataloguing codes called Anglo-American Cataloguing Rules (AACR2) were endorsed (Brophy 2005:7).

Bibliographic databases and electronic resources were created to improve access to the library holdings (Anglada 2014:605). However, the inadequacy of early computer networks, the technicality of software and the limited funds constrained academic libraries to utilise electronic resources fully. As a result, access to commercial
databases was restricted to library users only; a phenomenon which became a socio-structural and technological barriers to various library users (Li 2009:23). Retrospectively, the provision of CD-ROMs and other associated databases did not make a great impact on academic library users, let alone add value to the status of academic libraries professionals (Anglada 2014:605). Through library consortia, a number of digital related projects such as copy cataloguing systems and interlibrary loan services were introduced (Kwanya et al., 2011:147). However, access to such commercial databases was restricted to licence certificates forcing each academic library entity to select pertinent collections based on their user’s needs (Li 2009:12).

Anglada (2014:605), Bailinn and Grafstein (2005:319) as well as Brophy (2005:56) noted that instead of promoting the value of utilising digital resources, many academic libraries concentrated on controlling access to digital resources using rigid passwords and procedures. Hence, most of the electronic resources were constrained by difficulties of supplying topical subject-based content. As indicated by Lynch (2000:62) a positive influence of shared cataloguing and newer library management information systems (MIS) was that it enabled academic libraries to control and manage their co-processes using statistics to support their decisions. As an effort to oversee the usage of academic library collections whilst minimising the library’s operational cost, online public access catalogue (OPAC), a module within MIS, was implemented in academic libraries in the 1980s (Dupuis 1999:196; Anglada 2014:605; Lynch 2000:60).

Designated to offer users better access to the entire library collection hosted within a defined parameter, arrays of library holdings and resources were consolidated into OPAC as a single operational management system (Kwanya et al., 2011:147; Lynch 2000:62). Using the OPAC system, union catalogues were created and conjoined to enable technical librarians’ staff copy and adopt bibliographic records of the entire library holdings effectively. As such, bibliographies of books, rare manuscripts, periodical volumes, electronic journals, CD-ROMs, and full-text products were compiled into a unique format (Anglada 2014:604). In augmenting the usage of library resources, OPAC calibre offered a number of rudimentary services like creating users profiles, reserving materials and capturing circulations statistics (Li 2009:24; Allison et al., 2012:3811; Anglada 2014:604).
As noted further by Anglada (2014:604), OPAC was signified as a major library operational system and networked application designed with searching options and interfaces to enable users to view the bibliographic records and the status of library holdings (Brophy 2005:78). Sullivan (2011:2) as well as Raju and Schoombe (2013:27) described the conversion of library catalogues into OPAC as a tedious task which forced academic libraries to restructure their internal operation and strengthen their public access services via digital library systems (Lloyd 2010:15; Johnson 2011:93). Noting the evolution of web-based information and fee-based resources, academic libraries began to revive their business operations and expand their services via digital services in the late 1990s as deliberated below.

2.2.2 Evolution of digitisation and interlibrary loan services

Li (2009) noted the digitalisation of unique and rare materials and the creation of a dedicated service called interlibrary loans (ILL) to supplement library holdings by lending. Following an increasing demand for scientific communication via research and development fields scholars and researchers began to demand topical materials to supplement the information contained in books (Brophy 2005:7). To expand access to a print collection within the digital format, a marginal number of rare and unique literatures were digitalised (Lynch 2000:63). In addition, special materials such as research manuscripts, theses and dissertations and print journals were also digitalised to extend access to scientific information and as an effort to meet undefined needs of academics and researchers (Kwanya et al., 2011:153).

However, although there were clearly increases in interlibrary loan requests (ILL), in addition to OPAC searches and circulation figures, the actual tasks performed by users could not be differentiated from the actual service delivered or received (Lynch 2000:62). Library usage statistics could also not reveal users difficulties in accessing in-house databases nor information gaps in the collection (Fernandez-Villavicencio 2010:125). Like the former phase, lending as a specialised service and the digitisation of library services became a burdensome task to many academic libraries due to the shortage of digitisation tools and expertise (Brophy 2005:7). Findings by
Fernandez-Villavicencio (2010:124) as well as Meyers et al., (2013:355) disclosed that between 1980 and the late 1990s, an increased usage of Internet technology and Web 1.0 infrastructures in higher learning institutions influenced changes within academic libraries.

Although such practices relied on Internet connectivity and bandwidth coverage, extended access beyond the physical collection and OPAC database became a durable move in academic libraries (Brophy 2005:76; Li 2009:23). Due to stringent issues such as licencing control and privatisation, interlibrary loan staff spent increasing amounts of time attending to technical issues and financial administration (Anglada 2014:605). Kwanya et al., (2011:157) as well as Li (2009:12) also cited the integration of academic-related applications and instructional reference services like CiteULike, Mendeley and Zotero as a strategy for enhancing the usage of Library Websites whilst improving students’ academic literacy and technical writing skills.

To address such predicaments, full-text based databases and electronic resources were introduced to support research and development projects (R&D) as noted by Simsek and Simsek (2013:128). As addressed under Heading 2.2.3 the evolution of Web 1.0 tools and services forced academic libraries to integrate electronic resources by subscribing to a variety of academic databases’ and open access resources.

2.2.3 Adaptation of electronic resources and digital-based systems

Since the evolution of digital-born information, a notable growth of specialised software within business industries began to offer better access to digital-based resources (Younie & Leask 2013:6). Following the evolution of commercialised information and academic resources accessed across a number of web-based services providers, especially via Google, most academic library services became doomed and ineffective in meeting users’ new demands and expectations (ACRL 2010, Leino 2006; Simsek & Simsek 2013, Kwanya et al., 2011). To leverage the gap between academic library users and the collections, electronic resources and
online reference services were introduced in European and Western academic libraries.

As defined by Kwanya et al., (2011:153) “a digital library is a library where the physical collection is processed and stored in digital formats facilitating electronic searching and retrieval of the same through digital devices such as computer”. Albeit, digital library services offer a number of salient features devoted to provide access to online content and digitised materials, irrespective of the format, systems and location (Simsek & Simsek 2013:127). As indicated by Li (2009:23) academic libraries in the developed nations increased their budgets and subscribed to a set of abstracts and full-text academic databases. While some academic libraries were pressurised by limited budget; other technological architectural conditions also restricted access to scientific or academic databases. As such, rendering access to rare materials/resources was either done through library consortia agreements or via open access negotiations; a structural hindrance which limited access to topical information and user-centred services (Li 2009:23).

That being argued, a number of electronic-based databases were selected by library professionals leaving out teaching academic and researchers’ inputs (Brophy 2005:12; Li 2009:23). To a certain degree, the absence of value-added discovery interfaces also affected the usage of library-subscribed resources because users failed to attach meanings to the actual value of utilising such e-resources (Anglada 2014:608). Li (2009:25) further stated that, relying on materials circulation statistics to plan and strategise worsened academic libraries performance and weakened the opportunities to anticipate changes influenced by external forces. Anglada (2014:608) noted that technological changes, legal and environmental policies and standards, economic growth and political as well as cultural issues presented threats to the longevity of academic libraries in an environment dominated by free and fee-based information via the Web.

Furthermore, poor assessment of user perceptions and limited skills in retrieving bibliographic records via electronic databases were contributing factors to lower usage of a number of academic library in-house databases (Leino 2006:5; Whitmire 2004:99; Sullivan 2011:2). Solorzano (2013:91) also noted that the availability of
web-based serendipity business models began to offer better access to information especially the digital natives. As such, the evolution of Web information did not only challenge the position of academic libraries endeavours, but also substituted academic libraries co-business, let alone surpassed the passive way of lending customer services (Fernandez-Villavicencio 2010:126; Wallis 2014:68).

To address the afore-mentioned indispensable changes within the academic library setting, reference services queries, interlibrary loan requests and subject-based services were constantly evaluated to enable academic libraries to detect changes within external environment (Wallis 2014:68). Correspondingly, academic library professionals were compelled to:

- Restructure and expand access to library archaistic systems by creating user searching guidelines and specialised content via library consortiums
- Integrate data management information systems, designed to manage and generate usage statistics from masses of in-house databases
- Consolidate universal library catalogue (WorldCat) (a module within MIS), in order to expand access to unique resources hosted by other libraries across the globe
- And most importantly develop practical user guides, hand-outs and subject-based searching techniques to enhance the process of retrieving journal articles and other knowledge discovery resources within the academic databases and digital systems

In order to provide better access to library-subscribed resources, most of the electronic databases were centralised to offer universal access via a one-stop gateway (Kwanya et al., 2011:152). Thereafter, information commons and digital reference services were introduced to ensure that academic libraries sustain and re-energised their valuable position in availing access to scientific resources and silos of knowledge repositories continuously. Heading 2.2.4 (page 24) addresses key issues which influenced the revival of reference desks and development of information literacy skills in a digital-dominant environment.
2.2.4 Creation of information commons and digital reference services

As documented by Brown (2010:1), Simsek and Simsek (2013:126), about half of the subject-specific databases and electronic resources acquired via library consortia began to lose their value and licencing authority toward the beginning of 2000. With a notable increase of digital borne content in 2000, extending access to academic resources and services beyond the physical library building became a critical strategy in many academic libraries (Li 2009:26; Fernandez-Villavicencio 2010:125). A model of unifying a set of library resources and user-driven services into a single learning platform was recognised as a feasible option. Li (2009:25); Whitmire (2004:45) as well as Kwanya et al., (2011:153) connoted this process as the creation of information commons dedicated to supply access to library-based resources and other knowledge management systems within the Web.

Noting the arrival of Web 1.0 resources and its complications, availing academic resources in a digital format via customised services alone did not lead to equal access to digital and electronic resources. As lamented by various authors, poor analysis of users’ needs and technology competencies prior to the integration of electronic and digital library services strained academic libraries co-value (O’Gorman & Trott 2009; Fernandez-Villavicencio 2010; Sullivan 2011). Arguably, the establishment of information commons amenities only benefited a marginal number of onsite students who possess basic knowledge and skills to access and retrieve information meaningfully (Baker et al., 2012:331). Yet, every student is required to possess basic skills and knowledge on how information is organised to utilise hybrid of information resources effectively (Kwanya et al., 2011:147).

Dominquez-Flores and Wang (2011:495) argue that, between 2000 and 2005, academic libraries began to strategise new ways of increasing the usage of electronic resources to justify their value and the return on investment rate. Accordingly, some academic libraries embedded web-based resources via digital reference services to facilitate access to library-based resources beyond the physical collection (Sullivan 2011:2). However, retrospectively, instructional guidance on how-to-access online information and differentiate information value from tons of Web
resources and scholarly resources was created and introduced via academic libraries websites (Solorzano 2013:90). Furthermore, Khan (2007:8) as well as Baker et al., (2012:330), assert that, although Web 1.0 offers information resources enabling users to embed content aggregator via computer-mediated systems, access to electronic and virtual-based resources still required practical skills to exploit information timely and meaningfully (Solorzano 2013:91).

Thus, acquainting academic library users with relevant searching skills became mandatory in an environment dominated by Google search engines, and other proprietary databases (Fernandez-Villavicencio 2010:125; Dominquez-Flores & Wang 2011:495; Solorzano 2013:91). With the availability of collaborative and gaming applications various academic libraries began to create a dedicated tech-fused space equipped with learning facilities such as computers, printing, scanning and photocopying facilities to support student academic digital work (Jane & McMillan 2003:240; Li 2009:31; Andrews & Haythornthwaite 2007:84). Collaborative training projects and library consortiums were also formed to negotiate better prices in acquiring more commercial products and grey or rare scientific literatures (Lynch 2000:62; Anglada 2014:605).

Retrospectively, a notable growth of web-based resources and digital learning objects like eBooks and peer-reviewed literature began to flourish in academic libraries, especially in the mid-2000s (Lynch 2000:226; Fernandez-Villavicencio 2010:125; Beetham & Sharpe 2007:4). Arguably, the mere introduction of the learning commons and user-centric services raised expectations that students should consult academic library professionals when confronted with information needs (Bailinn & Grafstein 2005:318). Accordingly, academic libraries began to simplify password-controls to library-subscribed databases to expand access beyond their Library Websites, using off-campus authentication links. Subsequently, academic libraries began to look at new ways of promoting academic library collections and services within a networked setting. Another factor was the revolutionising of personalised resources such as personal emails; media press communication, and other telecommunications in amplifying personal trust in a networked environment (Andrews & Haythornthwaite 2007:10).
As noted by Brown (2010:1), technical-related issues like the incompatibility of databases, password restrictions and network breakdowns continued to hinder library users’ especially undergraduate students to actively access library-subscribed resources. During 2005, a new wave of user-centric software was introduced with the proliferation of applications that offered better content and more interactive services (Brown 2010:2). Different fundamental principles were developed to guide the effectiveness of rendering user-driven services, Heading 2.3 discusses the evolution of user-generated tools (Web 2.0), while Heading 2.4 below gives a brief historical description of information literacy instructions and approaches in academic libraries. Thereafter, key factors that led to the evolution of reference desks and Virtual Reference Services (VRS) are discussed with specific reference to the hurdles of technological and socio-cultural issues encountered in accessing scientific information via academic library’s Websites.

2.3 Evolution of user-generated content and Web 2.0 applications

Web 2.0 is a buzzword coined by O’Reilly in 2005 following the introduction of user-centric software applications tailored to promote immediacy and interaction in a social setting in 2000. Designed from a user-centric orientation, Web 2.0 was viewed, by some, as a panacea and became a new paradigm for sharing, exchanging and connecting digital users with social information and online content instantly (Ajjan & Hartshorne 2008:71). Following the revolution of collaborative and interactive tools via Web 1.0 studies begin to examine Web 2.0’s richness and its associated proficiencies (Ajjan & Hartshorne 2008:72; Allison, et al., 2012:3811). Younie and Leask (2013:14) signified the inclusion of social and cultural aspects in software design as a key trait that improved the performance of digital games and web-based services intrinsically.

Web 2.0’s main characteristic revolves around sharing and connecting wealthy content via numerous, synchronous, interactive and human-collaborative services (Ajjan & Hartshorne 2008:71). Analysis from Meyers, et al., (2013:356) used the second generation of Web technology to describe innovative ways of incorporating users perspectives and experiences in designing content or creating new services.
Because the Internet’s openness and indistinctness allowed users as digital immigrants to connect, create and publish online content instinctively, there is no holistic approach to differentiating the calibre of Web 2.0 in harnessing individuals knowledge and social intelligence collectively (Wu Song 2010:249; Ajjan & Hartshorne 2008:71; Mannes 2006:140; Meyers et al., 2013:351).

Web 2.0 is a vibrant version of innovative technology designed with much improved collaborative services enabling instant interaction via digital networks (O’Reilly 2005:3; Fernandez-Villavicencio 2010:125). The invention of user-centric software applications designed with multi-sensory applications and cloud computing resources offers better functionality and has influenced people to experiment with new ways of finding solutions to their needs. As indicated by Arya and Mishra (2011:151), Web 2.0 offers personalised features through computing platforms. As shown in Figure 2.2 (below), Web 2.0 became a social connection and networking platform coupled with loose interoperability communication mechanisms to offer endless participatory-driven services to internet users or digital natives as referred by Meyer et al., (2013:355).

Figure 2.2: Web 2.0 as social conjoined space (adapted from Richardson 2005)

Given the ubiquitous calibre of service-oriented interoperability mechanisms, end-users began to drive the process of remising data and information exchange across
multiple sources. A range of Web applications and service-oriented architecture (SOA) were integrated to explore how Internet users connect and interact with each other in real-time or via synchronous collaboration applications (Baker et al., 2012:331). Web 2.0 attracted digital users to share content and co-design their own Websites using a number of unique features that signify the integration of human-driven interfaces. The evolution of user-driven services and processes is analysed in relation to its predecessor the Web or Web 1.0. This is done to understand the role of people in utilising and accessing digital resources meaningfully due to the following Web 2.0 features.

2.3.1 Web 2.0 features

In an attempt to measure the performance of web-based communities, Web 2.0 applications are classified in relation to the traditional authoritative information applications offered on Web 1.0. Changes included the conversion of user-oriented applications, internet-based services, instant messaging, Internet telephony, Internet bookmarking and social networking sites into the Website (Dunaway 2011:150). Instead of relying on rigid standards and predefined practices to facilitate and disseminate information across isolated networks; Web 2.0 applications are coupled with open-ended interfaces (O’Reilly 2005; Dunaway 2011:152; Ajjan & Hartshorne 2008:71). The capability of Web 2.0 tools in enabling users to modify content, control and co-create own social spaces, intrigued users to engage with the technological tools fully (Younie & Leask 2013:14).

Notably, Web 2.0’s vibrant operation is magnified by the availability of information architecture enabling rapid access to digital information; a critical aspect, which influences its usage amongst the young generation (Dunaway 2011:149). Due to the enhancement of several Internet multilingual functionality and communication interfaces, people begin to utilise information as consumers and producers not only as information receivers. Search options became key and vital features, not only in providing new content to internet users, but in enabling them to co-create and co-design whilst connecting with shrewd information instantly (Dunaway 2011:149).
Table 2.1 below present a set of human-driven features that distinguished the newer version of the Web from its predecessor Web 1.0.

Table 2.1: Critical features between Web 1.0 and Web 2.0

<table>
<thead>
<tr>
<th>Web 1.0</th>
<th>Web 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read and browse only</td>
<td>Read/Write/Collaborate</td>
</tr>
<tr>
<td>Web as reading platform</td>
<td>Web as publishing platform</td>
</tr>
<tr>
<td>Developer authorship</td>
<td>Public authorship</td>
</tr>
<tr>
<td>Individual intelligence</td>
<td>Collective intelligence</td>
</tr>
<tr>
<td>Software applications</td>
<td>Web as software platform</td>
</tr>
<tr>
<td>Commercial/proprietary</td>
<td>Open source/shared</td>
</tr>
<tr>
<td>Static content</td>
<td>Dynamic</td>
</tr>
<tr>
<td>Impersonal</td>
<td>It knows you &amp; your needs</td>
</tr>
<tr>
<td>Restricted collaboration</td>
<td>Collaborative-driven</td>
</tr>
<tr>
<td>Short tail- publish &amp; subscribe</td>
<td>Long tail publish frequently</td>
</tr>
<tr>
<td>Official releases</td>
<td>Constant versioning</td>
</tr>
<tr>
<td>Text-based</td>
<td>Multimodal</td>
</tr>
<tr>
<td>HD as storage platform</td>
<td>Web as storage platform</td>
</tr>
<tr>
<td>Lecture</td>
<td>Collaborative</td>
</tr>
</tbody>
</table>

(Compiled from O’Reilly 2005 and Aghaei et al., 2012)

Evidently, Web 2.0 technological innovation is driven by human engagement. To determine better ways of customising, connecting, exploring and building online communities, studies on users’ behaviours, perspectives and experiences became a core-focus in academic discourse. Notably, interchangeable terms like, online social networks/platforms, social networking tools/platforms, social learning approaches, social media, media and participatory technologies have been adopted to conceptualise the impact of Web 2.0 technological richness on digital users, particularly new generation entering universities (O’Reilly 2005:1; Allison, et al., 2012:3811; Phil 2013:2).

A brief analysis of how Web 2.0 tools have been integrated in education is elaborated under Heading 2.3.2 (page 31) followed by the historical review of the use of Internet technology and its associated services in academic libraries.
2.3.2 Types of Web 2.0 technologies

As Web 2.0 evolves, the influx use of the internet-based services contributes to the creation of various online collaborative services, information sharing tools and human-participatory systems across the social networking fraternity. Amongst many others, the following gained popularity amongst digital natives who form part of university undergraduate students:

- **Blogs and Wikis**: are defined as content curators used to create and publish individuals’ views on a specific subject matter (Dunaway 2011:150). In comparison to Web 1.0, Blogs were previously known as Weblogs. While Wikis, connoted by the term quick in Hawaiian, enables users to co-create, and revise online content (Wu Song 2010:249; Mannes 2006:143). These platforms are open web pages accustomed to capture, store and allow digital users to collaborate and contribute to online content subsequently.

- **Social network platforms and social bookmarking**: are microblogging information and content aggregator tools falling into the realm of Web 2.0 proponents. Social networking tools such as LinkedIn, Facebook, MySpace and Twitter gained popularity in bestowing and connecting digital savvies across the globe (Dunaway 2011:150).

- **Media participatory and service applications**: offer access to visual-based information using Web-hosting applications (YouTube) and image-hosting tools (Flicker) Podcast and Vodcast. These applications form part of Web 2.0 technologies designed with capabilities to embed individual’s views, images and audios instantaneously (Dunaway 2011:149). Both these Web 2.0 social-driven technologies can be personalised and accustomed to share information using automated alerts such as emails and Real Simple Syndicated (RSS) feeds as noted in Maness (2006:10).

As stated by Wu Song (2010:250) Web 2.0 technologies and remote collaborative services are becoming influential and have been appreciated as the most effective self-instructional platform. Noting the value of building collective intelligence using highly interactive and human collaborative applications, the term Web 3.0 is envisioned to describe the epic of sharing Web resources beyond the virtual
environment. Since the conception of Web 3.0 is under development, it is important to note the evolution digital users based on the phases of the Internet and its associated tools, processes, and services in accessing and utilising digital information and scientific communication as noted in Table 2.2.

Table 2.2 Evolution of Internet users, applications and services

<table>
<thead>
<tr>
<th>Digital refugees access &amp; push information via Web 1.0</th>
<th>Digital immigrants contribute &amp; share content via Web 2.0</th>
<th>Digital universe virtually innovate &amp; engage with content Web 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static HTML &amp; Company portals (read only)</td>
<td>Dynamic XML Wikis &amp; social networking platforms (wildly read &amp; write)</td>
<td>Semantic RDF &amp; Individual pages (portable &amp; hybrid)</td>
</tr>
<tr>
<td>Users as Page views</td>
<td>Web applications, Tagging &amp; Really Simple Syndication</td>
<td>User behaviour, Waves &amp; Livestreams</td>
</tr>
<tr>
<td>Directories, Email &amp; Web forms</td>
<td>IT applications &amp; Smart phones &amp; devices, Sharing content, Podcasting Audio &amp; Video</td>
<td>Smart data and applications &amp; Content and data consolidating, Sensory Objects &amp; Machines</td>
</tr>
<tr>
<td>Smart networks, Owning content, Video conferencing &amp; MP3</td>
<td>Interactive applications</td>
<td>Behavioural applications</td>
</tr>
<tr>
<td>Collaborative applications</td>
<td>High bandwidth &amp; Cheap computing</td>
<td>Cloud Computing</td>
</tr>
<tr>
<td>Low bandwidth &amp; Limited hardware</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Compiled from Aghaei et al., 2012)

As shown above, Web 2.0 applications have been widely recognised as powerful tools in connecting and empowering digital users with information collectively and its calibre relies heavily on individual understanding of its operation. As such, assessing digital users’ attitudes and perspectives prior to the integration of any human-driven systems is a critical aspect. Notably, scholars like Maness (2006), Kwanya, et al., (2009); Dunaway (2011), and Transue (2013) also tailored the potential of Web 2.0 proponents to connect online users with electronic content and digital services. That being stated, this study is bounded within the context of Web 2.0 despite the evolution of the semantic Web and its ambivalent applications.

Hitherto, terms like social networking and user-participatory services like Facebook, online discussion forums, Wikis and Blogs have been populated by undergraduate students. Thus, the position of academic libraries in embedding innovative applications and services to revolutionise access to digital information can be realised as discussed under Heading 2.3.3 (page 33)
2.3.3 Usage of Web 2.0 user-driven content by undergraduate students

The evolution of information in a networked environment has been investigated by various scholars. Since the evolution of digital information and scientific communication, the impact of user-oriented tools on human behaviour and interactive services such as email, Wikipedia, personal blog and instant messaging systems have been investigated in academic library settings (Wallis 2014; Schwartz 2014; Johnson 2011; O`Gorman & Trott 2009; Bailinn & Grafstein 2005:317). As cited by Li (2009); Leino (2006); Brown (2010); Brophy (2005) as well as Sullivan (2011), there is a need to identify, evaluate and expand critical sources of academic information and its associated resources beyond standardised virtual learning tools and information learning commons.

Accordingly, some academic libraries embed knowledge-based applications into virtual learning modules and students’ portals to expand access to user-generated content via Library Websites. Johnson (2011:95) noted the value of integrating human-collaborative applications, bibliometric support services and reference systems within academic setting especially in support of digital savvies. During the early development of Web 2.0 social applications, Khan (2007) stated that the success in managing self-paced learning approaches in a cyber-centric setting rely on a number of contingent factors, ranging from cultural values, technological and computer literacy skills as well as social view, that shape virtual communities. Phil (2013:2); Allison et al., (2012:3811) and Whitmire (2004:100) indicate that techniques of filtering information via knowledge discovery applications has become a new paradigm of building relationships whilst creating a spirit of connecting people with information strategically.

As further proposed by Kwanya, et al., (2011:149) a forward-thinking library is one that anticipates students’ digital needs and learning trends, using innovative technological tools and knowledge discovery. Considering the rate at which digital users contribute to the creation of online-based content, individuals’ competencies in utilising hybrid tools and human-mediated systems were singled out as a critical trait in a digital-connected era (Andrews & Haythornthwaite 2007:83). Valuing the
calibre of Web 2.0 proponents, and the use of web-based applications amongst
digital natives, academic libraries need to invigorate better user-driven content,
ensuring users to exploit new learning objects beyond the accustomed eLearning
resources and library-subscribed databases (Kwanya et al., 2009; Dunaway 2011;
Meyers et al., 2013). Various Web 2.0 frameworks have been adapted to leverage its
usage and co-benefits in harnessing knowledge collectively.

To signify the calibre of user-oriented platforms and media sharing applications in
connecting, co-creating and deepening social knowledge in academic libraries, the
term Library 2.0 was connoted in 2005 (Maness 2006:1). Since then, this term
reflects an innovative ground-breaking model in academic library settings and the
potential of integrating library-based enabling services within Web 2.0 social
networks. This is described under Heading 2.3.4. This is followed by a conceptual
review of issues that are affecting the development of information literacy skills in
academic libraries: a human-based responsibility which is driven by Subject
Librarians and reference librarians and discussed under Heading 2.4 (page 37).

**2.3.4 Integration of Web 2.0 applications into academic libraries (Library 2.0)**

Given the richness of Web 2.0 technological amenities in delivering better access to
digital content spontaneously, the instigation of virtual learning environment systems
in academic programs was noted as another key influence of change in academic
libraries services (Brown 2010:1; Khan 2007:12). Using the present human-mediated
tools in facilitating access to information, whilst anticipating digital natives’ academic
information needs, Michael Casey bestowed a term Library 2.0 in 2005 (Kwanya et
al., 2009; Maness 2006; Dunaway 2005). As simplified by Maness (2006:3), Library
2.0 refers to “the applications of interactive, collaborative, and multimedia web-based
technologies to web-based library services and collections”.

To enhance the embedding of web-based interactive technological tools and
services into libraries, the term Library 2.0 became a social networking trend
envisioned to connect academic learning resources with libraries users instinctively.
As noted by Maness (2006:3), the following key features constitute Library 2.0:
- **User-centred focus**: enabling academic library staff to engage users in the creation of library services
- **Multi-participatory**: enabling academic library staff to co-design and contribute to the library content using hybrid tools like video and audio
- **Socially rich**: enabling academic library staff to connect, interact and share information and documents via the Web
- **Communally innovative**: enabling academic library staff to anticipate change whilst allowing users to contribute their views and perspectives

As a way of signifying the value of rendering information and knowledge exchange via web-based enabling platforms, the input of academic library professionals becomes mandatory. Accordingly, a number of Web 2.0 content participatory and social bookmarking features have been highlighted as critical in enabling academic libraries to repackage knowledge using appropriate channels of communication and sources within the realms of the Library 2.0 model. Analysed in comparison with its predecessor Web 1.0 (denoted as Library 1.0), Table 2.3 indicates features of Library 2.0 which can be integrated via Web 2.0 (Maness 2006; Li 2009; Lloyd 2010; Bladek & Okamoto 2014).

![Table 2.3: Evolution of Library 2.0 via Web 2.0](source)

From the onset, a thorough analysis of the target audience needs, perspectives, and experiences is mandatory in establishing a Virtual Reference Service (VRS) (Jane & McMillan 2003:245). It is also argued that despite the integration of the Library 2.0 model into academic library co-business, developing individuals’ academic literacy skills to a high extent remains a complex and paradoxical phenomena characterised
by a number of cultural and techno-social-driven traits (ACRL 2010:2; Eisenberg et al., 2004:130; Bladek & Okamoto 2014:19).

As supported by Elmborg (2006:193); Baker et al., (2012:1) as well as Raju and Schoombe (2013:28) the complex nature of students’ technological education and cultural backgrounds as an information literate user is now constituted by various contagious factors such as:

- technological literacy
- networking literacy
- computer literacy and
- media literacy

A notable aspect which rose within Web 2.0 and Library 2.0 academic discourse was the engagement of human sources in facilitating, mediating and counselling digital users’ predicaments (Maness 2006:9; Johnson 2011:91; Schwartz 2014:8). Jane and McMillan (2003:245) stressed the importance of including a range of communication mechanisms to connect users with information widely and using a mode that is convenient and cost-effective to users. In order to investigate the impact of digital technologies and its associated consequences, Phil (2013:1) created a learning pyramid using the influx of mass media and digital technologies as key impediments of human learning and knowledge development practices.

Needlessly, a notable growth of cloud computing services such as Google sharing documents and social networking tools like Facebook, LinkedIn, Twitter and others also became dominant in supplying topical information via feeds and email alerts systems (Johnson 2011; Schwartz 2014; Wallis 2014). Since the development of computer desktop metaphors, interactive whiteboards as well as microscopes, instructional tools have been designed to widen access to education and training (Younie & Leask 2013:1). At present, Web 2.0 messaging applications like Skype and WhatsApp applications offer instant interaction between people. As noted in Figure 2.3 (page 37), a Virtual Reference Service (VRS) as a user-driven model should offer a combination of traditional and modern communication technological tools.
With hindsight, a broader outlook of library-based information literacy was discussed in accordance with the evolution of educational learning styles and instructional techniques. Paradoxical issues involving the creation of information literacy programs in academic library co-services and reference service techniques are summarised under the plethora of information literacy concept discussed under Heading 2.4.

2.4 Developing information literacy in academic libraries: a brief review

Prior to the explosion of the information-age in the early 1970s, the lack of technological skills standards and knowledge creation practices influenced the formation of institutes for information literacy in higher education as endorsed by the Association of College and Research Libraries (ACRL) (Beetham & Sharpe 2007:35; Eisenberg et al., 2004:192). Since the conception of the information literacy panacea in 1974 academic library instructions and teaching strategies have been revised, mainly to address the need for a better strategy for developing skills in using information technologies to access appropriate sources of information (Eisenberg et al., 2004:143). According to Eisenberg et al., (2004:143) and Lloyd (2010) information literacy is defined as "the ability to educate library users on how to find, evaluate, use, communicate and appreciate any form of information produced in its
various formats”. This concept was adapted as a leading phenomenon in American libraries, and later spread across the world.

What has been recognised as influential interventions to define and mount an information literate society, are the contributions of the American Library Association (ALA) and Association of College and Research Libraries (ACRL) in 1989 (Eisenberg et al., 2004:146; Brophy 2005:15; Lloyd 2010:7). Contemporary information literacy techniques have been analogised and stretched in the myriad of academic libraries (Eisenberg et al., 2004; Maness 2006; Li 2009; Lloyd 2010). Academic libraries are sanctioned with the responsibility of imparting, and equipping library users, particularly undergraduate students with the appropriate skills and knowledge required for utilising academic resources effectively (ACRL 2010:1).

Following numerous debates, in 1989 the American Library Association (ALA) declared that “to be information literate requires a new set of skills, which includes how to locate and use information needed for problem-solving and decision-making effectively” (Eisenberg et al., 2004:129). Accordingly, some higher learning institutions, particularly in the developed nations, have successfully endorsed information literacy programs to be a prerequisite academic module; while others, declare it a library-centric phenomena (Eisenberg et al., 2004:129; Aijan & Hartshorne 2008:73). Theoretically, an information literate student is one who recognises the need to consult multiple sources of information, using different types of tools to find an effective solution to a certain problem or need (Kuuthlau 1989; Eisenberg et al., 2004:146; Lloyd 2010:7). However, a rapid increase of information produced in multifaceted formats changes the way individuals acquire and develop skills and knowledge within a digital-dominant learning environment (Bladek & Okamoto 2014:19; Fernandez-Villavicencio 2010:129).

Hence, various conceptual frameworks and information literacy thematic approaches have been adopted in Library and Information Science (LIS). Dupuis (1999), Eisenberg et al., (2004) and Lloyd (2010) proposed the following two necessary academic literacy co-competencies:

- Ability to evaluate and critically analyse the integrity of information published in any format
• Ability to locate and retrieve sources of information from a wealth of knowledge objects and learning resources efficiently, effectively and ethically

Although information literacy has been applied in academic libraries, the emergence of new digital users' has exposed them to different learning needs, forcing them to acquire competencies in order to excel in their academic undertakings. Notably, a number of predicaments continue to affect the performance of academic institutions due to the emerging needs of student learning in a digital-centric environment. Every student is expected to possess basic skills and knowledge to accomplish academic endeavours productively, but the failure to achieve this goal remains a concern (Ajjan & Hartshorne 2008:73). According to Li (2009), this is assessed in regards to the techniques used to acquaint undergraduate students’ information searching and retrieval skills using various user-based support services such as:

• Library user orientation
• One-on-one reference instructions with library staff as well as
• On-hands information literacy training via a computer lab or other teaching and learning facilities such as oral talks, PowerPoint presentations and online guides

Therefore, before examining the extent to which education learning theories and knowledge productive styles has been incorporated in academic libraries information literacy instructions, Heading 2.4.1 reviews the evolution of the reference help desk in academic libraries. The section further summarises a number of inherent and contingent factors surrounding the application of information literacy instructions in academic library co-services to equip undergraduate students with appropriate knowledge and skills particularly in a digital-dominant environment.

2.4.1 Evolution of reference instructional services

Academic reference work gained its popularity in public libraries during the enlightenment period; a notion which called for the promotion of social democracy and readership, particularly after the Civil War in the 18th century (Solorzano 2013:89). An individual’s ability to access, retrieve and anticipate academic based
databases and virtual learning management systems became a central demand in academic libraries. In response to a number of social changes and technological predicaments in accessing academic-based resources, the custodial role of reference services is purposely given special attention in this study. In order to create a learned society, many academic libraries created public visibilities through reference corners or Reference Desks.

Since then, reference services have been recognised as a valuable solution to bridge the gap between an information seeker and information sources; a role which remains critical in sustaining the longevity of modern academic libraries (Jane & McMillan 2003:240; Johnson 2011:99; Anglada 2014:608; Schwartz 2014:10). Analogies by Wallis (2014:67) and Johnson (2011:93) stated that prior to the explosion of digital and online resources; academic libraries were dominated by print materials and reference artefacts. These types of materials were compiled in encyclopaedias, dictionaries, subject headings, atlas and other periodicals materials. While the use of such physically-bounded information sources signified the evolution of internet-based information, some library users experienced difficulties in consulting reference sources (Jane & McMillan 2003:241; Wallis 2014:67).

Purposefully, a physical desk was created and reference sources were allocated within its vicinity to enable reference librarians to consult them easily as indicated in Figure 2.4 (page 41). However, a number of contingency issues affected the performance of reference librarians due to a rise in commercial databases, computerised resources and digital services. As deliberated under Heading 2.4.2 (page 41) the use of Reference Desks and computerised support services faced challenges in augmenting the process of searching and retrieving academic information within an increasingly digital-based environment.
2.4.2 Shortfalls of rendering reference instructional services

An increased demand for subject-based services and topical electronic reference collections pressurised the performance of reference librarians to offer services beyond the Reference Desk in many academic libraries (Schwartz 2014:8). Culturally related issues, communication barriers and scarcity of staff were noted as factors that contributed to a decline of reference queries, reader advisory and selective dissemination services during the digitalisation and electronic-based era (O’Gorman & Trott 2009:330). Furthermore, reference works and materials in print began to lose their value due to the increase of online reference tools such as Encyclopaedia Britannia, Credo Reference, Oxford Reference Online and other web-based serendipity accessing via Web 1.0 (O’Gorman & Trott 2009:330). As a result, the statistical usage of Reference Desks began to decrease because reference librarians were not able to provide quick solutions to library clients; a predicament which dissatisfied users (O’Gorman & Trott 2009:330; Johnson 2011:93).

As noted by Kuhlthau (1989) students’ information seeking processes are enhanced by individuals’ behaviour and analytical skills before addressing any problem encountered. Matteson (2014:862) also noted that individuals go through a sequel process when confronted with a problem or information gap. As such, anxiety, lack of understanding and analytical skills could influence students to seek information from other sources such as Google, instead of approaching academic library
professionals. This is because approaching library staff for assistance when confronted with a problem depends on the students’ state of mind, confidence, trust as well as time (Kuhlthau 1989:5; Matteson 2014:862).

Following the accumulation of tons of academic literature, the core value of reference services was judged according to the ability and competencies of academic library staff to refine and respond to users queries meritoriously (Schwartz 2014:8; Johnson 2011:92). As stipulated by the Reference and User Services Association (RUSA), the ultimate objective of a reference librarian is to respond to the needs of academic library users and the public at large with relevant information, using suitable communication mechanisms within appropriate time (Schwartz 2014:8; O`Gorman & Trott 2009:327). Simply put, reference librarians in the 21st century (which is dominated by innovative and highly intelligent applications) need to be knowledgeable and willing to seek a possible solution in order to satisfy users’ needs uniquely yet conveniently (Jane & McMillan 2003:241).

Retrospectively, value-added reference services were offered to academic library users via the following techniques (Solorzano 2013:93; Johnson 2011:93; O`Gorman & Trott 2009:332; Arya & Mishra 2011:150; Jane & McMillan 2003:242):

- Face-to-face chatting or interaction with library users to provide ready-made answers to their questions (commonly coded as face-to-face reference interviews)
- Use of email to respond to users queries (the email-based reference system)
- Use of a telephone or cell phone to contact users (internet-based reference or text-based remote reference) as well as any other forms of communication that are suitable such as fax or telegram
- Use of a library-enquiry form or walk in approach to make an appointment (book a librarian) in order to address a critical and in-depth subject-based query of research needs during a specific time slot (call-in or appointment-based reference services)

With a vision of building a reading culture, libraries were tasked to widen access to knowledge artefacts and information repositories (Johnson 2011:91). However,
absence of a virtual learning framework for addressing the mediocrity needs of incoming undergraduate students presented a digital divide due to different socio-technological and paradoxical issues (Solorzano 2013). Following the evolution of collaborative systems designed with peripheral asynchronous interactive calibre; many academic libraries revolve their Reference Desk to attend to the changing nature of students and academic needs and social behaviours (Dominquez-Flores & Wang 2011:492). Thus, a number of contingency issues affected the performance of reference librarians due to a rise in commercial databases, computerised resources and digital services.

The conceptualisation and instigation of information learning into learning commons influenced academic libraries to revive the face of the Reference Desks. This was done to promote the use of digital reference portals/gateways as a knowledge common (O’Gorman & Trott 2009:335; Wallis 2014:53). In order to justify the position of academic libraries in building capacity whilst supporting knowledge creation and knowledge production processes, the use of virtual reference tools and computerised support services became a strategy to augment the process of searching and retrieving academic information (Johnson 2011:93). As deliberated under Heading 2.4.3 an online help section and digital reference techniques such as Instant Messaging (IM), email, Internet chat as well as mobile phones were introduced to respond to users’ queries via a virtual reference interview.

2.4.3 Introduction of Virtual Reference Services (VRS)

Faced with a challenge of justifying the usage of the much-anticipated academic library subscribed databases; a number of specialised virtual reference assistances were introduced to attend to instant questions and ready-reference answers (Schwartz 2014:9; Johnson 2011:93; O’Gorman & Trott 2009:335). Beck (2010:91) describes Virtual Reference (VR) a service-oriented model integrated in academic libraries to enable “the use of computer and communications technology to provide a remote interaction between librarians and library users”. Aimed to serve individuals learning needs with immediacy, informality and interactivity, Virtual Reference Services (VRS) were introduced to ensure that students are provided with proper
guidance in accessing and utilising academic sources ethically (Li 2009:206; Bailinn & Grafstein 2005:317).

Of particular interest is a review of web-based interaction and user-centric services designed to streamline academic libraries services with students learning needs beyond a physical face-to-face interaction (Jane & McMillan 2003:245). Research instructional guides and subject related toolkits were created and offered to strengthen the use of EbscoHost, Emerald, ScienceDirect and other reference databases, in a virtual sphere (Bailinn & Grafstein 2005:319). Due to the openness of Web 2.0 information suits, and collaborative tools, terms like Live-Chat Reference Service, Virtual Reference (VR), Instant Messaging (IM) and Instant Text Messaging (ITM) were integrated into academic libraries (Arya & Mishra 2011:155). As noted by Beck (2010:92) as well as Jane and McMillan (2003:245), the implementation of newer synchronous tools enhances the value of personalised communication; a notable change that increases academic libraries visibility in attending to students needs instantly.

According to analysis by Kwanya et al., (2011:147); O`Gorman and Trott (2009:334); Johnson (2011:95) as well as Arya and Mishra (2011:155) the following ready-reference tools form part of the Virtual Reference Services (VRS):

- Creating library signage, bibliographic instructions, and ready-reference answered toolkits
- Designing subject-based instruction and library guidance (Lib-Guide) via document delivery and information referral services
- Designing self-learning PowerPoint presentation, Frequently Asked Questions (FAQs) and online factsheets to guide library users on how to utilise fee-based services and library-based databases in their free time
- Creating library web-based tutorials and online quizzes using YouTube, Skype-based reference systems and Voice-over-Internet Protocol (VoIP)
- Promoting the use of library resources via the academic libraries website, on call services or book a librarian services via video conferencing and text-based messaging
- Embedding proliferated applications in the Library Website to enable users to post live questions to a librarian, express their views and service reviews via feedbacks, suggestions or comments
- Weblog and Wiki (Wikipedia) were also integrated in some academic libraries to enable students to interact with librarians via student portals beyond the library’s operational hours

As further evidenced by Brown (2010:1) and Beck (2010:92), the introduction of user-oriented applications became a catalyst for change in augmenting open access tools, virtual reference inquiries and personalised services via an academic library setting. A synopsis of various shortfalls concerning the approaches used in teaching information literacy training in academic libraries is given under Heading 2.4.4. In order to conceptualise the innovative approaches of adopting and embedding relevant Web 2.0 resources into academic libraries services, a number of pragmatic issues underpinning the utilisation of digital technologies in a formal and social driven environment needs to be taken into consideration. Thus, this study re-visits pragmatic factors grounding the use of technological instructions in capacitating human minds discussed under Heading 2.5 (page 48).

2.4.4 Impacts of information literacy instructions on undergraduate students

Grounded by common goals, and social values, academic library instruction and user education programs are expected to focus on equipping students with basic skills, and knowledge to augment their learning process (Dupuis 1999:287). Following a sudden depletion of vital resources due to global change socially and economically, the custodian role of academic libraries focused more on familiarising library users to the physical spaces, collection and services (Dupuis 1999:287). A notable growth of digital-born information sources and knowledge repositories began to rise. According to Wallis (2014:67); the content and approaches used in teaching information literacy in academic libraries remains unchanged despite the evolution of user generated content and media participatory applications within the digital space.
In a nutshell, the following information literacy predicaments were noted:

- Ineffective teaching standards and cumbersome techniques (due to the theoretical approach) in addressing critical academic information needs of undergraduate students
- Lack of pedagogical skills and interpersonal communication skills amongst library professionals and reference librarians staff manning the Reference Desk
- Undergraduate students have limited time to attend information literacy training at a specific time-frame (this is due to lecture schedules and the absence of accredited information literacy courses in the academic curriculum)
- Poor managerial support from the institutional positions
- Poor analysis of users emerging needs, user experience and technological preferences
- Poor integration of knowledge discovering applications into OPAC and electronic databases interfaces
- Lack of standardised electronic reference systems and search interfaces to facilitate and mediate access to library-subscribed databases within a virtual-based approach
- Lack of Web 2.0 proliferation in information literacy skills using e-reference content, e-books and e-journals, e-tutorials

As shown in Figure 2.5 (page 47), Library 2.0 could be used to connect undergraduate students with appropriate information and learning resources using the right tools and services with a variety of Web 2.0 and information literacy programs.
Evidently, the integration of instructional guidance and user education within the paradox of reference services and information literacy signified the value of human experts in driving the process of sharing and interacting with digital natives. However, the notion of building an information and knowledge-based citizen has shifted from a speculative learning oriented, to a user-driven approach (Li 2009:160; Lloyd 2010:29; Houser & Kuzmic 2001:432). As stated by Siemens (2005:29) capacity building involves a number of factors such as collaboration, scientific research and personal networking. Arya and Mishra (2011:162) signified the value of human-mediated techniques such as telephone, email, instant messaging and text-based messaging in supplying information and connecting users via Web 2.0 innovative applications.

The following key issues emanating from the above-discussion forced this study to revisit education theories and fundamental principles in using instructional technology as a learning and knowledge development tool:

- There is no single information literacy model neither nullified nor established as a holistic solution of leveraging undergraduate students’ basic information skills and knowledge mediocrity (Dupuis 1999:287; Eisenberg et al., 2004:55; Lloyd 2010:15; Beck 2010:91).
• It is apparent that a mere provision of web technology, electronic resources and information commons is not sufficient to instil value into the lives of library users, let alone contribute to academic libraries returns of investment rate as indicated by Anglada (2014:605).

• A gap in addressing undergraduate students’ information retrieval and academic literacy mediocrities within Library and Information Science (LIS) continues to present challenges in providing digital savvies an effective information seeking and retrieval process.

• Considering the nature of information literacy standards, skills competency and user services guidelines, academic libraries need to identify new approaches and practices in addressing undergraduate students’ academic needs.

Based on the above argument, significant factors that modernised students learning styles are taken into consideration. This is done to gauge better ways of addressing a set of paradoxical issues facing digital natives and to understand how the evolution of technology resources in academic libraries influences social change and learning complications. Thus, five educational learning theories are discussed under Heading 2.5 and analysed to provide basic philosophical views and conceptual synergies grounding the scientific process of developing human critical thinking and knowledge acquisition processes accordingly. These educational theories are Behaviourism, Cognitivism, Vygotsky Socio-constructivism, Social learning and Connectivism.

2.5 Theoretical review of educational learning theories and styles

Thomas Kuhn (1973) is known as the father of science and a pioneer of the evolution of learning paradigms and innovation who categorised learning enquiries from three main perspectives, namely: positivist, interpretivist and critical theory (Dills & Romiszowski 1997:5; Hergenhahn 1982:15). Drawing from Kuhn’s work, a term paradigm diffusion was used to emphasise a theoretical view of addressing pre-pragmatic factors influencing social change and economic growth through human learning processes (Dills & Romiszowski 1997:164). The theory is compelling the humanities and social studies to offer innovative ways of responding to societal
change and learning dilemmas to provide a retrospective view of various pragmatic issues.

Factors that led to the development of instructional technologies in academic sphere are reviewed using a Humanist frame of reference to orient readers to educational learning theories and styles. This is done to bridge the discussion between Behaviourism and instructional learning theory during the automation and completer dominant era. Subsequent is a presentation of critical views from Cognitivism mental development and Vygotsky Socio-constructivism learning processes in acquiring skills in a digital and network-centric sphere. Thereafter, views from Social learning theory and Connectivism are discussed in relation to the custodial roles of academic libraries in identifying, controlling, managing and facilitating the knowledge creation processes in a highly interactive and social connected environment. This is done to reflect on possible ways of utilising technological instructions as a strategy for developing human minds meaningfully.

2.5.1 An overview of humanism learning styles in higher education

The work of a well-known humanist philosopher, John Dewey, stated that the ultimate purpose of education should liberate individuals to become self-actualising in fulfilling human needs and those of society (Hergenhahn 1982:246; Jacobs 1990:2). As documented by Dills and Romiszowski (1997:55) "a process of developing human beings to be capable of making significant personal choices within the constraints is imposed by heredity, personal history, and environment". Due to the importance of acknowledging individuals' beliefs, freedom and their autonomy in a general context, Dewey’s philosophy continues to be cited as the most influential theorist in liberating citizens in a postmodern sphere and continues to inspire many scholars (Jacobs 1990:2; Houser & Kuzmic 2001:431; Lui & Mathews 2005:386).

Seeking for possible ways of leveraging the gap between individual’s learning styles and competencies, preliminary undergraduate studies on the usage of digital technologies have been carried out in the last three decades (Younie & Leask
2013:2). Classical works such as Dills and Romiszowski (1997) argue that the fundamental role of building a progressive society entails the following aspects:

- To learn by doing, one must be an active driver of the process
- Intrinsic motivation plays a significant role in stimulating human capability
- Knowledge is changing, not fixed. As such, evaluation of teaching models, approaches and learning assessments should be beyond passing rates
- Learning should relate to one's needs and interests
- Democratic procedures are essential, therefore, education should respect learning approaches and understand other human behaviours
- Learning should be related to the world beyond the classroom and should help to improve that world continuously

A comprehensive approach to train information literacy skills within Library and Information Science (LIS) has been faced by a number of intrinsic dilemmas. Accordingly, this section reflects on fundamental issues raised in educational learning theories and styles. Moving from the oldest to more modern educational theory, a behavioural instructional approach is presented to gauge ways of controlling and analysing individuals’ learning approaches while upholding their morals, values and principles objectively.

### 2.5.2 Behavioural learning theory

Behavioural learning theory, also known as the mechanistic instructional approach, is a classical and positivist learning approach which persists in developing individuals minds to be competent in a specific subject context (Dills & Romiszowski 1997:164). Founded by Watson (1924) and populated by Pavlov (1927) as well as Skinner (1953-1954), behavioural learning theory dominated during the mechanical and instruction computer-centric era in the 1950s and 1960s (Dills & Romiszowski 1997:164). Following the introduction of standalone computers and instructional teaching aids in education, Pavlov classical conditioning (1927) and Skinner operant conditioning (1954) experimentations were adapted and continue to be cited as the most influential instrumental natural learning models in empirical studies (Jacobs 1990:2).
Skinner’s learning approaches (1953) gained recognition as a method of natural science (Gillani 2003:3) that provided a range of specific solutions to human behaviour, particularly in a complex learning task. Scholars who concurred with Skinner’s Operant Learning Method established how students’ performance can be measured according to the learning objectives. Through the use of the trial and error or hit-and-miss learning model, developing new knowledge especially in the developed societies become possible. In order to stimulate students’ thinking capacity at a higher level, behavioural learning theory consists of the following (Houser & Kuzmic 2001:432; Gillani 2003:22; Liu & Matthews 2005:388; Jacobs 1990:5):

- Learning is viewed as objective, therefore individuals are viewed as object of change
- A set of structured lessons or learning by doing needs have to be created because human behaviour is viewed as a learned process
- Learning is viewed as an isolated phenomenon relying on the use of responsive systems to increase the rate of mastering practical experiences in a correct and orderly fashion
- The process of acquiring knowledge and skills can only be gratified through a pre-determined and controlled environment and,
- Specific experiences can only be gained in a fixed process using concrete learning instructions and tasks

In order to analyse learning in hyper-contextual and situational based information, instructional tools need to be designed from an objectivistic view as summarised by Jacobs (1990:3):

- Instructors should be competent in a specific subject in order to develop appropriate instructional content (materials), learning activities and learning assessments
- Learning tasks should be aligned with instructional teaching approaches (pedagogy) to address specific needs using consistent instructions and learning procedures
- The success of behavioural learning approaches relies on regular practices with training guides either manually or via tutorials
A functional analysis of per-determined learning events should be well-articulated to help students master the subject context effectively

Subject instructors should provide appropriate clues to stimulate students’ learning capacity

Houser and Kuzmic (2001:432) reasoned that providing information and learning resources in a classical and linear process is a fragmented approach, and can undermine highly exceptional citizens preventing them from becoming innovative and open-minded thinkers. Due to the rigid approach of relying on archaic library-centric systems and database information literacy training concentrates more on imparting students with a general view of how to retrieve information using bibliographic records (Li 2009:12; Younie & Leask 2013:130). Findings from Meyers et al., (2013:356) also highlighted the lack of interactive interfaces in library operational systems and standalone computers as factors that constrained academic libraries from applying a behaviourism-learning approach in their instructional course material. Needless to say, the use of library-centric terms and language limited students to explore the library catalogues and learning resources semantically (Dupuis 1999:288; Allison et al., 2012:3813; Bladek & Okamoto 2014:19).

Introducing undergraduate students to a library’s physical collections, concepts, and information organisation through library tours holds no value in augmenting their practical skills to utilise in-house databases (Dupuis 1999:287; Fernandez-Villavicencio 2010:129). While behavioural learning theory still holds a position in humanities and social science fields such as psychology and education, the evolution of web-based services agitated the need to expand learning strategies beyond a conventional and rudimentary structure (Allison et al., 2012:3811). As postulated in Dills and Romiszowski (1997:271) as well as in Lui and Mathews (2005:282), empirical enquiries on the impact of mental and cognitive development began flourishing in academic discourse using cognitive and socio-constructivism views as a new paradigm of learning.
2.5.3 Cognitive and Socio-constructivism learning theory

In contrast with the behavioural learning theory, Piaget cognitive developmental theory (1952) postulates that learning is a genetic process of developing human brains to master the subject context through a flexible and formal process (Dills & Romiszowski 1997:271). To make sense of the outer world, Piaget cognitive developmental learning theory (1952) took a theoretical position in explaining how individuals reconstruct their own knowledge using optimal conditions or under existing and specific rules or categories (Gillani 2003:49). A term Constructivism was connoted to define a new learning paradigm where human beings are viewed as genetic whose intelligence is manifested in a complex and subjective symbol (Liu & Matthews 2005:386; Jacobs 1990:5).

Opposing objective views from classical and operant learning techniques, the constructivism-deterministic approach views learning as a self-generating and socially-bounded process influenced by a combination of concrete traits and the availability of sources of information (Jacobs 1990:5; Dills & Romiszowski 1997:271). As such, a number of socio-cognitive factors like linguistic, cultural, educational background and students’ level of competencies play a role in developing an individual’s capacity (Gillani 2003:49). Therefore, an individual’s beliefs, perspectives and attitudes can be used to anticipate the quality of education and training they are likely to achieve over a specific period (Dills & Romiszowski 1997:271; Liu & Matthews 2005:385). Considering the embedding of personalised learning resources and intelligent tutoring systems, a traditional approach to information literacy programs is ineffective to equip new students with practical searching and information retrieval skills.

To assess how learning taxonomies influence an individual’s knowledge acquisition practices and applications, a number of digital literacy traits need to be taken into consideration. Paul Glister (1997) defines digital literacy as “the recognition of pre-requisites technical know-how and information skills required by individuals to effectively utilise digital text and access multimedia information” (Meyers et al., 2013:356). Since information literacy is a liberal-centric subject, a comprehensive
and ideal strategy of enriching students' mental process with basic digital literacy traits was adapted by Shapiro and Hughes (1996) in Eisenberg et al., (2004:149):

- **Tool literacy:** the ability to understand, conceptualise and utilise the latest information technological tools
- **Resource literacy:** the ability to understand the manner in which information sources are organised and managed in any format and location
- **Social-structural literacy:** equipping every individual with basic skills and knowledge in order to identify, locate and utilise public information managed by any social institutions effectively
- **Research literacy:** the ability to conceptualise and exploit information technology in discovering new knowledge using research support systems tools like software analytical tools, and reference management tools without any limitations nor difficulties
- **Publishing literacy:** the ability to create content and contribute to the existing body of knowledge using applicable formats and networks
- **Emerging technology literacy:** the ability to acquire new skills and knowledge on how to utilise the latest technological tools effectively, timely and intelligently
- **Critical literacy:** the ability to critically evaluate information authenticity, integrity and information quality in a way that multiplies students’ opportunities to expand their knowledge and understanding in solving their information needs

According to Gillani (2003:40) and Boden (2010:87) the impact of cognitive and mental learning development became a source of knowledge and social change. Faced with the challenge of interpreting how knowledge is accumulated in an empirical and ordinary scientific studies, Piaget’s mental cognitive or constructivism was accepted as a philosophical ground, rather than a learning theory. Consequently, language development and learning taxonomies were signified as a critical learning process connotated as Vygotsky learning theory or social cognitive theory (1962, 1978) as noted by Bladek and Okamoto (2014:20).
2.5.4 Vygotsky learning theory

Evidently, the role of language is noted as the most powerful trait in gathering, controlling, processing and building new knowledge (Boden 2010:84; Younie & Leask 2013:76). Vygotsky learning theory attempts to respond to the demand to clarify how knowledge is constructed, in and beyond a traditional learning setting (Bladek & Okamoto 2014:20). With an objective of adding value to students learning styles and knowledge application processes, studies on socio-cognitive learning became prominent in constructing new knowledge via a formal grounded environment. Significantly, Vygotsky socio-cognitive learning philosophy strongly believes in the use of scenarios planning enabling students to build on ideas that will eventually solve their learning problems (or in a situation analysis approach) (Boden 2010:87). In advancing students' socio-cognitive abilities, the basis of Vygotsky Learning Theory stresses the importance of integrating intermediating tools to promote and enhance access to learning resources and academic services extensively (Liu & Matthews 2005:387).

Gillani (2003:77) highlighted communication methods, personality traits, cognitive abilities, linguistics styles and academic background as critical success factors that support the process of reconstructing information available in any format such as visual texts, moving images and sound/audio. In order for individuals to visualise the subject context effectively, their social patterns and perceptions must be taken into consideration to construct and attach meaning to what they are learning. This according to the author is known as a zone of proximal development and can shape students` searching and retrieval abilities (Gillani 2003:81).

Drawing insights from Bloom Learning Taxonomies, students go through the following linear stages to acquire knowledge (Boden 2010:87):

- **Knowledge/Remembering:** having the ability to bring to mind facts and information as the basic need driving an individual`s quest to look for information
- **Comprehension/Understanding:** having the ability to comprehend, translate, and interpret problems logically and intellectually
• **Application/Applying**: having the ability to use a main concept and apply it to new things

• **Analysis**: having the ability to divide a main concept into parts by forming a structure that is flexible and simplified

• **Synthesis/Evaluation**: having the ability to create a new concept from the previous learned event or material

• **Evaluation/Creating**: having the ability to give a personal opinion or to critique ideas logically

While much of Vygotsky theoretical grounds still holds value in creating a constructive learning platform, social cognitive abilities and cultural beliefs rely more on a human being to facilitate the learning process. Human competencies and behaviours are two mutually-contingent factors (Boden 2010:84). As such, using a theoretical and comprehensive approach in training students information seeking and retrieval will not effectively address individuals’ needs and knowledge gaps. As noted by Lui and Mathews (2005:386); as well as Khan (2007:3), some academic libraries integrated live-collaborative and instant communication tools like online forums, chat rooms and other e-learning hubs to enhance the visibility of academic libraries. However, the absence of digital prerequisite skills challenged undergraduate students to extract value from multiple academic resources.

Li (2009) noted that many academic libraries fail to embed information discovering applications and self-paced content. In addition, the lack of information searching skills, Internet downtime factors, and limited content continues hindering students trying to utilise library-subscribed databases (Sullivan 2011:2; Bladek & Okamoto 2014:34). Unless students seek assistance and guidance from library staff serving at the Reference Desk, it is difficult for them to acquire adequate skills via a formal and theoretical approach without practical training (Ajjan & Hartshorne 2008:72; Boden 2010:87). Therefore through a human-mediated system, a range of structured and unstructured resources could be customed to providing and deliver just-in-time using online tutorials to demonstrate how students retrieve information across silos academic databases (Jane & McMillan 2003:243).
Noting the calibre of Web 2.0 innovative technologies, using Vygotsky socio-cognitive learning approaches could pose difficulties in explaining how individuals apply knowledge (Wu Song 2010:249). However, the use of graphic images via Video and Podcasting could enhance their cognitive abilities in addressing any problems encountered. Based on these assumptions, equipping students with information seeking skills from a library-based context might only benefit those with better analytical skills in contextualising their problem effectively. However, noting the popularity and convenience of social networking platforms and human-participatory systems accessed via Web 2.0, enriching students’ cognitive abilities and understanding may not be achieved via a Vygotsky theoretical approach alone.

Since learning is a socially constructive process that relies on different learning traits, a better approach in addressing undergraduate students learning gaps could be gained through social interaction; a phenomenon that seems to be addressed in the Bandura social learning theory discussed next.

### 2.5.5 Bandura social learning theory

According to Gillani (2003:84) Bandura social learning theory was introduced in 1978 and is closely related to Vygotsky socio-cognitive developmental learning processes. Deviating from the use of mental cognitive events to explain the influence of social collaboration in building collective intelligences, social learning theory views human behaviour as a social learned process (Gillani 2003:84; Whitmire 2004:98; Younie & Leask 2013:186). Arguably, knowledge cannot only be gained through direct experience and or via interconnected computer networks, but by engaging themselves in some form of human-to-human interaction (Phil 2013:1). As asserted by Bell (2010:98) building social nodes between online communities depends on user interests in participating in knowledge-sharing and creation activities.

Contrarily, Wu Song (2010:251) offered a multi-rhetoric analysis to intercept the process of acquiring information and knowledge in a digitally inherent environment. This author’s theoretical position maintains that relying on informal discourses is likely to be influenced by a mixture of individual’s needs, societal norms and cultural
values. Certainly, the gap between undergraduate student's digital skills and learning styles differs dramatically; partly because each individual views the world differently. As such, allocating, managing and hosting a range of academic databases and virtual learning resources via academic Library Websites can be unadventurous for new students (Dunaway 2011:152; Ajjan & Hartshorne 2008:72). Thus, Bandura`s view on social learning theory is characterised by aspects such as reasoning, attitudes and behaviours intuitively (Meyers et al., 2013:369).

Reflecting on the dominant use of Web 2.0 proliferation tools, Bandura social learning theory could ground the importance of building human-to-social interactions in academic libraries via a Virtual Reference Service (VRS). To achieve that, a thorough preparation of knowledge repositories and information database systems is crucial in providing and controlling access to digital resources using Connectivism as a contemporary learning trend as proposed by Maness (2006), Siemens (2005), Downes (2007) and Transue (2013).

2.5.6 Connectivism learning theory

Following a dominant creation of social nodes between students and their online peers, a Connectivism learning style was adapted by Siemens (2005), Downes (2007) and Transue (2013). Envisioned to investigate how digital users, particularly millennium students or connected natives attach value to personalised services, communication, collaboration and interaction between online communities was found enriching. Citing the effective use of human-mediated systems and collaborative learning systems as convenience and rewarding, Siemens`s study (2005:1) redefined learning approaches in a digital and virtual settings by observing how students use social nodes to connect information and knowledge learning hubs.

Similarly, studies by Downes (2007) and Transue (2013) also investigated how students were interacting and navigating via a social network platform and connect knowledge creators with other learning networks in the Blogosphere. Objectively, both studies of Transue (2013), Downes (2007) and Siemens (2005) concurred with the term Connectivism and adapted it to describe a third generation of learning in a
digital rooted environment. As evidenced in Library and Information Science (LIS) literature, most of the academic libraries databases, instructional systems and information literacy programs remain reticent; limiting incoming undergraduate students' to effectively utilise them (Kwanya et al., 2011; Dunaway 2011; Drexler 2010; Meyers et al., 2013; Transue 2013). The lack of browsability and multi-discovery interfaces on e-books and e-reference platforms can reduce them to being merely descriptive of e-resources databases (Whitmire 2004:98). Access to academic resources needs to be improved using a wide range of learning, research and personal networks to address students’ academic needs.

To illustrate a conceptual framework that binds individuals to interact, engage and consult with instructional and human-mediated systems, eight core principles of Connectivism learning models were developed by Siemens (2005:2):

- Learning and knowledge rest in a diversity of opinions
- Learning is a process of connecting specialised nodes of information sources
- Learning may reside in non-human appliances
- Capacity to know more is more critical than what is currently known
- Nurturing and maintaining connections is needed to facilitate continual learning
- Ability to see connections between fields, ideas, and concepts is a core skill
- Currency (accurate, up-to-date knowledge) is the intent of all connective-learning activities
- Decision-making is itself a learning process, therefore choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality

While findings from Transue (2013); Dunaway (2011) and Drexler (2010) recommend the value of integrating Connectivism as a conceptual framework to underpin a number of e-infrastructures and e-resources into a single space, a thorough assessment of user's needs, preferences and views of Web 2.0 is mandatory. By embedding Web 2.0 social technologies, academic libraries could streamline its services via computer-mediated systems (blackboards), and human-mediated communications (chat reference and subject-based query) to avail better
ways of accessing academic learning-information and knowledge-based resources to undergraduate students (Dunaway 2011:155). Academic libraries are confronted with various inherited factors in adapting a holistic approach in training library users learning needs and dilemmas. This can be done by widening students’ social knowledge through the Connectivism learning model using current awareness services to expose students to numerous Communities of Interests (CoI) and Communities of Practices (CoP).

Academic library staff can also subscribe to RSS feeds, tag social bookmarking and offers instant updates via email referrals and personal space platforms like Facebook and Twitter (Drexler 2010; Bell 2010). Moreover, online social networks, subject-specific resources, expert databases, blogs, and knowledge discovery systems can also be linked via students personal accounts and the Library Websites (Maness 2006:8; Bell 2010:98; Dunaway 2011:675). Li (2009) and Lloyd (2010), show that contemporary studies continue to point out a lack of human capital, limited pedagogical skills and an absence of teaching content as factors hindering academic library professionals to effectively execute information literacy program. Retrospectively, both Reference Librarians and Subject Librarians need to be proactive in rendering innovative library-based services and training via a Virtual Reference Service (VRS) (Arya & Mishra 2011; Wallis 2014).

Based on the above deliberation, it is clear that teaching information literacy from a theoretical approach will not address a number of socio-technological issues facing undergraduate students. As an attempt to adapt the appropriate learning styles, Drexler (2010:372) proposed the following guides as critical when consideration is being given to developing a collective and hybrid learning approach:

- Understanding the characteristics of connected and digital students
- Analysing the academic environment where students are operating
- Understanding the diverse needs of each academic discipline in order to link students with appropriate academic resources to complete their study adequately
As stipulated in the ACRL (2010) and RUSA in Schwartz (2014), the underlying responsibility of every academic library is to foster students' learning environment with the latest academic resources, digital learning facilities and technological innovative tools to provide timely access to information. However, the use of bibliographic library-centric terms and concepts in developing users’ searching tips, guides and information factsheets continues to create different forms of animosity amongst incoming undergraduate students. Time limits and lack of standardised information literacy programs remains a concern.

It is therefore undoubtable that, the vitality of Web 2.0 resources in delivering new content to users whilst also enabling them to access and contribute to real-time interaction inspires students to seek for similar self-regulated and innovative learning resources within the academic libraries setting (Wu Song 2010:250; Elmborg 2006:193). Extracting views on Constructivism learning styles and Bandura social learning theory, this study considers the possibility of using a Connectivism learning model as a social technology approach to tag and supplement academic libraries instructional and digital literacy programs via a Virtual Reference Service (VRS). Therefore, by connecting digital users with knowledge repositories and communities of practices, students could be provided with rich information.

In support of the above notion, this study concurred with views from Arya and Mishra (2011) who developed a reference formula to put an emphasis on the need for integrating Web 2.0 tools and techniques into academic library environment as shown below: “Virtual Reference Service + Web 2.0 + Connectivity=Virtual Reference Service 2.0”. On that note, a range of user experience and rich information could be used to connect undergraduate students with the right information using appropriate social technological communication mechanisms, ranging from social interaction within a formal and informal environment, as shown in Table 2.4 (page 62):
Table 2.4: Connectivism features

<table>
<thead>
<tr>
<th>Social</th>
<th>Formal</th>
<th>Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion forums, Media-rich instruction via YouTube, Tagging, Folksonomies, Ratings, Blogs, user-generated content, social networking, Microblogging, Comments and instant publishing (Wikis), Photosharing via Flicker and Instagram, Google Maps Google Drive</td>
<td>Emails, User-oriented tours, eLearning platforms, information literacy conferences, Instructional forums, eLearning instructional sessions, Virtual-instructions, Virtual world, User-oriented audios and videos, Taxonomy, Factsheets, Subject-specific guides, OPAC tips</td>
<td>Social interaction, Live webcasts, Recorded Web-embedded video, Video-conferencing, Workshops, One-on-one coaching, Websites, Podcasts, Case studies, e-books</td>
</tr>
</tbody>
</table>

(Compiled from Siemens 2005 and Downes 2007)

Based on the above deliberation, it is evident that, academic libraries are still faced with the challenge of equipping every student with sufficient skills and the digital knowledge required to utilise academic resources effectively and productively. What is essentially important is to put measures in place for capturing, controlling and connecting students with specialised and personalised services, based on their subject interests. And, because digital natives are faced with hurdles of technosocially inherited factors, an effective and flexible learning model is one that addresses the core-factors required to fulfil undergraduate students’ academic learning needs effectively.

2.6 Section summary

This section reviews a range of literature relating to the integration of Web technological tools and human-mediated systems in augmenting the process of building knowledge and skills amongst students. Despite the reinforcement of information literacy competencies by ACRL and RUSA, the emergence of the millennium generation entering universities with new demands and learning styles presents new challenges as outlined by Meyers et al., (2013) as well as in Bladek and Okamoto (2014:195). The argument, as simplified by Elmborg (2006), is that undergraduate students fulfil their academic information needs based on critical thinking and academic reasoning; a critical aspect which relies on multi-skills and indefinite to measure. Although Web 2.0 is a user-generated phenomenon
accustomed by highly interactive content, the flow of processing information and skills cannot be easily controlled nor quantified (Drexler 2010:372; Bell 2010:98).

The study is being driven by the need to integrate Web 2.0 social technologies into a Virtual Reference Service (VRS) as part of Library 2.0 model, Connectivism as a social learning theory could build better relationships between students and library professionals through instructional programs (information literacy) and Virtual Reference Service (VRS) (Transue 2013; Johnson 2011). With rapid increases of Web 2.0 proponents, developing individuals’ multi-digital literacy skills is a critical prerequisite learning trait. A semantic and highly intelligent way of using Web 2.0 applications can be achieved by connecting students with the right information and social practices. Irrespective of digital users’ location and time, Library 2.0 is a human-action model constituted by a set of activities envisioned to anticipate change and serve digital users in near-real time or via instant communication.

Notably, information literacy programs continue to be implemented from a scientific and technical-centric approach, to anecdotal vantage and social practice orientation. As such, gathering undergraduate student perspectives, attitudes, values and preferences in utilising instructional learning tools should be assessed repetitively to understand their social learning styles and changing knowledge acquisition practices.
CHAPTER 3
RESEARCH METHODOLOGY AND DESIGN

3.1 Introduction

This study identified a number of pragmatic issues that are pressuring academic libraries to restructure their co-value in the 21st century, as discussed in Chapter 2. Creswell (2003:3) stated that for social research to be regarded as scientific, a set of procedures and criteria for addressing particular issues must be clearly outlined in order to discover or confer new knowledge - as indicated in Figure 3.1 below.

![Figure 3.1: Research procedures and processes (adapted from Mouton 2006)](image)

With the objective of gathering library-users perceptions, experiences and preferences toward the use of Web 2.0/Library 2.0 in providing quick solutions to undergraduate students information needs, an exploratory research approach was undertaken. This was done to discover better ways of embedding library-based
instructions and human-mediated services into UNAM Library services using a Virtual Reference Service (VRS). Drawing insights from a number of socio-technological and cultural factors related to this study’s gaps and objectives, Chapter 3 outlines the research methodology selected to investigate the subject. In order to determine undergraduate students’ behavioural and social practices on Web 2.0, a framework for designing a scientific approach was used not only to meet this study objective, but also to indicate techniques undertaken to generate and justify how knowledge is acquired theoretically as stated by Blaikie (2010:57).

Given the complexity of gathering data via human sources, and the ambiguity of their social practices, no single approach is adequate to generate and accumulate new knowledge. Accordingly, this study’s data collection procedures, analysis techniques, limitation and research ethics are covered in Chapter 3 while data analysis, presentation and interpretation will be explained in detail in Chapter 4. Subsequently, Chapter 5 will synthesise the study’s findings based on the study’s main problem to offer recommendations and draw conclusions.

3.2 Research paradigm

As explained by Pellissier (2007:xv) a research paradigm deals with a specific philosophy and belief concerning the nature of the world. Kline (2009:32) claimed that in modern days, a paradigm in social science was an ideal way of explaining how new knowledge can accumulate steadily. However, following the evolution of technological changes, the rise of cultural individualism and impact of globalisation; new ideas and social practices began to emerge making it problematic to assess how knowledge is accumulated. To develop new ways of innovating and capturing knowledge, measuring of social methods and processes entail the following aspects (Williams & Vogt 2011:2):

i. **A philosophical assumption:** to explain how knowledge is constituted and acquired

ii. **Identification of different forms of inquiry:** to guide a systematic approach to collecting data

iii. **Logical procedures:** to indicate how data will be analysed and presented
Correspondingly, this study is grounded within the context of the positivism paradigm, which is described as “an empirical and theoretical structure that builds on another in a way that permits results of current studies to extend earlier work” (Dash 1993:1). As postulated by Creswell (2003:4) classical research paradigms represent acceptable and preferred ways of acquiring reliable and valid knowledge about the natural world. Dash (1993:1) further asserted that a positivist paradigm demands for an examination of complex issues from a factual point of view to generate insights that influence an individual’s behaviour. Although the structure of scientific studies is rationalised by an individual’s radical change over time, a logical positivism approach holds value in verifying a set of criterion (Christensen et al., 2011:12).

As per Christensen et al., (2011:12) the role of theory in scientific research is to enable the researcher to describe, explain, predict and control why a phenomena study exists in a specific content using reliable facts. Since this research paradigm approach is influenced by the nature and extent of the problem at hand, it is important to study a number of causes and effects of human behaviour from an objective perspective (Dash 1993:2; Pellissier 2007:15). Mouton (2006:12) stated that study orientation could be constituted to be either experimental or descriptive. As further elucidated by Creswell (2003:13) as well as Christensen et al., (2011:28), an experimental study attempts to demonstrate the relationships between variable causes and effects by manipulating independent variables. As such, a descriptive study attempts to describe the phenomena investigated using different sets of events and criterions.

Therefore in this study, a positivism paradigm is selected as appropriate to understand how undergraduate students engage in social networking platforms using Web 2.0 technological tools. Blaikie (2010:105) stated that the value of research strategies is confirmed by the purpose of the study as well as the epistemological position of the researcher. In this study, a positivism viewpoint will be used to analyse participants’ perspectives toward the implementation of Web 2.0 social technologies as instructional learning approaches within a Virtual Reference Service (VRS) in academic libraries. Blaikie (2010:980) and Kline (2009:39) stated that positivists believe in generating new knowledge by extracting insights from the
data collected empirically. It is also important to limit and quantify users’ responses according to the research design and measurement of the study’s variables.

3.3 Research design

Mouton (2006) defined research design as procedure or guidelines employed to provide a structure that informs one on the tasks to be carried out to accomplish the study’s aims and objectives. The rationale of research design is to provide a direction undertaken to generate credible findings using an accurate instrument to collect data. As Fox and Bayat (2013:51) put it, “research design is the actual plan in terms of which you obtain research participants or subjects and collect data from participants”. The research design has the intention of capturing participants behaviour, perspectives and preferred Web 2.0 tools and understanding the context in which the study can be controlled and measured as a key aspect of social science research (Christensen, Johnson & Turner 2011:xix).

Scientifically, it has been established that acquiring knowledge in a given social phenomenon is a rigorous and complex process. As asserted by Christensen, Johnson and Turner (2011:xix), knowledge can be conceptualised, classified and categorised through different learning practices and pedagogical approaches. According to the authors, traditionally, intuition; authority; rationalism and empiricism are four main approaches that are signified as critical sources of new knowledge. Christensen et al., (2011:7) as well as Blaikie (2010:3) stated that for a study to generate valid information and new knowledge, different logics of inquiry can be employed. Although all four methods of reasoning are valuable and can be applied to any social science study intuitively, Kline (2009:32) stated that extracting insight from social actors in a noble research study is a rigorous process and often involves various possibilities.

That being noted, each approach has its own merits and demerits. As noted by Simonsen, Barenholdt, Buscher and Scheuer (2010:90), social science is a multi-liberal phenomenon centralised on discovering and controlling ways of creating change and solving problems of the social world. This study’s nature, scope and
assumptions are confined within the rationalism and empiricism approaches to assess participants’ knowledge based on facts generated from experiences. This is done by investigating the use of Web 2.0 tools by undergraduate students using their beliefs and reasoning. Analysis by Williams and Vogt (2011:98) as well as Simonsen et al., (2010: 90) also noted a growing behavioural tendency of conducting social research without making reference to any research paradigm. Blaikie (2010:79) asserted that, gathering empirical data in a soft science relies on the application of logic to claim new knowledge. In order to guide the process of collecting and analysing new knowledge empirically, an inductive method approach was used to infer individual’s behavioural and social practices.

Objectively, the study is grounded within the context of positivism research paradigm of which views regarding the use of Web 2.0 technology. In order to find a solution to the research gaps, an inductive reasoning which intends to apply logic in describing the subject characteristics and patterns from specific trends to a general context has been applied. To describe the relationships between variables, and to ensure that participants’ views reflect the reality of what is being investigated; the types of inquiries undertaken should be addressed. As stated by Creswell (2003); Mouton (2006); Blaikie (2010) and Christensen et al., (2011) social sciences studies are categorised into the following three main strategies of inquiry. Namely, qualitative, quantitative and the mixed methods approach. In this study, a quantitative approach of collecting information using numerical data, pictures, words, statements and other description facts to quantify individuals’ situations, views and behaviours was considered.

Because of its statistical-driven approach, different themes and operational categories are created to address specific assumptions and values. Objectively, each of these methodological paradigms requires maximum control of variables in capturing and contextualising individual’s views. Notwithstanding, each of the strategies of inquiry has its own inadequacy. Blaikie (2010:107) argues that a fairness approach to generating new knowledge is required in social research. To enable the researcher to extract values from participants’ views accurately, a research strategy must be selected to address the identified research problems and questions. In order for this study to explore and describe participant’s views in regard
to the use of Web 2.0 social technologies, a quantitative research strategy of inquiry was employed as detailed under Heading 3.3.1.

3.3.1 Quantitative focus study

Fox and Bayat (2013:51) define quantitative research as a systematic way of gathering numerical data from the population studied; usually describing the situation in which the study is expected to remain detached from engaging in the data collection process. As indicated by Creswell (2003:95), a quantitative research study intends to collect views that are numerically based grounded within the context of positivist paradigm. Simply put, a quantitative approach is an appropriate strategy to enumerate participants’ true views scientifically and objectively because the researcher has no major influence on the data collected. Creswell (2003:95) further asserted that quantitative strategies rely on collecting numerical facts and figures. As such, each variables can be transformed into numbers to enable the researcher attached meanings and interpretation them from a logical point of view to a specific context.

As further noted by Christensen et al., (2011:17), proper measures need to be taken into consideration so that individuals’ views are controlled and ambiguous responses are eliminated. Through a positivist vantage, participant’s views and perspectives need to be confined into specified variables; a positive aspect which heightens the chances of replicating similar studies whilst managing biased responses, this can be achieved by designing a valid and reliable data collection instrument (Blaikie 2010:106). Fox and Bayat (2013:78) confirmed that “the use of facts and numbers allows greater precision in reporting results”. More important, quantitative research enquiry relies on the creation of operational themes and variables (Christensen et al., 2011:30).

In order to address these gaps a number of operational concepts were identified from the literature and specific variables were designed to address the phenomenon at hand. This was done to enable the researcher to conceptualise key issues identified within the literature, using a set of “blocking aspects to generate different
values and categories independently” (Blaikie 2010:115). As an attempt to measure variables and to provide a clear analysis of complex and operational issues relating to this study phenomenon, operational themes and concepts were pre-determined by the researcher as advised by Creswell (2003:13). As further stipulated by Christensen et al., (2011:30) a set of relevant variables were differentiated and categorised in order to detect their causes and effects on the subject investigated.

Based on that assumption, this study concerns itself on highlighting the fact that, an inductive logical explanation is undertaken to aid the analyses of data using extensive information gathered from a large population as stated by Mouton (2006:12); and Creswell (2003:126). Research methods are defined as strategies employed to collect, analyse, present, and interpret data selected from credible and reliable sources, research methods are a critical part of social sciences research (Blaikie 2010:158; Christensen et al., 2011:54). Mouton (2006:57) indicated that “research designs are tailored to address different kinds of questions aimed to find a solution to a specific problem”.

In order to claim new knowledge and reliable conclusions appropriately, sources of data become a critical aspect in determining social actions and their intended consequences. As stated by Williams and Vogt (2011:3); Blaikie (2010:160) as well as Mouton (2006:49) in social research, data sources can be extracted and gathered from different sources using different applications and techniques. Primary data, secondary data and tertiary data are the three main streams of sources of knowledge. In order to gather and trace data appropriate to the study problem, this study collected primary data and reviewed tertiary data to deduce and substantiate what is already known in the field of study. As stated by Blaikie (2010:160) primary data refers to first-hand information and data collected and generated via empirical study. As emphasised by Greener (2011:150), the quality of research outcomes relies on the types and sources of data collected from a valid and reliable source.

To determine and quantify the degree nature of the investigated problem, it is important to specify how each variable is related to each other in a research framework (Kline 2009:40). Therefore to reach a fair conclusion using new knowledge in relation to the use of Web 2.0 interactive tools by undergraduate
students, this study used a quantitative research approach to gather data from a large population falling within a specified parameter. In an effort to control, manage and measure the study findings accurately, this study’s unit of analysis was identified through appropriate population and sampling method as discussed under Heading 3.4.

3.4 Population

Mouton (2006:110) provides the definition that “a population refers to a specific group selected to gather data using an appropriate instrument”. At present, the University of Namibia (UNAM) has 12 satellite campus located in various parts of the country. As evidenced by the University registrar, the undergraduate student population figures in 2015 across all satellite campuses was about 19,410 registered in different academic faculties.

In order to achieve a balanced outcome and achieve reliable results, this study was limited to undergraduate students who have been registered at UNAM for more than a 12 month period. Strategically, all campuses with a fully furnished library formed part of this study population. Thus, all first year undergraduate students who registered in 2015 were included as the potential study group as shown in Figure 3.2.

![Figure 3.2: Number of students registered per campus at UNAM in 2015](image-url)
Notably, UNAM’s student population is spread over diverse geographical locations. As noted by Bless, Higson-Smith and Sithole (2013:164) “a study sample is only considered to be adequate if it obtained the sufficient results designed to address a specific problem”. In order to have a fair representation of the study sample, all undergraduate students pursuing their studies ranging from certificate, diploma as well as honours degree studying either full time, part time or distance educational model stood a chance to participate in the study. As seen in Figure 3.3, a total number of 359 undergraduate students were drawn from different disciplines offered at different UNAM campuses, excluding those studying via the foundation programmes.

![Figure 3.3: Number of students registered per faculties at UNAM in 2015](image)

Logically, undergraduate students are expected to utilise academic resources to supplement their learning aids and content, provided by teaching academics. Therefore, purposefully, undergraduate students who were found in the library during the data collection process stood a chance to take part in this study irrespective of their social and cultural background, competencies or gender. Using the overall number of undergraduate students registered in 2015 at each campus, a maximum sample of 25 participants (at each satellite campus and 130 from the main campus) were expected to partake in this study.

As shown in Table 3.1 (page 73) this study population targeted 450 undergraduate students, and 352 questionnaires were completed and returned to the researcher.
Table 3.1: Study population, sampling and respondents per campus

<table>
<thead>
<tr>
<th>Library Campus Name</th>
<th>Total No. of undergraduate population in 2015</th>
<th>No. of questionnaires distributed</th>
<th>No. of respondents per campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sam Nujoma</td>
<td>103</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>Neudamm</td>
<td>149</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Ogongo</td>
<td>257</td>
<td>30</td>
<td>*38</td>
</tr>
<tr>
<td>Jose E. Dos</td>
<td>291</td>
<td>30</td>
<td>*31</td>
</tr>
<tr>
<td>Southern</td>
<td>299</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>Oshakati</td>
<td>512</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>School of Medicine</td>
<td>520</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>Katima Mulilo</td>
<td>750</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>Khomasdal</td>
<td>876</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Rundu</td>
<td>1172</td>
<td>30</td>
<td>22</td>
</tr>
<tr>
<td>Hifikepunye Pohamba</td>
<td>1531</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>Windhoek Main</td>
<td>10549</td>
<td>230</td>
<td>122</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17044</strong></td>
<td><strong>550</strong></td>
<td><strong>352</strong></td>
</tr>
</tbody>
</table>

*The numbers of respondents per Ogongo (38) and Jose E. Dos (31) do not correlate because students were registered at another campus when they were completing the questionnaire.

Given the diverse characteristics of participants in this study or “unit of analysis” as termed by Mouton (2006:39) findings will be generalised from the sample conducted to the entire population. And since a quantitative research employs empirical techniques to explain the phenomena constituted within a vast body of knowledge (Blaikie 2010:122), data collection processes need to be well-articulated to address the core-problem investigated. Fox and Bayat (2013:78) affirmed that conducting empirical research based on a large-scale population involves a set of techniques and questions, designed to draw specific information from the study participants.

With the above mentioned hindsight, this study maintains that gathering views from the sample group selected provided adequate empirical evidence to plan and implement appropriate Web 2.0/Library 2.0 strategies aimed to equip and connect students with academic learning resources and information searching techniques. As emphasised by Mouton (2006), the type of data collection instrument needs to be substantiated within the context of the research paradigm in order to achieve a satisfactory outcome.

A questionnaire was used to collect data from a sub-set that represents the study population as recommended by Blaikie (2010:162). Objectively, it is hoped that participants’ views will assist the UNAM Library in introducing appropriate human-
mediated and innovative reference services to facilitating better access to digital content and utilisation of library-based academic resources in an improved way.

3.5 Sampling

In a survey-bounded study, a sample drawn from the study population is a determinist source of data. Creswell (2003:45) defined a sample as “subjects or elements selected from a population” to represent views from a larger group of people. In a similar context, Blaikie (2011:172) defines the study population as “an aggregation of all cases that conform to a designated set of criteria”. In contrast, Mouton (2006) refers to the study population as elements of enquiries or unit of analysis selected to provide views on a particular aspect. As documented by Greener (2011:62) and Blaikie (2011:152) a fair representative sample that holds the study’s value needs to be determined to enable the researcher to control and manage the study accurately.

In order for this study to produce reasonable and adequate views from a selected population, criteria for selecting the phenomena studied, sample characteristics were taken into consideration. As suggested by Mouton (2006) a sample ratio of the entire population needs to be determined using the following main elements:

i. A sampling plan: that indicates how the research phenomenon is controlled to ensure that participants pose similar characteristics

ii. Measurements of operational variables: to control and construct meanings equivalently

iii. A selection of sample groups: in which data is observed and treated in a particular time frame

As indicated by Blaikie (2010:172) sampling methods play a major role in identifying the right participants that represent the views of others. Noteworthy, each sampling technique is associating with a number of pros and cons. Accordingly, sampling can either be categorised as random sampling; defined as “a technique of selecting the participant population strategically and systematically to ensure that everyone has a chance of being selected” (Blaikie 2010:173).
A non-random sampling technique; which intends to collect data from a relevant study population was identified to serve a specific purpose. This is taken into consideration in cases where participants have no equal chance of being included in the study (Blaikie 2010:173). To ensure that each study question is well covered and addressed in the questionnaire, participants were identified using a non-random sampling technique to collect numerical-based data as elaborated under Heading 3.5.1.

3.5.1 Non-random sampling technique

Fox and Bayat (2013:58), Christensen et al., (2011:158) as well as Blaikie (2010:158) defined a non-random sampling technique as a type of sampling method that focuses on collecting data from a large population, which may not be accurately represented. Williams and Vogt (2011:179) noted that, contemporary, extracting and tracking human patterns and views in a social-driven environment is becoming complex due to a number of historical, socio-technological, and cultural issues. Simonsen et al., (2010:90) and Kline (2009:40) noted that the process of acquiring knowledge in a digital-bounded environment is confronted by different perennial issues.

Given the complex nature of investigating the millennial generation, a non-random sampling technique is selected as an appropriate approach of collecting data from a diverse study population according to a sampling frame. An “authentic list of all the elements falling within a specific population”, was used to identify the sample from the study population as evidenced by Christensen et al., (2011:150) and Greener (2011:64). Mouton (2006:12) pointed out that a research design is quantified by views drawn from a fair representative of the population that holds sentimental views on the subject matter. In order to predict “the percentage of participants selected to be in a sample and compare those who eventually participate in the research study” (Greener 2011:65), a sampling frame was used to minimise sampling errors (Blaikie 2010:162).
Since this study relies on analysing numerical-centric statistics, the type of sampling method employed was chosen specifically to eliminate social influences. Objectively, participants were judged according to specific criteria and characteristics such as age categories, disciplines and level of studies. As established by various social sciences scholars, quantitative-oriented studies are becoming inexpensive and significant in generating large sum of data within a short time frame. Henceforth, a convenience sampling technique which falls under a non-probability/non-random sampling approach was selected to gather data from participants as detailed under Heading 3.5.2.

3.5.2 Convenience sampling method

Blaikie (2010:177) defined convenience sampling as a randomness sampling technique employed to address the study problem at hand by gathering data from a selected study population. To differentiate between the sample values and the true population parameters, the researcher’s assumptions and logical views need to be guided by the study orientation and design (Williams & Vogt 2011:179). Objectively, the practice of collecting data via a convenience sampling or self-selected process as known by Greener (2011:177) is commonly lamented for its inadvertent and bias nature (Pelissier 2007:32). However, the decision to employ this type of non-sampling approach was driven by the students’ accessibility and availability to participate in the study unobstructed. Thus, convenience sampling method was viewed as an appropriate method to meet this study’s co-focus.

Since this study investigated the use of library user-based resources and reference instructional services to determine the types of Web 2.0 technological tools used by undergraduate students at the University of Namibia; it was impossible to make exact estimates of sampling errors. Blaikie (2010:177) asserted that producing a richer understanding of social life is assessed on the value of sampling method and selection. Although the researcher’s understanding and competencies in defining variables could quantify the study findings, Bless, Higson-Smith and Sithole (2013:164) noted that time and resources are common factors that bound the study design to a specific geographical area. To overcome such predicaments,
questionnaires were distributed “until the sample reaches the designed size” as advised by Bless, Higson-Smith and Sithole (2013:172).

For this study it was assumed that targeting undergraduate students who seek assistance in the library premises indicated their awareness concerning the library’s role in providing access to sources of academic information and resources. In order to manage participants effectively, the characteristics of the study population need to be taken into greater consideration (Bless, Higson-Smith & Sithole 2013:164). In this study, the method used for data collection is discussed under Heading 3.6.

### 3.6 Data collection

A questionnaire data collection instrument was used to enable the researcher to target students who were aware of the library’s resources and happened to consult library expertise serving at different user-driven services such as Reference Desk Services, Computer Help Desk and Circulation Counter. Because in a social science study “no data collection method can result in absolute knowledge” (Fox & Bayat 2013:79), this study data collection instrument was designed from a positivism vantage. Using hurdles of socio-technological and cultural factors associated with the use of Internet technologies in accessing and retrieving online and digital resources discussed in Chapter 2, a set of questions and themes were pre-assumed by the researcher. This was done to predetermine the participants’ needs, using appropriate learning trends and variables to measure their responses accurately as opined by Williams and Vogt (2011:37).

The procedures on how tacit knowledge was extracted from the study phenomenon are explained under Heading 3.6.1, followed by the report on how the quality and effectiveness of this study’s data collection instrument was quantified through pre-testing assessment.
3.6.1 Data collection instrument and procedures

The importance of enforcing a high degree of management and control over the process of discovering new knowledge is highlighted by various researchers in social sciences. While this study positions itself in the positivism paradigm context, extracting primary data from its source is the key aspect in every social science study (Mouton 2006). Because this study is empirical-bounded, a questionnaire as a quantitative-oriented instrument was used as the sole source of collecting data. Defined by Christensen et al., (2011:58) as a “self-reported data collection instrument designed with a set of questions to be completed by participants”, a questionnaire was chosen as the appropriate tool for collecting data in this study.

Greener (2011:39) and Creswell (2003:2) indicate that questionnaires are a popular tool in assessing users’ patterns in social research. Creswell (2003:19) states that relying on a standardised format designed with a closed-ended questionnaire prompts participants to indicate their responses freely. That being argued, numerous pros and drawbacks are noted when employing a questionnaire to solicit numerical data from participants in a natural-bounded research. According to Greener (2011); Creswell (2003); Bless, Higson-Smith and Sithole (2013) as well as Mouton (2006) the following aspects are noted to be significant in utilising a questionnaire to collect participants’ views:

i. A questionnaire is a reliable and versatile tool for compiling a range of questions designed to measure patterns of human attitudes using pre-defined content

ii. It is inexpensive, convenient, but time-consuming tool with the capability to generate numerical data from a large population of participants cogently and objectively

iii. Through a set of information and content, participant’s views enables a researcher to identify causality between variables by predicting and grouping key aspects together to avoid ambiguous responses

iv. Due to the study nature, a questionnaire can be highly moderated and measured accordingly, leaving a researcher with a high chance of capturing accurate responses in order to construct and explore meaningful values
The strength of a standardised questionnaire is its ability to collect massive sources of data effortlessly, however, a number of weaknesses have also been identified. These are:

i. Questionnaires invite closed responses that are bounded, and this, therefore, tends to restrict participants from expressing their own views.

ii. Depending on the nature of the problem investigated, questionnaires may produce poor results due to a high rate of non-responses.

iii. Relying on open-ended items may reflect differences in verbal ability, obscuring participants interest in the phenomenon studied.

iv. Measuring data accuracy can be time consuming, and if not carefully analysed can lead to poor conclusion, mainly because the quality of statistical analysis relies on the researchers’ understanding of the subject investigated.

Christensen et al., (2011:57); Greener (2011:39) as well as Williams and Vogt (2011:39) argue that relying on closed-responses answers enables the researcher to gather information about the subject covered, leaving participants with no chance of imposing own views. In order to conceptualise the possibilities of discovering new knowledge, each proposition related to the study key objective was taken into consideration. And because this study relies on a participants’ opinions and perspectives on specific subject matter (the usage of Web 2.0 tools). As endorsed by Greener (2011:41), a self-administered questionnaire was designed with sub-questions substantiated with a set of closed-ended questions, using leading responses to allow participants to select (by ticking) and rate their own views of the listed issues (see Appendix A).

In addition, suggested questions and answers were made precise and concise to solicit participants’ preferences using thematic factors ranging from: the use of library-based resources and reference services, the types of internet-based communication formats used to access online and digital information as well as the degree of interest in utilising Web 2.0 social technological platforms to access library-based services. In an effort to provide guidance and more clarity, sufficient information was provided to avoid ambiguous answers as indicated by Fox and Bayat (2013:89). In order to gauge participants on issues that ought to affect their
service, some questions were constructed with an open-ended component to enable participants to express their views and expectations.

This approach was appropriate to determine more information and knowledge, students’ academic information needs, and assess their gaps using predefined criteria whilst mapping out the possibility of buying in to the integration of Library 2.0 innovative tools. That being given, Simonsen et al., (2010:90) have stated that instituting a survey-driven data collection instrument is associated with numerous dilemmas and errors. And, noting the researcher’s roles in reconceptualising the study’s operational questions and answers, it is likely that key semantic issues in this study instrument could be overlooked or distorted.

To eliminate any uncertainty and subjective based issues, as well as to identify any information paradox presented, questionnaires were pre-tested as recommended in Williams and Vogt (2011:40). Heading 3.6.2 discusses the pre-analysis of data collection processes; a crucial aspect in social science which seeks to refine the process of gathering data to give minimum errors.

3.6.2 Pre-analysis of data collection instrument

Mouton (2006) stated that in a survey-driven study, errors in sampling and data collection instrument design have a greater impact on respondents’ level of understanding of what is being investigated. To ensure that the main sources of error are minimised, pretesting or piloting of data collection instrument plays an underlying role in every social science study. Blaikie (2010:125) defines piloting as “an experiment process carried out on selected participants prior to the actual collection of data”. In order to pursue human knowledge in a logical, desirable and scientific context in this study, about 45 questionnaires were piloted with first year undergraduate students at Windhoek’s main campus library.

This pilot was carried out in 2014 during the second semester period, prior to the actual data collection process which took place in the first semester of the following year, 2015. The process enabled this study to gather different views from students
who have been at the university for more than 6 months assuming that they make use of the library resources and services. In determining the logic and sequence setup of questions, respondent’s demographic information such as, the level of study, faculty name and gender categories were presented in the first part of the findings. Questionnaires were physically handed over to first year undergraduate students who happened to seek assistance at the following library user-oriented service points: Reference Desk Service, Student Computer Help Desk and Circulation Counter at Windhoek Main campus during the month of September, 2014.

Accordingly, each questionnaire was given a unique number to keep track of the filled questionnaires. In order to ensure that this study generates accurate views regarding the phenomenon identified, data were pre-analysed and interpreted using Statistical Packages for Social Sciences (SPSS) data analysis system. Williams and Vogt (2011:8) defined SPSS as a multifunctional data analysis software application, designed with capabilities to capture, define and label variables using different techniques. The following Heading 3.7 discusses the process undertaken to pre-test data reliability and response rate.

3.7 Data analysis

Mouton (2006:161) defined data analysis as the ultimate process of refining, filtering and synthesising data compiled and presented in various forms. Christensen et al., (2011:348) stated that the value of data collected via a quantitative-based instrument relies on the use of multiple items to measure complex words or words constructed from numerical objects or events. To ensure that the study outcomes represent accurate views gathered from the sample population, a number of contingency and drawbacks need to be taken into consideration. Williams and Vogt (2011:40) supported Creswell’s (2003:139) view that quantitative-based studies are grounded within the realm of assessing “the probability of validating new claims of inquiry”, extracted from ordinary and hypothetical viewpoint.
As stated by Williams and Vogt (2011:49); Greener (2011:35) as well as Christensen et al., (2011:148) gathering data via human sources is a complex process associated with various errors. Specific themes and categories need to be created to enable the researcher to analyse, interpret and infer meanings to a set of quantitative data. The following aspects are signified in different social methodologies and sciences (Mouton 2006):

i. **Descriptive statistics:** a statistical analysis anticipated to analyse a set of observed data by explaining, describing and summarising cases in order to make assumptions and draw conclusions

ii. **Inferential statistics:** a method which focuses on synthesis data to draw meanings and new knowledge based on the study characteristics and sampling distribution

Each data analysis technique mentioned above is associated with unique drawbacks. Hence, the researcher’s logical stance plays a critical role in attaching values and inferring meanings to unique cases, using graphical tools to measure, estimate, validate or reject the relationships between variables (Creswell 2003:139; Williams & Vogt 2011:498; Christensen et al., 2011:349). These authors further stated that quantitative-oriented studies are highly associated with non-response issues; a common drawback that is likely to affect and impede a true representative of the sample views, due to missing data. In order to quantify social enquiry and validate new ways of generating knowledge objectively, data analysis techniques must be aligned with the study’s ultimate motive (Mouton 2006:12).

Williams and Vogt (2011:49) point out that relying on a number of statistical principled methods to measure multiple data sets does not guarantee a realistic conclusion. To claim a free-judgmental conclusion, all data observed must be captured thoroughly, using different validity techniques; a critical aspect in every scientific and empirical study (Greener 2011:168).
3.8 Reliability and validity of the data

According to Williams and Vogt (2011:49) social sciences are bound by research ethics to ensure credibility and integrity in analysing data to produce new knowledge using a systematic and “correctness and truthfulness of data inferences to reach a valid conclusion from the study findings”. Thus, the types of statistical technique employed must accommodate non-response categories as a mechanism to control and eliminate incomplete and missing data-value effectively.

As evidenced by Mouton (2006:177) and Christensen et al., (2011:168), the following validity strategies are commonly adapted to gauge and manipulate data integrity effectively and realistically:

i. **Statistical conclusion validity**: a process of validating data inferences made about the co-variation between a set of independent and dependent variables

ii. **Construct validity**: a process of extracting value from data cases by inferring them to the higher order of variables, to constructs and to establish operational concepts

iii. **Internal validity**: a process of examining the correlation between independent and dependent variables

iv. **External validity**: a process of inferring cases using causal relationships to define and weight people, the study settings, and to measure the variables based on specific aspects such as historical patterns, education backgrounds and the time frame

The study relied on statistical conclusion validity to measure the correlation between independent and dependent variables and construct validity to attach meanings. Because this study focuses on exploring new knowledge within the context of Library and Information Science (LIS) using Web 2.0 learning trends, a set of operational concepts and variables were employed to validate the subject views. This is done to maintain a high degree of data integrity whilst using findings to draw conclusions and construct new knowledge. Thus, data collection instrument was piloting and the outcomes are covered under Heading 3.8.1 (page 84).
3.8.1 Piloting results and outcomes

Using participants’ responses to analyse this study’s key objectives, such as library usage, Web 2.0 preferences and their degree of interest in Library 2.0 activities, an inductive approach was employed to determine the possibility of consulting human-sources in addressing their academic information needs and learning gaps. Correspondingly, pre-analysis results showed an increased value in assessing the types of approach desired/or undertaken by students when confronted with information needs and academic gaps. Because the students’ seeking approach and preference was initially addressed vaguely, the outcome of this question will determine whether students value human sources because of the convenience factor.

On a surface view, the piloting results also heightened the importance of expanding the study population to each library campus in order to obtain a fair representation whilst enhancing the possibility of generalising the need to implement a Virtual Reference Service (VRS). While the researcher accepted the possibility of generating similar outcomes, the final outcome of this study will be reflected by the actual findings. Simply put, the study values will only be quantified after the analyses and synthesising of the final outcomes. That being pre-justified, time and ethical consideration has a major impact on the respondent effects in reconstructing ideas and justifying knowledge.

Simonsen et al., (2010:90) stated that social sciences as a human and socially oriented discipline involve a number of ethical dilemmas and disquiets. As highlighted by Kline (2009:11) shaping ways of producing new knowledge via social and behavioural studies should be carried out in an appropriate manner by adhering to ethical codes of conduct that are applied in the social sciences. Therefore in an attempt to draw a reliable and logical conclusion, this study locates itself within the context of social sciences research good practices and ethical procedures as discussed under Heading 3.9 (page 85).
3.9 Ethical considerations

Fox and Bayat (2013:148) stated that research ethics is about informing participants about their rights to participate in the study. Due to a number of contagious factors associated with human behaviour, research ethics have become a central issue in social sciences. Greener (2011:142) defined ethics in the context of acceptable principles and fair practices to be taken in the entire process of conducting scientific studies that intend to enumerate views from social actors. As stipulated in various social research frameworks like the American Sociological Association (ASA) and the Economic Social Research Council (ESRC) social sciences studies are compelled to apply numerous ethical procedures and social practices throughout the entire research process (Greener 2011; Mouton 2006; Williams & Vogt 2011; Creswell 2003).

Greener (2011:128) indicated a number of research principles and practices grounding the entire process of identifying and justifying the purpose of the study ranging from the identification of the research problems, research paradigm, research design, data collection instruments and measurement of the study variables. Scientifically, the following principles and procedures are signified as critical aspects in conducting a study in a normal and soft science ethically (Williams & Vogt 2011; Fox & Bayat 2013; Greener 2011):

i. **Institutional right and approval**: seeking for approval from the highest authority to grant the study rights and permission to collect data from the identified population

ii. **Confidentiality**: ensuring that participants’ personal data, views and responses are protected

iii. **Consent to participate**: ensuring that participants have the right to participate on the basis of their own free-will and are able to withdraw their contribution freely

iv. **Right to clear instructions**: indicating guidelines and instructions on what is expected from respondents when answering a set of questions, provided in the data collection instruments
v. **Debriefing on how data will be collected:** providing vital information about the study’s purpose, population, and the intended use of the study outcomes including the estimated duration of time required for answering the questions

vi. **Debriefing on the anticipated risks and incentives:** ensuring participants are well informed about any associated risks as well as the types of incentives involved

In abiding by the above-mentioned ethical rules and principles, for this study research authorisation was granted by the UNAM Research and Publication Committee (URPC) and the UNAM Library Management (ULM) prior to the data collection process. Participants were briefed on the study objectives and procedures presented on the first page of the questionnaire. This study relied on voluntary participation, and no monetary reward was given to any participants. In order to ensure that participants remain anonymous, no personal details were required and participants’ responses will be kept confidential. Subsequent to the completion of the data analysing completed questionnaires will be handed over to the Department of Information and Knowledge Management for safe keeping and the raw data saved via SPSS files will be converted to Excel for digital archival and backups.

### 3.10 Section summary

The section outlined the research procedures and techniques to be anticipated in collected data from the identified sample group. Kline (2009) concurred that a number of contemporary studies on “soft behavioural science” are now employing a hybrid approach, making it difficult for social scientists to ground and commit their research study in a single paradigm. As signified by Christensen *et al.*, (2011) the process of conducting and analysing individual’s views and patterns in a natural environment relies on a set of variables.

To ensure that data collection instrument extracted reliable views from students, questionnaires were piloted and participant’s responses were integrated into the final tool as recommended by Mouton (2006). As, the process of gathering and generating new knowledge is becoming complex; measuring instruments must be
done effectively. Williams and Vogt (2011) as well as Simonsen et al., (2010) affirm that, when investigating the impact of social actors in a social-dominant environment, one is confronted with a number of perennial issues, forcing researchers to ground their studies on innovative and complexity theories.

Certainly, this study acknowledged the value of applying post-paradigm approaches in a quantitatively driven inquiry to trace, gather and discover data produced via technology-related formats as noted by Williams and Vogt (2011). However, due to the vibrant nature of Web 2.0 applications, this study applied a traditional and passive positivistic approach to gather data from a heterogeneous population by physically handing out questionnaires.

Creswell (2003) has fairly pointed out that science is the only acceptable way of assessing, validating and disvaluing the process of acquiring knowledge which tends to be a complicated and mystery process. That being done, data presentation and analysis will be covered in Chapter 4 while the discussion of the study’s main question will be covered in Chapter 5.
4.1 Introduction and data presentation

The underlying aim of Chapter 4 is to present, analyse and discuss the study results. Data collection was carried out between February and March 2015, using a convenience sample of 450 undergraduate students registered at UNAM 2015. The objective of study was to assess the usage of library-based resources and reference instructional services by undergraduate students’ in order to determine the types of Web 2.0 desired to address their academic gaps/needs within a virtual reference environment at UNAM Library. To achieve this, a questionnaire was used to collect data from the targeted population of students at undergraduate level across 12 UNAM campuses.

Driven by the need to determine the students’ level of interests in utilising Web 2.0 as a medium for accessing knowledge and information spontaneously; the following three sub-problems were developed to address the study gaps:

i. To assess the extent to which undergraduate students use library-based services and resources
ii. To determine the kind of library reference instructional services preferred to by undergraduate students in addressing their academic information needs using Web 2.0 activities
iii. To find out the types of Web 2.0 tools mostly used by undergraduate students
iv. To analyse the types of barriers facing undergraduate students in obtaining quality information, resources and services

Given the fact that this study population was scattered across 12 UNAM Campus situated in different parts of the country, questions were developed in logical groupings of sets to aid this study draw a fair conclusion using rich and valuable information extracted from participants responses. These include:
i. The degree of usage of UNAM Library services and resources
ii. The types of reference instructional services received (termed as user-based library training)
iii. The kind of communication tools/devices used to access online and digital based information (internet-based resources)
iv. The types of barriers and information gaps constraining undergraduate students in accessing and utilising academic resources effectively
v. The kind of approaches taken in seeking academic assistance
vi. The degree of interests in using Web 2.0 tools as Library 2.0 strategies

Due to time and resources constraints, the researcher could only manage to physically distribute and gather questionnaires at the main library campus in Windhoek and relied on library staff members to coordinate and distribute questionnaires at the remaining 11 satellite campuses; an aspect which left the researcher with limited control in monitoring the data collection process. To achieve a fair representative from the targeted audience, each library at satellite campus was given a proportional number of questionnaires based on unique characteristics such as the population size and the nature of disciplines. A quantitative-based statistical analytical program called IBM SPSS statistics version 22 was employed to assist in analysing, describing and manipulating raw data as explained below.

i) Statistical data cleaning, coding and analysis

In this study, 352 questionnaires were captured in SPSS statistics. During the data cleaning process, six questionnaires were identified as incomplete and, therefore, discarded from the data capturing process. Moreover, one questionnaire had five questions with missing values and a decision was made to exclude it from the data analysis.

As indicated in Table 4.1 (page 90), this study targeted a sample of 450 of undergraduate students registered at UNAM for more than 12 months period, and only 352 questionnaires were fully completed. Thus, a satisfactory response of 78.2% was attained.
**Table 4.1: Total number of the study population, targets and respondents per campus**

<table>
<thead>
<tr>
<th>Library Campus Name</th>
<th>Total No. of undergraduate population in 2015</th>
<th>Total No. of questionnaires distributed</th>
<th>Maximum No. of participants expected</th>
<th>Total No. of respondents per campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sam Nujoma</td>
<td>103</td>
<td>20</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Neudamm</td>
<td>149</td>
<td>30</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Ogongo</td>
<td>257</td>
<td>30</td>
<td>25</td>
<td>*38</td>
</tr>
<tr>
<td>Jose E. Dos</td>
<td>291</td>
<td>30</td>
<td>25</td>
<td>*31</td>
</tr>
<tr>
<td>Southern</td>
<td>299</td>
<td>30</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Oshakati</td>
<td>512</td>
<td>30</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>School of Medicine</td>
<td>520</td>
<td>30</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Katima Mulilo</td>
<td>750</td>
<td>30</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Khomasdal</td>
<td>876</td>
<td>30</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Rundu</td>
<td>1172</td>
<td>30</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Hifikepunye Pohamba</td>
<td>1531</td>
<td>30</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Windhoek Main</td>
<td>10549</td>
<td>230</td>
<td>185</td>
<td>122</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17044</strong></td>
<td><strong>550</strong></td>
<td><strong>450</strong></td>
<td><strong>352</strong></td>
</tr>
</tbody>
</table>

*The numbers of respondents per Ogongo and Jose E. Dos do not correlate because students were registered at another campus when they were completing the questionnaire*

In order to analyse and discuss the results of this study, descriptive frequencies, cross tabulation analysis and inferential analysis technique were adapted to attach meaning to the raw data (see Appendix A). Findings are reported in percentages. Thus the actual performance of the total number of the sample population is 352 (n=352). Each questionnaire consisted of 24 questions. In order to present, compare, explain and infer co-relationships between key variables, participants’ responses will be presented using figures and tables represented by question numbers as they appeared on the questionnaire (see Appendix B).

The study results are discussed according to the thematic issues using the following sub-headings. Heading 4.1.1 (page 91) presents the demographic of respondents; while Heading 4.2 analyses the usage of the library while data representing the types of reference instructional services user-based training is covered under Heading 4.3. Heading 4.4 will assess the types of barriers and gaps facing undergraduate students in accessing and utilising academic information. The awareness and preferences of Web tools/social networking tools are outlined under Heading 4.5.

Significantly, Heading 4.6 syntheses the study findings and outcomes. These are discussed in relation to a number of pertinent factors and issues discoursed within
the context of Web 2.0 learning trends and Library and Information Science (LIS) presented in Chapter 2. Where necessary, figures and tables will be used. This chapter concludes with a summary of key findings from each sub-problem while the study conclusion and recommendations will be addressed in Chapter 5.

### 4.1.1 Demographic details of respondents

As per the Social Science code of practices, gathering the demographic characteristics of each respondent signifies the value of human beings in partaking in any scientific study. In a retrospect view, respondents were asked to indicate their gender preferences, level of maturity, level of educational program and study stage, faculty name as well as the registered campus name. As shown in Figure 4.1.1 below, out of 352, accumulative to 100%, a total of 44.3%, 156 respondents, were made up of male respondents, leaving the remaining 196 respondents (55.7%) to be female. Because a larger number of the UNAM population is made out of females (62%) a higher representation of females in this study was excepted.

To determine the age distribution covered in this study, respondents were asked to indicate their age from a set of age-categories classified under a four years marginal stance. As shown in Figure 4.1.2 (page 92), 58.8% of the respondents, which is the largest representative belonged to the age group of 20-23 years, followed by those
who were in the age bracket of 23-27 years with a total of 10.5%. As expected, only 10.8% of respondents’ belonged to the younger age category of 16-19 years; an outcome which seems to correspond accurately with UNAM student’s profile. This could be explained by the situation in Namibia where learners are expected to complete their Grade 12 at the age of 16 and depending on their Grade 12 performance they can enter university at 17 years of age. Moreover, 6.5% of the respondents belonged to the 24-27 age category and only 0.6% of respondents preferred not to indicate their age group.

![Figure 4.1.2: Respondents age category](image)

With the intention of understanding the types of information required and academic resources to address undergraduate students learning demands, respondents were prompted to indicate their level of education. As presented in Figure 4.1.3 (page 93) results showed 297 respondents (84.37%) were busy studying towards an honours-degree qualification; a four year undergraduate degree which is the most common format in UNAM programs. Respectively, 50 respondents (14.2%) were busy with their diploma qualification which can be completed either in two-years or three years depending on the field of study, while 5 respondents (1.4%) were busy with their certificates.
Respondents’ level of study registered at the time of data collection process was examined to aid the study and assess the types of training attended as well as the type of scientific information that they will require. Classified under four categories, it appeared that a large total number of undergraduate students amounting to 35.5% of the respondents were on their second year level of study, followed by 113 respondents (32.1%) on a third year level and 23.6% on a fourth year level which would normally be their final year.

As indicated in Figure 4.1.4 (page 94), only 8.8% of participants were registered as having been studying at UNAM for more than 12 months but still classified as first years (indicating that they were repeating their first year.)
Following the indication of gender, age category and level of educational programmes, it was necessary for this study to know the respondents field of study. As presented in Figure 4.1.5 (page 95), a list of eight faculty names offered by UNAM was provided to enable respondents to indicate their broader area of study. The following breakdown was obtained Education (25.5%); Agriculture and Natural Sciences (22.7%) and Science faculties (12.7%).

The breakdown reflects the demand to produce Science and Technology experts as required in the Namibia’s long-term strategic plan, Vision 2030. Subsequent to the merging of former Colleges of Education into UNAM in 2009 and the expansion of innovation and agricultural-based programs, a higher number of students registered in Education and Agricultural was expected. Other faculties such as Economics and Management (10.8%); Humanities and Social Sciences (9.34%), Engineering (8.8%) as well as Health, Nursing and Medical Sciences (8.0%) were represented relatively well. Notably the Law faculty was only represented by 2.0% of the study sample due to the relatively limited number of registered students in this faculty at UNAM.
As shown in Figure 4.1.6 below a large percentage of participants were registered at Windhoek Main campus (34.7%), followed by Ogongo (10.8%) and Jose E. Dos Santos satellite campuses (8.8%). Respectively, with the exception of Windhoek Main campus and Sam Nujoma campus (3.1%), each UNAM satellite campus was expected to be represented by a maximum of 25 participants. However, it was discovered that two satellite campuses produced more than expected. This occurred because faculties such as Education, Engineering, Science and Health and Medical Science were also offered at Windhoek Main campus.
Heading 4.2 below examines the actual usage of the library services and user-based training received by participants. Questions were designed to target those who seek assistance at different user-based service points in the library. Namely; Reference services, Circulation section, Students’ computer-based areas, Short loan section, Special Collection (a thesis and dissertation section, also called Namibiana) as well as in the Subject-Librarian offices.

### 4.2 Usage of library services and resources

The characteristics and user-behaviour of each respondent were understood in this study by developing four key questions within Question 2 to measure the frequency visits of the library according to specific services points, as well as the types of assistance required in different academic needs. Retrospectively, respondents were also asked to rate the service areas that were most consulted in order to address their academic needs. As shown in Figure 4.2.1 below respondents who were visiting the library more than once a week were 51.0% of the research sample, followed by 26.6% of regular library visitors (on a daily-basis). Notably, a smaller number of 1.4% were using the library for the first time during the data collection process period, while the remaining 7.1% belong to the group who rarely visited the library.

![Figure 4.2.1: Usage of library services](image)

- 51.0% More than once in a week
- 26.6% Daily
- 13.9% Once a week
- 7.1% Once a month
- 1.4% First time ever

**Figure 4.2.1: Usage of library services**
4.3 **Usage of reference instructional services (user-based training)**

The study`s objective further examined undergraduate students information seeking habits and skills to determine whether undergraduate students attend library user-based training either through a formal classroom session or office/personal consultations which are a critical component of reference instructional services. Since library orientation and user-education awareness are mostly offered at the beginning of every academic year, a high number of participants only attended the library orientation (a total of 42.3%).

A total of 17.9% of respondents had attended a one-on-one information guidance session with a library professional designated as Subject Librarians, whilst only 16.5% of participants attended information literacy training. In Figure 4.2.2 below each type of library user-based training was assessed independently and results show that 39.2% indicated that they did not attend any of the listed library training activities.

<table>
<thead>
<tr>
<th>Library user-based training</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library Orientation</td>
<td>42.3%</td>
</tr>
<tr>
<td>None of the above</td>
<td>39.2%</td>
</tr>
<tr>
<td>One-on-one-instruction session with a library staff</td>
<td>17.9%</td>
</tr>
<tr>
<td>Information Literacy Training</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

*Figure 4.2.2: Total % of the library user-based training attended*

Since user-based training is a core-value of rendering reference instructional service in an academic library, the low turnout at the user-based training prompted this study
to examine the profile of those who attended the library training according to the level of study using a cross-tabulation analysis technique. As Figure 4.2.2a below indicates, library orientation programs were attended by a higher number of respondents at each level. The highest non-attendance of training occurred in the first and fourth year with over 50.0% of these participants not attending any library user-based training.

Another key interest for this study was to examine the types of library-based services and resource barriers constraining undergraduate students and seek for ways to fulfilling them. As shown in Figure 4.2.3 (page 99), a set of unidimensional Likert-type categories of Never, Sometimes and Frequently were employed to measure the degree of usage of each area. Results show that library-based subscription services, such as OPAC had 54.8% of users, whilst e-journal and e-books had 46.3% consultation by respondents.

An observation was also made that a high number of missing values of each reference instructional services queries was noted, ranging between 2.3% and 2.8%. This outcome could have resulted from a misconception of library centric concepts or their meanings to respondents. It is clear that the majority of respondents were more
likely to seek for information related to circulation (borrowing, renewing and reserving) and lecture notes. Since circulation services merely exist to serve and perform specific operational tasks, there were no discrepancies in respondents’ answers. Thus, a high number of missing values did not have a major impact on the outcome of this question.

Figure 4.2.3: Areas of reference instructional services assistance in the library

To further determine the kind of approaches taken to address undergraduate students academic needs via different library reference instructional services (or what is known as reference help desks/information desks), dedicated to assist, facilitate and mediate the process of acquiring information and knowledge, six library key service points were singled out. This was done to enable respondents to indicate their level of usage/consultation using Likert-type scaling categories of Never, Sometimes and Frequently.

Despite a number of missing values encountered between 1.1% and 2.6%, a dominant usage of Circulation Counter Desk (21.2%), Student Computer Help Desk (15.9%) and Short loan Section (15.3%) was noted. As shown in Figure 4.2.4 (page 100), library user-based sections such as Subject Librarian offices (8.8%),
Namibiana/Special Collection (12.5%) and Reference Desk (13.3%) were the least used services points.

Respectively, it was necessary to examine the profile of those who indicated the Never category amongst those who sought assistance at the Reference Desk and Subject Librarians. As shown in Figure 4.2.4a (page 101) the Reference Desk and Subject Librarians are likely to be used by those who visited the library rarely. The outcome on its own can be perceived to be a worrisome case which correlates with the results of a higher number of those who occasionally seek assistance in online and academic resources related areas discussed under Figure 4.2.3 (page 99).
Figure 4.2.4a: Cross tabulation of consultation of Reference Desk and Subject Librarians officers per library visits

Noting the importance of using the physical collections of materials available at different user-based sections, Figure 4.2.4b (page 102) shows a high use of Circulation Counter Desk. Short-loan Section and Special Collection Section were visited more by respondents at third year and fourth year level. This could be caused by the high demand to utilise scientific information in assignments and research reports using prescribed materials, period thesis and dissertations, annual reports and Namibian law reports. Undergraduate students at first year level only consulted Subject Librarians. Arguable, this could be the result of eagerness to seek assistance from the subject-based expertise.

The profile of those who mostly visited the Reference Desk was analysed further using the level of study categories. As demonstrated, in Figure 4.2.4b (page 102), a relatively low percentage of undergraduate students at second year level, ranging between 13.6% and 14.5% consulted the Reference Desk regularly. The Reference Desk was rarely consulted by those who were still busy with their first level of study (9.7% of the respondents); a revelation which seems to indicate the necessity of rendering ready-made solutions to undergraduate students’ inquiries.
It is clear that the majority of participants were not first-time users of the library. The next sub-objective was to analyse the types of barriers and gaps facing undergraduate students in accessing digital based resources and scientific databases via the Library Website. Findings from this question are presented under Heading 4.4.

4.4 Barriers in accessing academic resources via UNAM Library Website

Accordingly, the study investigated the types of barriers and challenges facing undergraduate students when accessing library-based resources via the UNAM Library Website. To answer this sub-question, respondents were asked to rate the effectiveness of UNAM’s Library Website. This was done to determine the types of communication tools used and the degree of satisfaction in locating and using library-based resources and online help facilities. A list of pre-mediated issues was provided to enable respondents’ to rate their degree of competencies in utilising various academic resources and information literacy signified to be crucial in attaining academic excellence.
Sequentially, Figure 4.3.1 (below) represents a summary of the types of internet-based hubs and communication devices facilitating access to communication platforms and internet-based resources. Results show that most of participants were using laptops with internet connections or mobile data (3G modems) (54.0%); mobile phones (39.5%); and home/work based computers (28.7%). A relatively lower usage of iPad/tablets (10.5%), private based computers (7.1%) and faculty based computers (6.0%) was noted; an outcome which indicates that only 16.5% relied on the library-based computers to access Internet based information as evidenced below.

In order to explore the validity of respondents’ answers, those who needed assistance with Wi-Fi connection settings via user-based services were discussed under Figure 4.2.3, a cross tabulation analysis was used (see Table 4.2.1 page 104).
Results seem to validate that 66.7% of those who access the Internet via a laptop were also the ones who frequently seek assistance with the Internet IP authentication, represented as Wi-Fi connection settings. Lower usage of library-based computers by undergraduate students indicates a trend towards using mobile handheld communications devices within the academic context.

Table 4.2.1: Cross tabulation of Laptop users with those who seek for Wi-Fi connection settings

<table>
<thead>
<tr>
<th>Wi-Fi connection settings</th>
<th>Laptop with WIFI/3G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
</tr>
<tr>
<td>Never</td>
<td>12.4%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>5.4%</td>
</tr>
<tr>
<td>Frequently</td>
<td>3.8%</td>
</tr>
<tr>
<td>Total</td>
<td>7.4%</td>
</tr>
</tbody>
</table>

Adding value to the above deliberation, the degree of use of the UNAM Library Website and access to multi-disciplinary academic resources was examined. Since a Library Website is envisioned to serve a critical role in communicating, it was surprising to note that only 18.5% indicated that they frequently used the Website. Although a Website is a focal gateway to library-subscribed scientific resources, only 19.0% used the UNAM Library Website once in a week as seen in Figure 4.3.2 below.

Figure 4.3.2: Usage of the UNAM Library Website
It was necessary to find out if those who visited the Library Website also seek assistance regarding e-resources. The outcome of this question can guide this study in adapting appropriate modes of approach aimed at addressing e-resource needs. As indicated in Table 4.2.2a below, there seems to be a linkage between those who used the Library Website once in a month with 28.8% of respondents who frequently requested assistance regarding the use of e-journal articles and e-books more than once a week. Missing values of 0.3% were recorded. The results could imply that, those who used the Library Website on a daily basis contributing 11.0% of the respondents who never really seek assistance related to e-journal and e-books.

**Table 4.2.2a: Cross tabulation of usage of the Library Website and enquiry of e-journal/e-books**

<table>
<thead>
<tr>
<th></th>
<th>Use of the Library Website</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily</td>
<td>More than once a week</td>
<td>Once a week</td>
<td>Once in a month</td>
<td>Missing</td>
</tr>
<tr>
<td>e-journal and e-books</td>
<td>Never</td>
<td>11.0%</td>
<td>23.3%</td>
<td>21.5%</td>
<td>44.2%</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>24.8%</td>
<td>26.4%</td>
<td>17.1%</td>
<td>31.8%</td>
</tr>
<tr>
<td></td>
<td>Frequently</td>
<td>23.1%</td>
<td>28.8%</td>
<td>19.2%</td>
<td>28.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>18.5%</td>
<td>24.7%</td>
<td>19.0%</td>
<td>37.5%</td>
</tr>
</tbody>
</table>

Although all informational resources are accessed via one single UNAM Library Website, it was necessary to analyse the usage of the Library Website per campus because each campus library has its own unique operations in terms of opening hours and utilisation of the library facilities. In general, none of participants from Oshakati campus used the Library Website on a daily basis.

It is also important to note that, participants pursuing their studies in Engineering Faculty (3.2%) and Health, Nursing and Medicines (7.1%) were the least users of the Library Website with a higher percentage who used it only once in a month 64.5% and 75.0% as shown in Figure 4.3.2a (page 106). This outcome could be substantiated by the lower usage of the subject specific resources accessed via library-subscribed databases.
In line with the above figure, respondents were asked to rate whether they struggled to locate and access information via the Library Website using three Likert-type categories Not at all, Sometimes and Yes. Figure 4.3.3 (page 107) shows that, out of 352 respondents, only 17.1% indicated that they did not struggle to access and locate information via Library Website. While 58.2% indicated a neutral view about the state of the Library Website in accessing and retrieving academic resources a total of 24.4% were experiencing difficulties in accessing and locating appropriately.
The next focal point was to determine whether respondents were equipped with appropriate knowledge and the necessary skills required to carry out their studies more effectively. Because the process of assessing respondents’ information and academic literacy skills in an environment dominated by digitally-connected tools is a broad and complex procedure, a set of key learning areas within the library-centric settings were grouped into one question. This was done to enable respondents’ to rate their level of competencies, using Likert-type categories of Poor, Fair, Good and Excellent. As demonstrated in Table 4.3.1 (page 108), respondents were better equipped with knowledge and skills in accessing course materials (lecturers’ notes) via the Student Portal (58.5%) and this was also considered the most useful resource for accomplishing assignments and research activities (51.7%).

A total of only 6.9% of respondents indicated a fair to moderate knowledge and skills in searching e-resources databases. Downloading e-books and e-journal articles was the most challenging area for students, with a total of 32.7%, listing this as difficult, whilst searching for scientific resources, such as e-resources databases, was the most problematic resource for 28.4%. A total of 29.8% of the respondents believed that they lacked knowledge related to the library-based system (called OPAC), whilst a total of 25.0% of the respondents were knowledgeable in accessing the Library Website via off-campus access link.
Table 4.3.1: Degree of respondents' academic literacy knowledge and skill

<table>
<thead>
<tr>
<th>Activity</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessing lectures notes via student portal</td>
<td>6.3%</td>
<td>11.6%</td>
<td>23.0%</td>
<td>58.5%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Assignment / research writing and referencing</td>
<td>11.1%</td>
<td>25.3%</td>
<td>51.7%</td>
<td>11.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Searching for Past Examination papers</td>
<td>23.0%</td>
<td>25.3%</td>
<td>27.3%</td>
<td>23.8%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Accessing Library Website via off-campus access link</td>
<td>25.0%</td>
<td>23.9%</td>
<td>32.7%</td>
<td>18.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Searching for e-resources databases</td>
<td>28.4%</td>
<td>36.9%</td>
<td>25.3%</td>
<td>8.5%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Searching for books via OPAC</td>
<td>29.8%</td>
<td>29.8%</td>
<td>24.1%</td>
<td>15.3%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Downloading e-books and e-journal articles</td>
<td>32.7%</td>
<td>29.5%</td>
<td>25.0%</td>
<td>12.8%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Although a mere library visit may not equip one with adequate skills and knowledge on specific areas, it was necessary for this study to determine the extent to which participants' made use of the library. This was done to shed light on the effect of library visits and the problems encountered. As expected, findings indicate that, first time users of the library (40.0% of the respondents) and 52.0% of those who used the library only once a month) rated Poor or Fair, in comparison to those who used the library regularly as seen in Table 4.3.1a below.

Table 4.3.1a: Cross tabulation of pattern of searching e-resources databases with Usage of library visits

<table>
<thead>
<tr>
<th>Library visits</th>
<th>Searching for E-resources Databases</th>
<th>Poor</th>
<th>Fair</th>
</tr>
</thead>
<tbody>
<tr>
<td>First time ever</td>
<td>40.0%</td>
<td>40.0%</td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td>52.0%</td>
<td>12.0%</td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td>26.5%</td>
<td>40.8%</td>
<td></td>
</tr>
<tr>
<td>More than once in a week</td>
<td>27.9%</td>
<td>41.9%</td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>23.4%</td>
<td>31.9%</td>
<td></td>
</tr>
</tbody>
</table>

Furthermore, a question was asked to determine whether participants were satisfied with user-help contacts provided via the Library Website. As indicated in Table 4.3.2 (page 109), the majority of the respondents (55.4%) gave a neutral view by indicating Sometimes, while 22.2% were satisfied and not satisfied. A cross tabulation was used to increase clarity on the degree of usage of the UNAM Library Website and each type of online assistance. Results show that 43.3% of the respondents who struggled to find information were not satisfied with the level of support offered via the Library Website. Despite the availability of requests forms, a Facebook fan page, Twitter and RSS, the lack of library customised self-services via the Web seems to influence the low rating given to online help services.
Table 4.3.2: Cross tabulation of accessing Library Website views with the level of online satisfaction

<table>
<thead>
<tr>
<th>Struggle to find information on the Library Website</th>
<th>Degree of satisfaction with provision of the Library Online Help Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Not at all</td>
</tr>
<tr>
<td>Struggle to find information on the Library Website</td>
<td>19.8%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>17.1%</td>
</tr>
<tr>
<td>Yes</td>
<td>43.3%</td>
</tr>
<tr>
<td>Total</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

Extracting views from the types of communication devices mostly used by undergraduate students when accessing interest-based information, discussed under Heading 3.1 (see Figure 4.3.1 page 103), a set of issues were identified as hindering undergraduate students’ learning processes. Accordingly, respondents were given a chance to indicate the types of pragmatic barriers and gaps experienced in the process of accessing and utilising academic based resources. As presented in Figure 4.3.4 (page 110) Internet network and bandwidth connections were rated as the most pertinent factors constraining students from easily accessing digital resources with a total of 74.4% respondents complaining about this problem. A large number, 222 respondents (67.3%), also expressed their concern that there were a limited number of computers, 42.9% indicated their dissatisfaction about the absence of e-learning facilities and 26.7% complained about their limited knowledge of library resources and limited time. Finally a total of 21.3% indicated a lack of confidence in the knowledge of staff when consulting library staff at user-based services.
Figure 4.3.4: Types of barriers faced by undergraduate students in using library resources

A further assessment to identify those with limited knowledge of library resources was done by looking at those who indicated Yes. As presented in Table 4.3.3 below, 36.1% of respondents at fourth year level had a lack of knowledge related to library-based resources; an outcome which seems to imply that although undergraduate students at fourth year level have been at the university longer than others, their knowledge and skills about library resources remains limited.

Table 4.3.3: Cross tabulation of respondent’s level of study and limited knowledge of library resources

<table>
<thead>
<tr>
<th>Respondents Level of Study</th>
<th>Limited knowledge of library resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>First year, but not newcomers at UNAM</td>
<td>83.9%</td>
</tr>
<tr>
<td>Second year</td>
<td>78.4%</td>
</tr>
<tr>
<td>Third year</td>
<td>71.7%</td>
</tr>
<tr>
<td>Fourth year</td>
<td>63.9%</td>
</tr>
</tbody>
</table>

Given the in-depth coverage of scientific information accessed via the library-subscribed resources in information literacy training, an effort to validate whether those with limited knowledge of library resources have attended such training was
signified. Intuitively, the outcome seems to confirm that 44.7% of those with little awareness about the coverage of e-resources hosted via the Library Website were not exposed to such information via the training as indicated in Figure 4.3.4a below.

![Figure 4.3.4a: Cross tabulation of respondents with limited knowledge of library resources per library user-based training](image)

Attaching value to a number of the barriers and gaps indicated, particularly on those with a greater impact on the use of e-learning resources and content accessed via the library, the next focal point was to assess the presence of undergraduate students within Web 2.0 space. Questions regarding participants’ academic information and knowledge seeking patterns in the virtual environment were designed to aid this study investigate issues associated with the use of digital information and Web 2.0 tools as presented under Heading 4.5.

### 4.5 Usage of Web 2.0 tools and preferences of social networking platforms

This section explores the usage of Web 2.0 tools and applications in a general context. From an objective stance, the outcome of this section offers insight on the types of tools to be considered in serving undergraduate students who are dominant users of Web 2.0. To break the ice, respondents were first asked to indicate their general knowledge about a set of Web 2.0 tools presented under Figure 4.4.1 (page 112). Logically, this question sought to introduce and expose participants to various...
Web 2.0 tools populated within the online communities and social networking sphere. While Facebook (95.2%); YouTube (89.8%) and WhatsApp/Hangouts (77.3%) play a prominent role in most undergraduate students’ lives, other, content-based, platforms such as Podcast and Vodcast (12.5%), RSS feeds and automation system (14.8%), LinkedIn (31.5%) and Blogs (33.2%) remain less well known Web 2.0 tools.

Building on the general description of Web 2.0 tools, the next task was to assess the degree of usage of each tool, using a Likert-type scaling measure of Always, Occasionally, Rarely and Never. As seen in Figure 4.2.2 (page 97), instant updates and chat messaging applications such as WhatsApp/Hangouts, Facebook, Youtube and Wikis/Wikipedia were also rated high, whereby a total of 25% to 50% always used these Web 2.0 tools.

Simply put, the types of Web 2.0 tools that were rated highly in the awareness category also falls under the least used category. Although these forms of content generators and information aggregators play an important role in disseminating and co-creating valuable information, its potential value may not be recognised by respondents.
From a list of the most used Web 2.0 tools, it was important to examine the types of approach most frequently undertaken by respondents to address their information gaps and learning predicaments. This question was designed to assist the researcher to understand undergraduate students’ information seeking behaviour as well as learning patterns. As shown in Figure 4.4.3 (page 114), it is clear that a total of 31.8% preferred to seek assistance via a text message or by making contact via telephone or cell phone, followed by those who used emails and instant messaging 29.8%.

Results also show that, only 18.2% considered posting their queries on a social networking platform while majority (77.8%) preferred to either conduct their own research or consult someone face-to-face when confronted with an academic-related problem. Since the motive behind each preferred method or approach was not questioned, it can be assumed that undergraduate students use tools to address and fulfil their academic needs.
In order to establish the profiles of those who preferred to engage in their own research, a comparison between respondents level of study was taken into consideration (see Figure 4.4.3a below). It seems evident that the highest percentages belong either to those who preferred to carry out their own investigation or to talk to someone face-to-face to fulfil their academic information needs which could be influenced by a higher representative number in this study.

It was also significant for the researcher to determine the preferred information searching patterns, and the characteristics of those who were interested in
consulting library staff using text messages or telephone inquiry based on the respondents’ age category. Results presented in Figure 4.4.3b (below) show that a total of 14.3% of those who fall in the 16-19 age category were more likely to seek information via telephone and text messaging. A total of 60.0% of the respondents who were 20-23 years of age preferred to send an email while respondents who were 24-27 years of age were least interested in texting nor seeking clarity via a similar method. It was also necessary for this study to examine the profile of those who preferred to post their queries via Web 2.0 platforms.

Results also show that, 59.1% of respondents between the age of 20-23 were more interested in conducting their own research while 56.3% preferred to seek assistance on a social networking platforms; followed by a total of 56.2% which belonged to those who preferred to seek assistance by talking to someone face-to-face.

In order to clarify the participants’ desired methods of seeking and obtaining academic information assistance, the next question determined their degree of awareness of three types of Web 2.0 tools provided via the UNAM Library Website page, namely; the Library Facebook fan page, RSS feeds as well as the Library.
Twitter account. As indicated in Figure 4.4.4 below, there was an equal balance between those who were aware of the UNAM Library Facebook page (representing 50.71% of the respondents) and those who were not aware (49.3%). Not surprisingly, the majority of respondents 74.8% were not aware of the UNAM Library Twitter account and only 10.5% were aware of the RSS feeds subscribing system.

![Figure 4.4.4: Awareness of Web 2.0 services offered via UNAM Library Website](image)

Basing on participants' prior-knowledge regarding the identified Web 2.0 tools, discussed under Figure 4.4.1 (see page 112), the next question aimed to assess their degree of interest in utilising the much-anticipated Web 2.0 tools as a learning trend. Measured in two categories (Interested and Not interested), results show that the majority of respondents were more interested in learning about library information literacy techniques via YouTube (90.9%). This is followed by those who wished to receive instant updates of news and content shared via email, RSS feeds and Twitter with 78.7%; posting queries via Facebook Group Discussion forums (73.3%) as well as those who wished to share their concerns via Web forms available on the Library Website.

Noting the generational coverage of this study, results show that both forms of communication in traditional and conversed approaches like handouts, quizzes, games and the use of Skype to contact library staff had the lowest percentages between 69.0% and 54.3%. As evidenced in Figure 4.4.5 (page 117), it is clear that
respondents who indicated their degree of interest were more interested in accessing academic assistance and learning content provided via instant feeds and self-discovery services.

Noting the value of integrating Web 2.0 tools in suitable and appealing instructional learning strategies in user-driven services, respondents were further prompted to give their views about the possibility of a Virtual Reference Service (VRS) which is the main focus of this study. The following three rating categories were created, namely; Yes for those interested; No for those who were not interested and Maybe for those who were not sure.

To attain greater value, a comparison of their age characteristics and degree of interest in consulting library staff via a VRS was explored. As presented in Figure 4.4.6 (page 118), a total of 45.5% were certain and indicated their interests in using an instant services technique, while about half of the respondents (50.9%) held a neutral view represented by Maybe.
A further analysis between those who were interested in using an instant chat/messaging service and their faculty of study was made. As analysed in Figure 4.4.6a (page 119) respondents from Humanities and Social Sciences (57.6%); Law (57.1%) and Education (53.3%) were most interested in consulting library staff using an instant chat/messaging application.

In contrast, 63.2% respondents from Economics and Management as well as 60.7% of those from Health and Medical Sciences gave a neutral view on the subject investigated. It is noteworthy that 12.9% of respondents from the Engineering faculty were not interested in using such practice; an outcome which may be influenced by the nature of the subject.
Figure 4.4.6a: Cross tabulation of those who were interested in using an instant chat/messaging service per faculty

From the above figures, it was also necessary for this study to seek a potential name for the VRS using a set of common designated names extracted from the literature. As presented in Figure 4.4.7 (page 120), 45.6% perceived “Ask-Anything” as the most appealing and inviting name, followed by “Hello, Ask Me Anything” with a total 36.5% of the respondents. Only 17.6% were attracted by the name “Chat Reference Point”.

Since this question was designed with an open-ended section to enable respondents to suggest their own names, 0.3% suggested names such as “UNAM Chatting Zone” (“UChatZone”); “Face-2-Face Conversation” and “Hello, May I Help You”; suggestions that give an indication highlights the need to attach meanings to online help services.
An open ended-question was used as a strategy to prompt respondents' to state the concerns that are crucial in their academic engagement within the context of the library’s services and resources. Results from this question were summarised into themes and they were recorded based on respondents’ indications (see Figure 4.4.8 page 121).

Concerns relating to inadequacy of books and materials represented 15.6% of the respondents; facilities, space and stationaries (13.6%) and training services as well as the attitude of staff towards students (11.9%) were the most listed areas. Other concerns about the library rules and regulations, Website use and students computing services were also listed by respondents.
The study being driven by the need to understand the type of reference services and training required by respondents; four critical issues facing undergraduate students per campus were investigated. As revealed in Figure 4.4.8a (page 122) respondents at each campus (except for Ogongo) indicated factors relating to materials shortages and inadequate resources. In addition, concerns about services, attitudes and user-based training were also experienced at every campus except those based at Khomasdal, School of Medicine and Sam Nujoma campus.
The results presented under each section are stringed with different issues; an observation which signifies the need to analyse and address pragmatic issues that are constraining undergraduate students' academic information needs. Heading 4.6 below presents the study’s key findings to the sub-problems while Chapter 5 will discuss the approaches used to answered the study’s main problem.

4.6 Synthesis and interpretation of the study findings

The study’s ultimate objective was to establish how the UNAM Library could improve the information literacy skills of undergraduate students within a Virtual Reference Service (VRS) using Web 2.0 tools that are commonly used. To answer the study’s main question, findings from each of the four research sub-problems are discussed using a thematic structure to show the relationships between sub-problems as constructed on the questionnaire. Heading 4.6.1 (page 123) draw insights based on the general usage of library user-based services and reference instructional services by undergraduate students at UNAM Library.
4.6.1 General usage of library user-based services and reference instructional services

In order to determine whether the UNAM Library is meeting the needs of undergraduate students’, findings emanating from the following two research sub-questions regarding their information seeking habits and learning approaches were grouped together: to what extent do undergraduate students use library-based services and what types of reference instructional services do they consult in order to address their academic needs?

In order to achieve this, first respondents were asked to indicate the degree of use of the user-based service points. Findings indicate that 37.9% of the respondents who visited the library regularly had consulted the reference help desk to seek for assistance regarding circulating library materials. A total of 37.8% belong to those who seek assistance related to OPAC and used the library frequently as presented in Figure 4.5.1 below.

![Sub-problem 1.1: Analysis of ready reference services per library visits](image)

**Figure 4.5.1: Total % respondents per reference services and degree of user-based training**

A comparison between the types of reference instructional services enquired via Reference Desk and Subject Librarians’ offices was also done to determine whether undergraduate students value the presence of library staff in serving them on generic library services as pointed out by Bladek and Okamoto (2014:19); Johnson (2011) as
well as Becker (2012:474). Interestingly, findings revealed that, the Reference Desk was only consulted by those who needed assistance on accessing lecturers’ notes and material circulation co-activities as seen in Figure 4.5.1a below.

The impact of library user-based training was also assessed by examining the profile of those who requested e-content resources provided via the Library Website. Findings show that 61.4% of OPAC related queries came from those who did not attend any library-based training. Since the term OPAC is a library-based term, a high number of queries could justify the need for careful consideration in using broader terms that are meaningful to undergraduate student’s learning environment without confining them to the library context as advised by Raju and Schoombe (2013), Dunaway (2011) and Transue (2013).

Building on the above findings, the next sub-problem investigated the pragmatic barriers associated with the use of scientific resources accessed via Library Website addressed under Heading 4.4.2 (page 125).
4.6.2 Types of barriers constraining access to library-based resources

In order to address gaps within information literacy training programs and instructional reference services, the question was raised: *What types of barriers constrain undergraduate students in utilising academic library-based resources via the Library Website?*

To gain adequate insight on this sub-problem, the study investigated the types of communication tools used to access internet-based resources and perspectives on the effectiveness of locating and using the Library Website. Findings show a notable increase in the use of laptops, cellphones and smartphones. This outcome revealed that undergraduate students were not only relying on computer-based Internet hubs to access digital based resources and knowledge systems as argued by Younie and Leask (2013). It was also discovered that more than 57.8% of undergraduate students at each level of study struggled to access and locate information via the Library Website as shown in Figure 4.5.2 below.

As indicated by Li (2009) and Kwanya *et al.*, (2010), the poor attendance of information literacy training sessions has a major impact on undergraduate students' library knowledge and information retrieval skills.

![Figure 4.5.2: Total % of respondents who struggled to access/locate information via UNAM Library Website](image)

Objectively, it was also noted that assignments and research activities were the only known area with a total of 51.7%; an outcome which corresponds to the types of
academic assistance most requested. Noting the significance and importance of addressing sets of pragmatic issues raised, the next sub-question investigated the use of Web 2.0 tools by undergraduate students and is discussed under Heading 4.6.3 (page 127).

4.6.3 Types of Web 2.0 tools mostly used by undergraduate students

Since Web 2.0 tools offer rich applications designed with information sharing and creation capabilities, the third and last sub-problem assessed the presence of undergraduate students on social networking space using the following question: What Web 2.0 tools are mostly used by undergraduate students? From a list of commonly known Web 2.0 tools, findings show a low usage of content generated and knowledge discovery applications tools like Blogs, Skype, and RSS feeds as well as Podcast and Vodcast (see Figure 4.4.2 page 113). As indicated by Wallis (2014); Dominquez-Flores and Wang (2011) as well as Arya and Mishra (2011), types of Web 2.0 user-generated services signify the engagement of subject expertise in creating content and sharing new information instantly.

Findings show that instant messaging platforms such as WhatsApp and Hangouts; Facebook; YouTube and Wikipedia were the most used Web 2.0 tools used by undergraduate students. This outcome signifies the convenience of instant messaging applications as noted by Maness (2006), Dunaway (2011); Solorzano (2013) and Transue (2013). As reflected in Figure 4.5.3 (page 127), types of barriers affecting undergraduate students` academic engagement at each level of study could be addressed using the most used Web 2.0 tools.
Recommendations of personalised Chat Reference names such as “UnamChatting Zone” (“UChatZone”) and “Hello, May I Help You” signify the importance of giving the system an ‘inviting’ name as presented in Figure 4.4.7 (see page 120). Taking insight from the discussed factors, UNAM Library could careful consider integrating the most potential Web 2.0 tools such as user-generated content and instant messaging applications to supplement undergraduate students’ academic information gaps.

4.7 Section Summary

This chapter presented, discussed and analysed the usage of UNAM’s Library resources, particularly reference instructional services, to identify barriers facing undergraduate student in accessing digital based resources as well as the type of Web 2.0 tools mostly used. The study was being driven by the rhythm of equipping undergraduate students with appropriate knowledge and skills to utilise library-based resources more meaningfully. Chapter 5 will outline key variables identified as crucial in answering the main study problem as well as the conceptual framework of developing undergraduate students` skills and building knowledge in a social dominant environment. The chapter will conclude the study recommendations.
CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents key variables identified to substantiate how UNAM Library could improve undergraduate students’ information literacy training within a Virtual Reference environment using Web 2.0 tools. As noted by Li (2009) library user-value added training and services are designated to provide undergraduate students with appropriate knowledge and the necessary skills required to utilise scientific resources and knowledge-based repositories more meaningfully. As per academic libraries co-operation, such responsibility falls under the myriad of user-based education and reference instructional services.

Reflecting on various pragmatic issues and conceptual views regarding the use of technological instructions and human-mediated systems in academic context, the following four key variables were taken into consideration in answering the study’s main problem. This includes; the tools and communication devices used by undergraduate students; the type of user-based resources used and the types of reference instructional services offered to support their academic needs via different library user-based training; as well as the degree of interest and preferences in acquiring knowledge and skills within a virtual-based environment. Findings from each variable identified are discussed per operational themes beginning with the types of tools used and this is detailed under Heading 5.1.1.

5.1.1 Information seeking approaches and tools used to access library-based services and resources

In addition to respondents’ demographic records, the study gathered data regarding the use of library-subscribed academic databases and digital resources by undergraduate students. This was done by examining the types of academic assistance that are crucial for academic excellence using the following key variables:
A first variable was the use of different information seeking approaches to library service points designated to assist undergraduate students with their queries. This was done to determine the frequency with which use was made of such services in order to attach meanings to the type of challenges facing undergraduate students in their academic endeavors. To validate participants’ answers, participants were asked also to indicate the types of user-based training and reference instructional services.

A second variable was the requests about Internet IP authenticated networking access or Local Area Networks (LANs) denoted as Wi-Fi connection settings which was signified to determine the extent to which UNAM Library provides Internet access points to undergraduate students beyond the library-based computers.

As shown under Figure 4.3.1, (page 103) findings indicate a higher requests from those using laptops (54.0%) and mobile communication devices (39.5%). In addition, it was also noted that Internet network connections and downloading issues were the highest rated barriers impeding undergraduate students to effectively utilise digital based resources. The findings could aid this study to take into consideration the types of content/format to be used in instructing undergraduate students with appropriate knowledge and skills through information literacy training.

A third variable investigated was the requests regarding the use of library-based databases and scientific resources provided to support undergraduate students learning processes. Findings indicate a lower request for OPAC and e-resources based content such as e-journals and e-books (see Figure 4.2.3 page 99). The revelation presents a concern because results could imply that undergraduate students either lack knowledge on using such critical resources or lack understanding of their importance.

Based on this view, the next study outcome which assisted in answering the types of Web 2.0 tools that ought to be used in order to improve UNAM Library information literacy programs within the Virtual Reference environment examined the effects of library user-based training on undergraduate students’ academic engagements as elaborated under Heading 5.1.2 (page 129).
5.1.2 Effect of library user-based training and reference instructional services

As cited by the works of Becker (2012) and Kwanya et al., (2010); poor design of information literacy programs could result in academic libraries to continue reinventing the same wheel in educating undergraduate students with unconventional content and learning artefacts. Since UNAM Library already employs a theoretical-based approach in teaching information literacy training, the study examined whether respondents who visited the library frequently and attended the library user-based training were knowledgeable in using library-based resources.

Respectfully, findings revealed that although 51.0% of undergraduate students visited the library premises more than once a week, a high number of those had limited knowledge on library resources. Assistance was frequently requested by those who attended information literacy training and one-on-one instructions (see Figure 4.2.1 page 96). This outcome corresponds with the needs of those who needed assistance regarding access to learning artefacts such as course content; study notes (assigned by lecturers) as well as enquiries related to borrowing, renewing and reserving materials as presented in Figure 4.2.3 (page 99).

Despite the commitment of Subject Librarians in creating users guides and learning commons to educate undergraduate students on paradoxical issues regarding the use of library-in-house databases and value-added services via information literacy programs as per ACRL (2010), findings show that a significant number of those who attended library user-based training (39.2%) still lack appropriate knowledge and skills on using OPAC, e-journals and e-books as seen in Figure 4.5.1 (see page 123).

As stipulated by ACRL (2010) each undergraduate student is required to possess the necessary digital skills in order to access library-based bibliographic database and utilise a variety of multifaceted learning artifacts effectively. Significantly, this study examined the types of Web 2.0 tools preferred by undergraduate students as deliberated under Heading 5.1.3 (page 131).
5.1.3 Degree of interest in using Web 2.0/Library 2.0 tools

Taking into consideration the kind of barriers and gaps constraining the process of acquiring knowledge and skills required by undergraduate students to satisfy their academic inquests, this study prompted respondents to indicate their level of interests in various Web 2.0 centric services. As presented in Figure 4.4.2 (see page 113), a high percentage of respondents were interested in receiving information literacy learning content via subject specialised forums; current awareness RSS feeds via emails and Twitter (90.9%); instant updates and online tutorials via Facebook and group discussion forums (78.7%) as well as via YouTube (73.7%).

In addition, 69.0% of respondents also showed their interests in using games and quizzes as a means to learn about the use of library-based resources; the library bibliographic system (OPAC) and e-databases. Furthermore, it was also noted that undergraduate students preferred to seek academic assistance by consulting human sources (77.8%) and conducting their own research (77.8%) as argued by Mannes (2006); Kwanya et al., (2011) and Johnson (2011). This revelation signifies the need to integrate virtual-based instructional services into UNAM Library’s generic services using content-driven tools and information shared platforms such as WhatsApp; Facebook; YouTube; Wikipedia and Skype as presented in Figure 4.4.5 (see page 116).

It is significant that 74.4% of undergraduate students admitted poor knowledge on downloading articles via e-journals and e-books and 42.9% lamented the lack of e-learning facilities. Respectively, 26.7% also showed limited knowledge of academic based resources (see Figure 4.3.1 page 103), therefore, the necessity of strengthening human-to-human interaction with library staff via a virtual-based service becomes apparent. As further revealed by Allison et al., (2012:3812) and Dunaway (2011:152), poor presentation of informational resources and limited knowledge could impact the use of academic-based databases.

On a surface view, undergraduate students who were pursuing their studies at third and fourth year level were amongst those who struggled to locate and utilise
informational resources accessed via the Library Website (see Figure 4.5.2 page 125). Argumentatively, this outcome could be caused by a number of socio-technological issues, cultural related barriers and knowledge gaps as noted by Wu Song (2010:250) as well as Simsek and Simsek (2013:127). Notwithstanding, it was necessary to identify pragmatic issues prior to the revival of UNAM Library information literacy training within a Virtual Reference space.

Based on that view, the study extracted views from educational learning theories to understand the value of grounding the use of technological instruction in building knowledge as advised by Khan (2007:15); Bladek and Okamoto (2014:19) as well as Glassman and Burbidge (2014:15). Logically, a number of theoretical frameworks are relevant to address UNAM Library’s information literacy predicaments experienced over the past years as stated in the rationale of this study (see Chapter 1).

5.2 Theoretical framework of developing information literacy skills within a Virtual Reference Environment using Web 2.0 tools

As pointed out by Anglada (2014:603) and Fernandez-Villavicencio (2010:125) an innovative academic library is one that leverages the kind of library user-based training and value-added services to support the emerging needs of its clientele particularly in a 21st century dominated by digital-born content. Siemens (2005) and Bell (2010) also argued that the essence of sustaining academic library co-processes should be influenced by the value attached by its clientele and returns on investment rate. As confirmed by Dunaway (2011); Arya and Mishra (2011), as well as Johnson (2011), offering real-time solutions instantly is a ground-breaking factor that upholds the value of using scientific information accessed via the multifaceted information sources.

As stipulated by Dupuis (1999); Eisenberg, Lowe and Spitzer (2004), Bladek and Okamoto (2014), every library user must be equipped with necessary skills required to identify, access, utilise, manage, refine and filter information value from tons of multifaceted sources and knowledge repository artifacts, presented and available in many format. But, since, there appears to be no single panacea to address
undergraduate students’ issues associated with knowledge acquisition and skills development practices within an academic library context, the study extracts common ground from Constructivism learning styles, Bandura social learning theory and Connectivism learning technique. The three conceptual models could influence the process of building undergraduate students’ capacity and social skills uniquely yet meaningfully because the majority of university clientele are already exposed to sophisticated communication devices and instant messaging applications at an early age (Becker 2012; Denison & Montgomery 2012; Ajjan & Hartshorne 2008).

Noting the undivided value attached to the current Web 2.0 *social technologies* a Connectivism learning approach could bind various e-content, e-tools and informal discussion forums into a single platform using a Virtual Reference Service (VRS) as a knowledge portal as simplified by Drexler (2010) and Siemens (2005). This can be achieved by subscribing to library-based automated systems such as RSS feeds and social networking discussion forums via Facebook, Twitter and blogs as recommended by Dunaway (2011) and Wallis (2014). Suffice to argue, the availability of human capital serving at user-based points such as the Reference Desk and Subject Librarians could strengthen the operation of a Virtual Reference Service (VRS) as envisioned by Drexler (2010:373).

Transue (2013:183) states that the impact of generational differences on embracing technological tools via a Virtual Reference System (VRS) can be captured by analysing the types of reference services, and preferred method of searching for academic assistance by undergraduate students. Subject Librarians could co-create self-guided content based on undergraduate students’ academic information needs and subject areas using Web 2.0 instant messaging applications. By so doing, undergraduate students’ academic literacy skills would be enhanced irrespective of their level of study, especially those who are experiencing difficulties in utilising library-centric bibliographic system (OPAC); scientific databases (e-journals and e-books) as well as knowledge-based repositories (past examination papers and lectures course notes).

Arya and Mishra (2011) state that “Virtual Reference Service + Web 2.0 + Connectivity = Virtual Reference Service 2.0”, this study believes that *Virtual
Reference Service + Social technologies 2.0 + Academic Sources Connectivity =
Collective Academic Literacy Social intelligence 2.0. Based on the factors previously discussed the following limitations were noted.

5.3 Recommendations and future study

Due to hurdles of learning predicaments and information gaps impeding the use of scientific resources via UNAM Library the decision lies within the hands of the UNAM Library Management to implement a Virtual Reference Service (VRS), using the most desired Web 2.0 tools termed social technologies. The study recommends the use of the following Web 2.0 for information literacy training to equip undergraduate students with appropriate knowledge and skills:

i. Reviving the UNAM Library Facebook fan page and Twitter account as well as RSS feeds applications to enable undergraduate students to subscribe to instant news and content updates

ii. Implementing a Chat Reference Service with the most inviting name to attract, invite and connect undergraduate students with the UNAM Library resources and library expertise using social networking tools and instant messaging/hangouts

iii. Designing and embedding online tutorials, and YouTube videos into the UNAM Library Website and any other UNAM social technologies platforms to strengthen library orientation and instructional reference services

iv. Creation of subject-based content and student personalised services via UNAM Library Wikipedia to consume, critic, contribute and connect undergraduate students with current information, subject based expertise and academic resources across UNAM campuses

While this study generated a similar sentimental value that millennial students are highly exposed to a set of Web 2.0 tools, their technological proficiencies and digital skills in using computers, let alone surfing the Internet need to be examined. Based on that view, future studies could focus on the following:

- Analysis of undergraduate students views toward the use of scientific resources accessed via library-subscribed databases and Internet resources
• Assessing whether the learning patterns of undergraduate students who frequently use Web 2.0 technologies has improved from an academic perspective using a qualitative or mixed-method approach
• Replication of this study to assess the effect of human-mediated systems and the impact of Web 3.0 technologies in building academic knowledge via a Virtual Reference Service (VRS)

Based on the above, this study believes that a Virtual Reference Service (VRS) would connect undergraduate students with academic information and knowledge discovery resources via Web 2.0 as concluded under Heading 5.4.

5.4 Study conclusion

The study concludes that the process of equipping library users with relevant skills and knowledge is a multifaceted and inextricable process caused by a digital-divide created by a combination of socio-technological constraints and cultural values. Consequently, a higher percentage of undergraduate students are confronted with limited knowledge on the use of academic databases accessed via UNAM Library Website. As confirmed by Arya and Mishra (2011), Schwartz (2014); as well as Young and Rossmann (2015), building a social presence within the virtual sphere goes beyond a mere dissemination and connecting of digital natives with current information. As such sets of digital learning traits can be achieved by embedding instant messaging applications and mobile interfaces on academic library user-based services and reference instructional services.

Based on the scientific findings, the decision lies with the UNAM Library Management to reinforce the implementation of a Virtual Reference Service (VRS) to enable reference service staff to engage with users on a real-time basis; a ground breaking aspect which could uphold the value of using academic library-based resources to sustain its academia position. Failure to do so could impact on the longevity of academic library co-values and affect the future of undergraduate students at UNAM as presaged by Anglada (2014) as well as Young and Rossmann (2015).
REFERENCES


Bell, F. (2010). Connectivism: Its place in theory-informed research and innovation in technology-enabled learning. The International Review of Research in Open and Distance Learning, 12(3), 98–118


Dominquez-Flores, N. & Wang, L. (2011). Online Learning Communities: Enhancing Undergraduate Student’s Acquisition of Information Skills. The Journal of Academic Librarianship, 37(6), 495-503


Wallis, L. (2014). Building a Virtual Reference shelf, the serials librarian: From the printed page to the digital age, 67(1), 52-60 doi: 10.1080/0361526X.2014.899291


APPENDIX A: Questionnaire

UNDERGRADUATE STUDENTS QUESTIONNAIRE: UNIVERSITY OF NAMIBIA
FEBRUARY / MARCH 2015

Dear Senior Student

My name is Jakobina Mwiiyale, a Masters-Degree Student in the Department of Information and Knowledge Management, at the University of Johannesburg. I would like to gather library-users perceptions, experiences and preferences toward the use of Web 2.0 tools in providing quick answers to undergraduate students information needs in the online. Please be informed that your responses will be treated confidentially. Findings from this study will be communicated with UNAM Library Management to justify the need to implement Web 2.0 library-based services (e.g. Virtual-Chat platform).

The questionnaire consists of 4 sections and may take about 7 minutes to complete. Should you agree to take part in this study, kindly answer all the questions. Please note that, you have the right to withdraw from taking part in this study at any point.

If you have an enquiry, please do not hesitate to contact my direct supervisor, Dr. Paul Laughton at +2711 559 3518 or send an email to paul@uj.za.ca. I can be contacted at +26811282174 or via this email jmwiiyale@unam.na.

Thank you for your anticipation.

SECTION 1: DEMOGRAPHIC OF RESPONDENTS

<table>
<thead>
<tr>
<th>1.1 Please indicate your gender:</th>
<th>Male ☐ Female ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Which range includes your age?</td>
<td>16-19 ☐ 20-23 ☐ 24-27 ☐ 28 and Above ☐ Prefer not to answer ☐</td>
</tr>
<tr>
<td>1.3 Level of Qualification currently studying towards:</td>
<td>Certificate ☐ Diploma ☐ Honours-Degree ☐</td>
</tr>
<tr>
<td>1.4 Year of study currently registered:</td>
<td>First year, but not newcomers at UNAM ☐ Second year ☐ Third year ☐ Fourth year ☐</td>
</tr>
<tr>
<td>1.5 Name of Your Faculty:</td>
<td>Agriculture &amp; Natural Sciences ☐ Economics &amp; Management ☐ Education ☐ Engineering ☐ Health &amp; Medical Sciences ☐ Humanities &amp; Social Sciences ☐ Law ☐ Science ☐</td>
</tr>
<tr>
<td>1.6 Name of Your Campus:</td>
<td>Hifikepunye Pohamba ☐ José E.D Santos ☐ Katima-Mulilo ☐ Khomasdal ☐ Neudamm ☐ Ogongo ☐ Oshakati ☐ Rundu ☐ Sam Nujoma ☐ School of Medicine ☐ Southern ☐ Windhoek Main ☐</td>
</tr>
</tbody>
</table>
**Section 2: Library Usage; User Training and Services**

### 2.1 How often do you visit the library? (please tick one answer in the box)
- [ ] First time ever
- [ ] Once a month
- [ ] Once a week
- [ ] More than once in a week
- [ ] Daily

### 2.2 Which of the following types of training have you attended? (please select more than one option if applicable by ticking in the box)
- [ ] Library orientation
- [ ] Information literacy training
- [ ] One-on-one-instruction session with a library staff
- [ ] None of the above training attended

### 2.3 How often do you seek for assistance in the following areas? (please indicate your answer for each option by ticking in the most appropriate block)

<table>
<thead>
<tr>
<th>Area</th>
<th>Never</th>
<th>Sometimes</th>
<th>Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi connection settings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-journal and e-books</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assignment/research query</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturers notes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borrow/renew/reserve books</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2.4 Which of the following service points do you visit most? (please indicate your answer for each option by ticking in the most appropriate block)

<table>
<thead>
<tr>
<th>Service Point</th>
<th>Never</th>
<th>Sometimes</th>
<th>Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulation Counter Desk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Computer Help Desk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference Desk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-loan section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Namibiana/Special Collection section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject Librarian Office</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Section 3: Barriers & Gaps in Accessing Academic Resources via the Library Website**

### 3.1 How often do you use the following to access internet-based resources? (please indicate your answer for each option by ticking in the most appropriate block)

<table>
<thead>
<tr>
<th>Device</th>
<th>Never</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library-based computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty-based computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home/work-based computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet-café-based computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laptop with Wi-Fi / 3G</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell phone/Smartphone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iPad/Tablet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2 How often do you visit the Library Website? *(please tick one box only)*
- Daily
- More than once a week
- Once a week
- Once in a month

3.3 When you visited the Library Website, did you struggle to find/locate what you were looking for? *(please tick one box only)*
- Not at all
- Sometimes
- Yes

3.4 On average, how do you rate your knowledge and skill in accessing the following resources/area? *(please indicate your answer for each option by ticking in the most appropriate block)*

<table>
<thead>
<tr>
<th>Resource</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment / Research writing and referencing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Searching for Books via OPAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Searching for E-resources Databases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Searching for Past Examinations Papers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downloading E-books and E-journal articles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessing Lectures Notes via Student Portal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessing Library Website via Off-campus link</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.5 In General, are you satisfied with the Online Help Services currently offered by the library? *(please tick one box only)*
- Not at all
- Sometimes
- Yes

3.6 What types of barriers are you facing in using library resources *(please select more than one option if applicable by ticking in the box)*
- Inadequate computers
- Internet network connection and downloading issues
- Limited time to use/search library-based resources
- Limited knowledge of library resources
- Lack of e-learning help services
- Lack of confidence when consulting library staff at help desks

Please specify other barriers that you are faced with:

---

### SECTION 4: AWARENESS, USE AND PREFERENCES OF WEB 2.0 / SOCIAL NETWORKING TOOLS

4.1 From the following Web 2.0 / social networking tools, please tick the ones you aware of.
- Blogs
- Instagram
- Facebook
- LinkedIn
- Podcast/Vodcast
- RSS feed-updates
- Skype
- YouTube
- WhatsApp/Hangouts
- Wikis/Wikipedia
- Twitter

If not listed above, please specify:

4.2 To what extent do you use the following Web 2.0 / social networking tools? *(please indicate*
**4.3** In General, if you need help in your academic work, how do you go about “getting assistance”? *(please select more than one option if applicable by ticking in the box)*

- [ ] Talk/consult someone face-to-face
- [ ] Sending text message or make telephone contact
- [ ] Sending an email/inbox messaging
- [ ] Post your query in any social networking platform
- [ ] Do own research

*If not listed above please specify:*

**4.4** Are you aware that UNAM library offers/provide the following Web 2.0 services via the Website? *(for each, please tick in the appropriate box)*

- Facebook: [ ] No [ ] Yes
- Twitter: [ ] No [ ] Yes
- RSS feeds: [ ] No [ ] Yes

**4.5** Would you be interested in using the following activities/platforms to satisfy your academic needs? *(please indicate your answer for each option by ticking in the most appropriate block)*

<table>
<thead>
<tr>
<th>Activity/Platform</th>
<th>Not Interested</th>
<th>Interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Searching tips via Hand-outs/Pamphlets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Skype to contact library staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submit query via Library Web-forms/Website</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn OPAC/E-resources via Games &amp; Quiz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YouTube for information literacy Tutorials/Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instant-texting via WhatsApp/Hangouts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post query via Facebook Group Discussion forums</td>
<td></td>
<td></td>
</tr>
<tr>
<td>News /Content updates via Email, RSS feeds &amp; Twitter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Please indicate other format/platforms which you are interested in:*
### 4.6 The library is planning to introduce a Virtual Chat Reference Point, would you be interested in consulting library staff via such instant chatting / messaging service? *(please tick one box only)*
- No
- Maybe
- Yes

### 4.7 From the given list, which name would you suggest for a Library Virtual Chat Reference Service? *(please tick one name/box only)*
- Ask-A-Librarian
- Chat Reference Point
- Hello, Ask Me Anything!

If you would like to suggest any other name, please specify:

### 4.8 What other assistance do you expect from the library that you are not getting currently? *(please state them here)*

- [ ]
- [ ]
- [ ]
- [ ]

End.

Thank you for your time. Kindly give the questionnaire back to a library staff.

Have a Good Day!
APPENDIX B: SPSS Frequency Tables

Section 1: Demographic of Respondents

1.1 Gender Composition

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>156</td>
<td>44.3</td>
<td>44.3</td>
<td>44.3</td>
</tr>
<tr>
<td>Female</td>
<td>196</td>
<td>55.7</td>
<td>55.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

1.2 Respondents Age Category

<table>
<thead>
<tr>
<th>Age Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-19</td>
<td>38</td>
<td>10.8</td>
<td>10.8</td>
<td>10.8</td>
</tr>
<tr>
<td>20-23</td>
<td>207</td>
<td>58.8</td>
<td>58.8</td>
<td>69.6</td>
</tr>
<tr>
<td>24-27</td>
<td>82</td>
<td>23.3</td>
<td>23.3</td>
<td>92.9</td>
</tr>
<tr>
<td>28 and Above</td>
<td>23</td>
<td>6.5</td>
<td>6.5</td>
<td>99.4</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>2</td>
<td>.6</td>
<td>.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

1.3 Respondents Level of Education

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>5</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Diploma</td>
<td>50</td>
<td>14.2</td>
<td>14.2</td>
<td>15.6</td>
</tr>
<tr>
<td>Honours-Degree</td>
<td>297</td>
<td>84.4</td>
<td>84.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

1.4 Respondents Level of Study

<table>
<thead>
<tr>
<th>Level of Study</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year, but not newcomers at UNAM</td>
<td>31</td>
<td>8.8</td>
<td>8.8</td>
<td>8.8</td>
</tr>
<tr>
<td>Second year</td>
<td>125</td>
<td>35.5</td>
<td>35.5</td>
<td>44.3</td>
</tr>
<tr>
<td>Third year</td>
<td>113</td>
<td>32.1</td>
<td>32.1</td>
<td>76.4</td>
</tr>
<tr>
<td>Fourth year</td>
<td>83</td>
<td>23.6</td>
<td>23.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

1.5 Faculty Representation

<table>
<thead>
<tr>
<th>Faculty Representation</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Natural Sciences</td>
<td>80</td>
<td>22.7</td>
<td>22.7</td>
<td>22.7</td>
</tr>
</tbody>
</table>
### Economics & Management

<table>
<thead>
<tr>
<th>Field</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>90</td>
<td>25.6</td>
<td>25.6</td>
<td>59.1</td>
</tr>
<tr>
<td>Engineering</td>
<td>31</td>
<td>8.8</td>
<td>8.8</td>
<td>67.9</td>
</tr>
<tr>
<td>Health &amp; Medical Sciences</td>
<td>28</td>
<td>8.0</td>
<td>8.0</td>
<td>75.9</td>
</tr>
<tr>
<td>Humanities &amp; Social Sciences</td>
<td>33</td>
<td>9.4</td>
<td>9.4</td>
<td>85.2</td>
</tr>
<tr>
<td>Law</td>
<td>7</td>
<td>2.0</td>
<td>2.0</td>
<td>87.2</td>
</tr>
<tr>
<td>Science</td>
<td>45</td>
<td>12.8</td>
<td>12.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

### 1.6 Campus Names

<table>
<thead>
<tr>
<th>Campus Name</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hifikepunye Pohamba</td>
<td>18</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Jose Eduardo Dos Santos</td>
<td>31</td>
<td>8.8</td>
<td>8.8</td>
<td>13.9</td>
</tr>
<tr>
<td>Katima-Mulilo</td>
<td>18</td>
<td>5.1</td>
<td>5.1</td>
<td>19.0</td>
</tr>
<tr>
<td>Khomasdal</td>
<td>12</td>
<td>3.4</td>
<td>3.4</td>
<td>22.4</td>
</tr>
<tr>
<td>Neudamm</td>
<td>25</td>
<td>7.1</td>
<td>7.1</td>
<td>29.5</td>
</tr>
<tr>
<td>Ogongo</td>
<td>38</td>
<td>10.8</td>
<td>10.8</td>
<td>40.3</td>
</tr>
<tr>
<td>Oshakati</td>
<td>16</td>
<td>4.5</td>
<td>4.5</td>
<td>44.9</td>
</tr>
<tr>
<td>Rundu</td>
<td>22</td>
<td>6.3</td>
<td>6.3</td>
<td>51.1</td>
</tr>
<tr>
<td>Sam Nujoma</td>
<td>11</td>
<td>3.1</td>
<td>3.1</td>
<td>54.3</td>
</tr>
<tr>
<td>School of Medicine</td>
<td>18</td>
<td>5.1</td>
<td>5.1</td>
<td>59.4</td>
</tr>
<tr>
<td>Southern</td>
<td>21</td>
<td>6.0</td>
<td>6.0</td>
<td>65.3</td>
</tr>
<tr>
<td>Windhoek Main</td>
<td>122</td>
<td>34.7</td>
<td>34.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 2: LIBRARY USAGE; USER TRAINING AND SERVICES

#### 2.1 Use of the library

<table>
<thead>
<tr>
<th>Use</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>First time</td>
<td>5</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Once a month</td>
<td>25</td>
<td>7.1</td>
<td>7.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Once a week</td>
<td>49</td>
<td>13.9</td>
<td>13.9</td>
<td>22.4</td>
</tr>
<tr>
<td>More than once a week</td>
<td>179</td>
<td>50.9</td>
<td>50.9</td>
<td>73.3</td>
</tr>
<tr>
<td>Daily</td>
<td>94</td>
<td>26.7</td>
<td>26.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

#### 2.2 Types of library user-based training received

<table>
<thead>
<tr>
<th>Training</th>
<th>No</th>
<th>Yes</th>
<th>Missing</th>
</tr>
</thead>
</table>

148
<table>
<thead>
<tr>
<th>Library Orientation</th>
<th>Row N %</th>
<th>57.7%</th>
<th>42.3%</th>
<th>0.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information literacy training</td>
<td>Row N %</td>
<td>83.5%</td>
<td>16.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>One-on-one-instruction session with a library staff</td>
<td>Row N %</td>
<td>82.1%</td>
<td>17.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>None of the above</td>
<td>Row N %</td>
<td>60.8%</td>
<td>39.2%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

### 2.3 Degree of seeking assistance from various academic areas

<table>
<thead>
<tr>
<th>Service Points</th>
<th>Row N %</th>
<th>Never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi connection settings</td>
<td>Row N %</td>
<td>34.4%</td>
<td>42.3%</td>
<td>22.2%</td>
<td>1.1%</td>
</tr>
<tr>
<td>OPAC</td>
<td>Row N %</td>
<td>54.8%</td>
<td>31.8%</td>
<td>10.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>E-journal and e-books</td>
<td>Row N %</td>
<td>46.3%</td>
<td>36.6%</td>
<td>14.8%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Assignment/research query</td>
<td>Row N %</td>
<td>28.7%</td>
<td>44.6%</td>
<td>23.9%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Lecturers notes</td>
<td>Row N %</td>
<td>27.3%</td>
<td>31.5%</td>
<td>39.8%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Borrow/renew/reserve books</td>
<td>Row N %</td>
<td>17.0%</td>
<td>42.3%</td>
<td>39.8%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

### 2.4 Types of library service points consulted

<table>
<thead>
<tr>
<th>Service Points</th>
<th>Row N %</th>
<th>Never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulation Counter Desk</td>
<td>Row N %</td>
<td>39.5%</td>
<td>36.9%</td>
<td>21.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Student Computer Help Desk</td>
<td>Row N %</td>
<td>37.5%</td>
<td>44.9%</td>
<td>15.9%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Reference Desk</td>
<td>Row N %</td>
<td>39.5%</td>
<td>45.5%</td>
<td>13.4%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Short-loan Section</td>
<td>Row N %</td>
<td>45.7%</td>
<td>37.8%</td>
<td>15.3%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Namibiana/Special Collection section</td>
<td>Row N %</td>
<td>52.6%</td>
<td>33.2%</td>
<td>12.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Subject Librarian Office</td>
<td>Row N %</td>
<td>59.9%</td>
<td>28.7%</td>
<td>8.8%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

### SECTION 4.3: BARRIERS AND GAPS IN ACCESSING ACADEMIC RESOURCES VIA THE LIBRARY WEBSITE

### 3.1 Tools/Devices used to access internet-based resources

<table>
<thead>
<tr>
<th>Access Point</th>
<th>Row N %</th>
<th>Never</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library-based computer</td>
<td>Row N %</td>
<td>22.7%</td>
<td>41.8%</td>
<td>19.0%</td>
<td>16.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Faculty-based computer</td>
<td>Row N %</td>
<td>61.1%</td>
<td>22.2%</td>
<td>8.8%</td>
<td>6.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Home/work based computer</td>
<td>Row N %</td>
<td>34.7%</td>
<td>18.2%</td>
<td>17.3%</td>
<td>28.7%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Internet-cafe-based computer</td>
<td>Row N %</td>
<td>58.8%</td>
<td>23.6%</td>
<td>8.2%</td>
<td>7.1%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Laptop with WIFI/3G</td>
<td>Row N %</td>
<td>7.4%</td>
<td>14.8%</td>
<td>23.0%</td>
<td>54.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Cellphone/Smartphone</td>
<td>Row N %</td>
<td>19.3%</td>
<td>18.5%</td>
<td>22.2%</td>
<td>39.5%</td>
<td>0.6%</td>
</tr>
<tr>
<td>iPad/Tablet</td>
<td>Row N %</td>
<td>63.9%</td>
<td>14.5%</td>
<td>9.4%</td>
<td>10.5%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
### 3.2 Use of the Library Website

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>65</td>
<td>18.5</td>
<td>18.5</td>
<td>18.5</td>
</tr>
<tr>
<td>More than once a week</td>
<td>87</td>
<td>24.7</td>
<td>24.7</td>
<td>43.2</td>
</tr>
<tr>
<td>Once a week</td>
<td>67</td>
<td>19.0</td>
<td>19.0</td>
<td>62.2</td>
</tr>
<tr>
<td>Once in a month</td>
<td>132</td>
<td>37.5</td>
<td>37.5</td>
<td>99.7</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>.3</td>
<td>.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3 Views of the Library Website

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>86</td>
<td>24.4</td>
<td>24.4</td>
<td>24.4</td>
</tr>
<tr>
<td>Sometimes</td>
<td>205</td>
<td>58.2</td>
<td>58.2</td>
<td>82.7</td>
</tr>
<tr>
<td>Yes</td>
<td>60</td>
<td>17.0</td>
<td>17.0</td>
<td>99.7</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>.3</td>
<td>.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

### 3.4 Rating of undergraduate students knowledge and skills in various academic areas

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment / Research writing and referencing</td>
<td>11.1%</td>
<td>25.3%</td>
<td>51.7%</td>
<td>11.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Searching for Books via OPAC</td>
<td>29.8%</td>
<td>29.8%</td>
<td>24.1%</td>
<td>15.3%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Searching for E-resources Databases</td>
<td>28.4%</td>
<td>36.9%</td>
<td>25.3%</td>
<td>8.5%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Searching for Past Examination papers</td>
<td>23.0%</td>
<td>25.3%</td>
<td>27.3%</td>
<td>23.6%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Downloading E-books and E-journal articles</td>
<td>32.7%</td>
<td>29.5%</td>
<td>25.0%</td>
<td>12.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Accessing Lectures notes via Student Portal</td>
<td>6.3%</td>
<td>11.6%</td>
<td>23.0%</td>
<td>58.5%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Accessing Library Website via Off-campus access link</td>
<td>25.0%</td>
<td>23.9%</td>
<td>32.7%</td>
<td>18.5%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

### 3.6 Types of barriers facing undergraduate students in using library resources

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate computers</td>
<td>32.7%</td>
<td>67.3%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Internet network connection &amp; downloading issues</td>
<td>25.6%</td>
<td>74.4%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Limited time</td>
<td>75.0%</td>
<td>25.0%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
### Limited knowledge of library resources
- Row N %: 73.3% 26.7% 0.0% 100.0%

### Lack of e-learning facilities
- Row N %: 57.1% 42.9% 0.0% 100.0%

### Lack of confidence when consulting library staff at help desk services
- Row N %: 78.7% 21.3% 0.0% 100.0%

## SECTION 4: AWARENESS, USE AND PREFERENCES OF WEB 2.0 / SOCIAL NETWORKING TOOLS

### 4.1 Degree of Awareness of Web 2.0 tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>No</th>
<th>Yes</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blogs</td>
<td>66.8%</td>
<td>33.2%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Instagram</td>
<td>39.5%</td>
<td>60.5%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Facebook</td>
<td>4.8%</td>
<td>95.2%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>68.5%</td>
<td>31.5%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Podcast &amp; Vodcast</td>
<td>87.5%</td>
<td>12.5%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>RSS feeds via email</td>
<td>85.2%</td>
<td>14.8%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Skype</td>
<td>26.4%</td>
<td>73.6%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>WhatsApp / Hangouts</td>
<td>22.7%</td>
<td>77.3%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Twitter</td>
<td>29.3%</td>
<td>70.7%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>YouTube</td>
<td>10.2%</td>
<td>89.8%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Wikis/Wikipedia</td>
<td>26.7%</td>
<td>73.3%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### 4.2 Use of Web 2.0 / social networking tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Always</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blogs</td>
<td>65.1%</td>
<td>19.9%</td>
<td>10.2%</td>
<td>3.1%</td>
<td>1.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Instagram</td>
<td>53.4%</td>
<td>19.6%</td>
<td>14.2%</td>
<td>11.9%</td>
<td>0.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Facebook</td>
<td>6.8%</td>
<td>13.1%</td>
<td>32.7%</td>
<td>47.4%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>65.6%</td>
<td>15.6%</td>
<td>12.8%</td>
<td>4.3%</td>
<td>1.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Podcast &amp; Vodcast</td>
<td>84.1%</td>
<td>9.4%</td>
<td>3.1%</td>
<td>1.1%</td>
<td>2.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>RSS feeds/Updates</td>
<td>78.7%</td>
<td>10.8%</td>
<td>6.0%</td>
<td>2.0%</td>
<td>2.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Skype</td>
<td>28.7%</td>
<td>29.0%</td>
<td>33.8%</td>
<td>8.5%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Twitter</td>
<td>34.4%</td>
<td>29.3%</td>
<td>24.1%</td>
<td>12.2%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Wikis/Wikipedia</td>
<td>23.0%</td>
<td>9.7%</td>
<td>34.1%</td>
<td>33.0%</td>
<td>0.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>WhatsApp/Hangouts</td>
<td>22.2%</td>
<td>8.8%</td>
<td>19.9%</td>
<td>49.1%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>YouTube</td>
<td>11.4%</td>
<td>8.2%</td>
<td>35.2%</td>
<td>45.2%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### 4.3 Types of method/approach used in getting academic assistance

<table>
<thead>
<tr>
<th>Tool</th>
<th>No</th>
<th>Yes</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talk to someone face-to-face</td>
<td>21.9%</td>
<td>77.8%</td>
<td>0.3%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
### 4.4 Awareness of Web 2.0 tools offered and accessed via UNAM Website

<table>
<thead>
<tr>
<th>Tool</th>
<th>Row N %</th>
<th>No</th>
<th>Yes</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>50.6%</td>
<td>50.6%</td>
<td>49.4%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Twitter</td>
<td>74.7%</td>
<td>74.7%</td>
<td>25.0%</td>
<td>0.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>RSS feeds</td>
<td>88.9%</td>
<td>88.9%</td>
<td>10.5%</td>
<td>0.6%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### 4.5 Degree of interests in using Web 2.0 activities to satisfy academic needs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Row N %</th>
<th>Not Interested</th>
<th>Interested</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Searching tips via Handouts/Pamphlets</td>
<td>30.4%</td>
<td>30.4%</td>
<td>69.0%</td>
<td>0.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Use Skype to contact library staff</td>
<td>45.5%</td>
<td>45.5%</td>
<td>54.3%</td>
<td>0.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Submit query Web-forms via Library Web forms/Website</td>
<td>26.1%</td>
<td>26.1%</td>
<td>73.3%</td>
<td>0.6%</td>
<td>100.0%</td>
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<tr>
<td>Learn OPAC/E-resources via Games &amp; Quiz</td>
<td>32.7%</td>
<td>32.7%</td>
<td>67.3%</td>
<td>0.0%</td>
<td>100.0%</td>
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<tr>
<td>YouTube for information Literacy Tutorials/Video</td>
<td>9.1%</td>
<td>9.1%</td>
<td>90.9%</td>
<td>0.0%</td>
<td>100.0%</td>
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<tr>
<td>Instant texting via WhatsApp/Hangouts</td>
<td>28.7%</td>
<td>28.7%</td>
<td>71.3%</td>
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<td>100.0%</td>
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<tr>
<td>Post query via Facebook Group Discussion forums</td>
<td>26.4%</td>
<td>26.4%</td>
<td>73.3%</td>
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<tr>
<td>News / Content updates via Email, RSS feeds &amp; Twitter</td>
<td>21.0%</td>
<td>21.0%</td>
<td>78.7%</td>
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### 4.6 Interested in Consulting library staff via a Virtual Chat

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>3.7</td>
<td>3.7</td>
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<td>Maybe</td>
<td>179</td>
<td>50.9</td>
<td>50.9</td>
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<tr>
<td>Yes</td>
<td>160</td>
<td>45.5</td>
<td>45.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
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### 4.7 Preferred name of a Library Virtual Chat Reference Service

<table>
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<tr>
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<th>Cumulative Percent</th>
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</thead>
<tbody>
<tr>
<td>Valid</td>
<td>161</td>
<td>45.7</td>
<td>45.7</td>
<td>45.7</td>
</tr>
<tr>
<td>Chat Reference Point</td>
<td>62</td>
<td>17.6</td>
<td>17.6</td>
<td>63.4</td>
</tr>
<tr>
<td>Hello, Ask Me Anything</td>
<td>128</td>
<td>36.4</td>
<td>36.4</td>
<td>99.7</td>
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<tr>
<td>Missing</td>
<td>1</td>
<td>.3</td>
<td>.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
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### 4.8 Categories of barriers and issues related to library (Open-ended)

<table>
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<tr>
<th>Category</th>
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<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Internet Connection/Network related</td>
<td>89.8%</td>
<td>10.2%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Books/Materials/Resources related</td>
<td>84.4%</td>
<td>15.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Computers related</td>
<td>92.0%</td>
<td>8.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Website related</td>
<td>93.5%</td>
<td>6.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Printing/Scanning/Photocopying related</td>
<td>91.7%</td>
<td>8.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Service/Attitude/Training related</td>
<td>88.1%</td>
<td>11.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Opening/Borrowing time related</td>
<td>96.6%</td>
<td>3.4%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Facilities/Space/Stationaries related</td>
<td>86.3%</td>
<td>13.7%</td>
<td>100.0%</td>
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</table>
4th November, 2014

Ms Jacobina Mwiyyale
ILRC
UNAM Main Campus

Dear Ms Mwiyyale

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT UNAM

Your application for permission to conduct research at UNAM has reference.

- **Title of Study**: Developing information literacy skills within a virtual reference system
- **Level of Study**: M.Phil.
- **University of Registration**: University of Johannesburg, South Africa

Your application was evaluated in accordance with the relevant UNAM Policies and related guidelines to check for any possible infringement of their provisions. It was noted that you have done the relevant requested revisions given to you after your first submission. Hence, the requirements have been satisfied.

Your application to conduct this research at UNAM is therefore approved on the following conditions:

(a) In the course of your research, you will observe the required procedures, norms, and ethical conduct in accordance with the relevant policies and guidelines, and as outlined in your proposal.
(b) No inconveniences or disruptions to the normal duties and operations of the participants and other processes will be caused.
(c) Results/findings of this research will be shared with the PVC (AA&R) (and/or his appointees) before they are disseminated in the public domain.
(d) On completion, a copy of the M.Phil. Thesis should be lodged with the UNAM Library, and, notwithstanding the University of Johannesburg conditions, an electronic copy should be lodged with the UNAM Institutional Repository.
(e) Proper acknowledgement of the University of Namibia and participants shall be done in the thesis and any subsequent publications arising from this research.

You must liaise with the relevant Offices (e.g. Dean Of Students, ILRC, SRC) where relevant, before collecting data to ensure proper coordination of your activities.
If you accept the above conditions, please sign and date a copy of this letter and return to the Research & Publications Office at your earliest convenience. You are free to contact the Research & Publications Office if any of this is not clear to you.

I would like to wish you all the best in your studies.

Yours sincerely

Prof. I. Mapaure
UNAM RESEARCH COORDINATOR

C.c.: Prof. O.D. Mwandemele, PVC: Academic Affairs & Research
Mr. C. Mabhiza, Head: User Services

I accept the above conditions.

NAME: Jakobina M. Mwinyole
SIGNATURE: ______________________
DATE: 10 November 2014
**APPENDIX D: Ethical clearance letter**

**FACULTY OF MANAGEMENT**

**PROJECT PROPOSAL APPROVAL AND ETHICS CLEARANCE**

<table>
<thead>
<tr>
<th>Name of candidate</th>
<th>Jakobina Mwiliyale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student number</td>
<td>201383679</td>
</tr>
<tr>
<td>Degree</td>
<td>MPhil Information Management</td>
</tr>
<tr>
<td>Title</td>
<td>Developing information literacy skills within a Virtual Reference System</td>
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</table>

**DECLARATION BY HEAD OF DEPARTMENT**

The undersigned confirms that:

- The project proposal of the above candidate was internally evaluated and quality assured;
- The ethical implications of the research project have been reviewed and ethical clearance provided; and
- The Intellectual Property Rights of the UJ have been duly noted;

<table>
<thead>
<tr>
<th>Title and name of HOD (print)</th>
<th>Prof. Chris Rensleigh</th>
</tr>
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<tbody>
<tr>
<td>Signature of HOD</td>
<td></td>
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<tr>
<td>Date</td>
<td>30/08/2014</td>
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</table>

<table>
<thead>
<tr>
<th>Title and name of Supervisor (print)</th>
<th>Dr Paul Laughton</th>
</tr>
</thead>
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<tr>
<td>Signature of Supervisor</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>30/09/2014</td>
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</table>
APPENDIX E: Letter requesting study permission

UNIVERSITY OF JOHANNESBURG
DEPARTMENT OF INFORMATION AND KNOWLEDGE MANAGEMENT
MEMORANDUM

TO: To whom this may concern
FROM: Dr Paul Laughton
DATE: 28 March 2014
SUBJECT: Permission to conduct research on a Virtual Reference Service at the University of Namibia Libraries

I am a Senior Lecturer at the Department of Information and Knowledge Management at UJ and I have a student Jakobina Mwiiyale (student number: 201383679), who is completing her MPHIL Degree in Information Management. Part of this degree requires the student to conduct a research project. Ms Mwiiyale has decided to conduct research on a potential Virtual Reference Service in the UNAM libraries and she has communicated this with the library management. I ask for permission for Ms Mwiiyale to conduct her research at UNAM, and hand-out questionnaires to undergraduate students in the library as well as academic staff. This research is directed at improving services at the library of UNAM and your cooperation would be most helpful. If there is any further information required please do not hesitate to ask me (contact details provided below).

Regards

[Signature]

Dr. Paul Laughton
Department of Information and Knowledge Management
(011) 559-3518
A Bridge 511
paul@uj.ac.za