DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

Digital Literacy Instruction in Academic Libraries in KwaZulu-Natal

By

AMAHLE KHUMALO

21544087

A dissertation submitted in fulfilment of the requirement for the

Master of Management Science in Library and Information Sciences

Faculty of Accounting and Informatics, Department of Information Systems, Postgraduate Studies, Durban University of Technology

Supervisor: Dr M. Rajkoomar (PhD)

Co-Supervisor: Ms A. Rajagopaul (MTech)

2022

DURBAN UNIVERSITY OF TECHNOLOGY

Digital Literacy Instruction in Academic Libraries in KwaZulu-Natal

By

AMAHLE KHUMALO

21544087

A dissertation submitted in fulfilment of the requirement for the Master of Management Science in Library and Information Sciences

Faculty of Accounting and Informatics, Department of Information Systems, Postgraduate Studies, Durban University of Technology

Supervisor: Dr M. Rajkoomar (PhD)

Co-Supervisor: Ms A. Rajagopaul (MTech)

2022

DECLARATION

I, *Amahle Khumalo*, declare that:

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

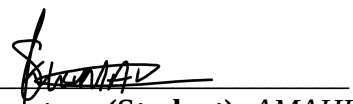
(ii) This dissertation has not been submitted for any degree or examination at any other university.

(iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

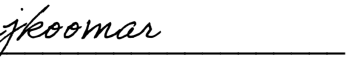
(iv) This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

- Their words have been re-written but the general information attributed to them has been referenced.
- Where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

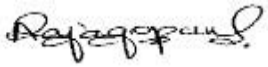
(v) This dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the dissertation and in the Reference Section of this dissertation.



Signature (Student): *AMAHLE KHUMALO*

Signed: 

(Supervisor)

Signed: 

(Co-Supervisor)

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisor, Dr. Rajkoomar and co-supervisor Ms. Rajagopaul for their contribution to this work. I am grateful for their guidance, support, encouragement, and precious time dedicated throughout the period of this research. I highly appreciate their invaluable supervision.

Further, I would like to extend my gratitude to Subject Librarians from the Durban University of Technology, Mangosuthu University of Technology, University of KwaZulu-Natal, University of Zululand, and University of South Africa (KwaZulu-Natal Campuses) for participating in this project. I also thank all participants who took their time to participate in the pilot study for this project.

Lastly, I would like to thank the National Research Foundation (NRF) for funding my project.

ABSTRACT

Information and Communications Technologies (ICTs) has become an integral tool in enhancing library services worldwide. ICT can be used as a tool for acquisition of digital literacy skills. The use of ICT in digital literacy education can enhance students' digital literacy skills, which are deemed as critical in a technologically orientated society. Therefore, this explanatory sequential mixed methods study examined the extent to which Subject Librarians in academic libraries use ICTs in digital literacy instruction. The objectives of this study were to ascertain ways in which Subject Librarians use information and communication technologies for digital literacy instruction in academic libraries in KwaZulu-Natal. The study further sought to reveal whether Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries.

The target population for this study was Subject Librarians in traditional universities and universities of technology in KwaZulu-Natal Province, South Africa. The online survey was administered to a total of 58 Subject Librarians. As a result of an explanatory sequential, follow-up interviews were conducted with the intention of getting richer and in-depth information on the use of ICT in digital literacy instruction and develop a clearer picture and understanding of digital literacy instruction in academic libraries.

The findings of this study revealed that Subject Librarians use ICTs for digital literacy instruction in various ways. Almost all the respondents were in agreement that computers, projectors, PowerPoint presentations, interactive white boards and various learning management systems are to a very large extent seen as best ways of using ICTs for digital literacy instruction. While the use of various Learning Management Systems was deemed as the most effective way through which Subject Librarians use ICTs for digital literacy instruction; the findings further revealed a lack of adequate digital literacy skills among Subject Librarians. This, therefore compromises their ability to provide relevant digital literacy skills' training. The findings suggest that Subject Librarians need more training in the proper use of ICTs in digital literacy instruction. Digital literacy is increasingly considered an essential survival skill and a fundamental life skill in the 21st century. If Subject Librarians are digitally literate, and trained to use ICT, then they will be able to provide creative and adequate digital literacy skills for students to enable them to locate resources of desired information efficiently and effectively.

Keywords: Digital literacy, Subject librarians, digital skills, academic libraries

Table of Contents

List of figures

List of tables

LIST OF APPENDICES

LIST OF ABBREVIATIONS

CILIP - Chartered Institute of Library and Information Professionals

DIL - Digital information literacy

DL - Digital literacy

ECU- Edith Cowan University

ICT- Information and Communications Technology

IL - Information Literacy

KZN – KwaZulu-Natal

SL - Subject Librarians

UNESCO - United Nations Educational, Scientific and Cultural Organization

LIST OF TERMINOLOGY

Academic Staff

In this current study, the term academic staff is synonymous to faculty staff and is used to refer to university staff with direct responsibility for teaching, learning and assessment activities. In the South African context, academic staff is defined by the Department of Higher Education and Training (2021: 15) as any person appointed to teach or to do research at a public higher education institution and any other employee designated as such by the council of that institution. The current study refers to academic staff as 'instruction' staff, particularly lecturers who spend more than 50% their official time on duty on instruction activities (Department of Higher Education and Training 2021: 15).

Digital Information Literacy (DIL):

Digital information literacy (DIL) is the application of information literacy standards and skills with digital technologies (Adam-Turner 2016: 19). Digital information literacy covers the knowledge and skills required for effectively using digital information to achieve personal, civic, or workplace goals. Sparks, Katz and Beile (2016: 1) DIL as the ability to obtain, understand, evaluate, and use information in a variety of digital technology contexts. It is critically an important skill deemed necessary for success in higher education as well as in the global networked economy.

Digital Literacy (DL):

Digital Literacy (DL) is the ability to understand, analyze, assess, organize, and evaluate information using digital technologies (Mohammadyari and Singh 2015). Adopting Maphosa and Bhebhe's (2019) definition of digital literacy, this current study defines digital literacy as the ability to utilize information and communication technologies in teaching and learning.

Adam-Turner (2016) highlighted that the definition of digital literacy is inclusive of information literacy (IL) since IL applies to the digital technology format. In this current study, digital literacy is synonymous with digital information literacy (Adam-Turner 2016).

Faculty staff

According to Tennessee State University (2020: 1) the term ‘faculty’ shall be limited to regular, full-time personnel at institutions whose regular assignment include instruction, research, and/or public service as a principal activity, and who hold academic rank as a professor, associate professor, assistant professor, or instructor, senior instructor or master instructor, and as senior vocational teacher, intermediate vocational teacher, vocational teacher (Tennessee State University 2020: 1). For the purpose of the current study, the term faculty staff is used synonymously with academic staff to refer to university staff with direct responsibility for teaching, learning and assessment, particularly lecturers.

Information and Communications Technology (ICT):

Ratheeswari (2018: 45) refers ICTs to as technologies that provide access to information through telecommunication. Information and Communications Technology is similar to Information Technology (IT) but focuses primarily on communication technologies. This includes the internet, wireless networks, cell phones and other communication mediums (Ratheeswari 2018: 45). Information and communications technology is defined, for the purposes of this study, as a “diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information.” The study further refers ICTs to as a range of electronic technologies that are flexible, adaptable, enabling, and capable of transforming students’ digital literacy skills and redefining social relations.

Information Librarian:

An Information Librarian provide information services on a particular subject area. They are responsible for particular modules and assists academic and administrative staff as well as postgraduate students in finding quality research level information. For this study, Information librarian is synonymous with Subject Librarians.

Information literacy:

Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use the needed information effectively (Adam-Turner 2016).

Liaison librarian:

Liaison librarians are defined by Church-Duran (2017: 258) as librarians assigned to a specific client base (a school, department, college, research center, or co-curricular unit) in a personalized, relationship-centered system of service delivery.

Subject Librarians:

In this study, Subject Librarians are synonymous with liaison librarians; information librarians and branch librarians. Madhusudhan and Lamba (2021: 90) define Subject Librarians as librarians who are assigned to a particular department in an educational institute or university or college with a particular educational background or experience. They are the communication bridge between the library system and their respective departments in order to provide support for teaching and research. They perform various tasks including taking instruction sessions, providing research support to the academic staff and students, and helping in the collection development for their respective departments. Liaison librarians usually specialize in specific subject areas or are assigned to specific client groups to capitalize on their specialized knowledge. This enables them to tailor library services according to their users' needs (Madhusudhan and Lamba 2021: 90). The academic liaison librarians help the students to develop information literacy skills that are related to finding, evaluating, and using scholarly information related to their specialized course to complete their assignments or conducting research. They assist students in searching and evaluating scholarly literature and research materials for writing essays, reports, literature reviews, dissertations, or theses. Academic liaison librarians usually work alongside the academic staff to foster the development of student research skills and support the practice of academic research at all levels in accordance with a university library's research skill support strategy (Madhusudhan and Lamba 2021: 90).

Web 2.0:

Web 2.0 is a development of Web 1.0 that refers to the beginning of the web, as an electronic-publishing platform, where people went to multiple webpages to get content, but did not interact with the content (Adam-Turner 2016).

Chapter 1: Introduction to the study

1.1 Introduction

Digital literacy can be described as the utilization of technology; and can be seen as a pivotal skill in a technologically evolving society (Mohammadyari and Singh 2015: 25). Essentially, digital literacy skills enable individuals to participate in digital creation and communication, and digital citizenship as such (Hamilton 2015: 85). Most often, when students enter the work environment, they are not always afforded the same digital literacy training as offered by academic libraries. Therefore, this emphasizes the importance for higher education sector to adopt digital literacy teaching strategies that will allow the utilization of digital literacy skills by students in the workplace and beyond (Hamilton 2015: 85). In the modern times, digital literacy is the constituent part of information literacy. Nevertheless, digital literacy can be referred to as the understanding of "why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner" (Chartered Institute of Library and Information Professionals (CILIP) 2020: 23).

Digital literacy is defined by Lynch (2017: 1) as "the ability to find, evaluate, utilize, share, and create information found online." Similarly, Heitin (2016: 37) referred to digital literacy as the individual's ability to utilize various information and communication technologies to retrieve, evaluate, generate, and disseminate information. Digital literacy instruction is necessary in creating digital natives that embrace digital citizenship and acknowledges the impact of their digital footprint thereby taking full account of the manner they utilize ICTs to interact with the society around them (Polkinghorne and Julien 2019: 102). In this sense, digital literacy can be viewed as the ability of an individual to use various digital platforms to communicate information clearly, either in writing or in any other form.

Academic libraries have been largely viewed as perfectly suited and well-equipped for developing students' digital literacy skills (Brink and Andresen 2010: 87). Academic libraries are instrumental in students' digital literacy skills development, and they can be seen as key role players in any educational system. Murray and Perez (2014: 55) argued that digital literacy skills are of great importance among students as they afford them the flexibility to connect to the globally available information sources and retrieve desired information, relevant for their studies.

Lynch (2017: 3) reveals that it is vital for educators and librarians to provide classroom literacy training for students to make them to be fit enough to face the digital world.

1.2 Research problem

The problem statement is defined by Sekaran and Bougie (2016: 35) as a “clear, precise, and succinct statement of the question or issue that is to be investigated with the goal of finding an answer or solution.” Kumar (2019: 69) on the other hand refers to the problem statement as any question that the researcher wants to answer. It introduces the research background. The description and a clearly defined research problem enables the reader to understand the problem context and the proposed solution.

Digital literacy offers opportunities to achieve valued outcomes in life, especially in today’s digital age. The definition of digital literacy is controversial and has resulted to the development of several inconsistent indicators for measuring digital literacy (Krish et al. 2018:6). Further, Krish et al. (2018) explain that digital literacy offers the basic skills to achieve valuable results in life. It is a key factor in the economic transformation, as it increases chances of employability through the access to digital resources and services (Krish et al. 2018: 6). Khan and Waheed (2015) referred digital literacy to as the ability to carry out digital literacy instruction effectively in the current digital era; whereas Krish et al. (2018: 6) believe that digital literacy can be referred to as the “awareness, attitude, and the ability of an individual to use digital tools for communication.” Given the importance of digital literacy for lifelong learning (Lynch 2017: 1); authors Adeoye and Adeoye (2017:1) argue that digital literacy is very important such that it can be very difficult for undergraduate students to survive in university without basic knowledge of ICTs and digital literacy skills. Furthermore, it can be acknowledged that the future of students as engaged citizens and future employees rest upon appropriate acquisition of digital literacy skills (Pangrazio 2016: 164). Digital literacy is a critical skill that students need to fully adapt to the digital world and achieve their academic goals (Adeoye and Adeoye 2017: 1). In view of this, Kelly (2019: 2) highlighted that digital literacy skills are of paramount importance among university students in the contemporary era. As a result, it is a necessity for academic

libraries to participate in digital literacy skills' development among students through relevant digital literacy training (Attahir 2019: 111).

Although Kelly (2019: 2) views digital literacy skills as critical for students in the digital era, a study by Kajee and Balfour (2011: 188) found that many first-year students coming to tertiary education still grapple with basic information literacy skills. This is further noted from the early study by King (2007: 60) who mentioned that most first-year students are not perfectly equipped with adequate information literacy skills required to complete coursework as required by the tertiary education institutions. Kajee and Balfour (2011: 195) noted that it has become a norm for university students who are not well equipped with digital literacy to pay other students to do their assignments. Although this literacy crisis is highly notable from studies that date back to more than a decade; studies by Shopova (2014); Eurostat (2015) and Adams-Becker et al. (2017) also found digital literacy to be the biggest challenge among university students. The study conducted by Eurostat (2015) concluded that "nearly 80% of young individuals use the internet only for social activities." However, due to the limited digital literacy skills, the use of ICTs by students for educational purposes was found to be very low.

Shopova (2014: 31) found that many university students do not possess adequate skills necessary for internet browsing and information technology, which makes them struggle with different tasks individually or in teams.

Even so, many higher education institutions have units who teach digital literacy, and academic libraries today have digital librarians. Therefore, academic libraries are perfectly suited for the student digital literacy development. As mentioned by Emiri (2015: 155), the main purpose of academic libraries is to "support teaching, learning, and research in ways consistent with, and supportive of, the institution's mission and goals." Additionally, academic library resources and services must be of sufficient quality, depth, diversity, and value to support the institution's curriculum. As a result, academic libraries are often viewed as the primary information centers and important organs of universities. In relation to this, IFLA (2017) made a statement highlighting the need for institutions of higher learning to integrate Subject Librarians' skills and expertise in academic libraries into Learning Management Systems to improve students' digital literacy. Back in 2013, the study by Ganaie (2013: 95) supports the important role of academic libraries as it mentioned that academic libraries can play

an important role in educating the dynamic leaders of tomorrow, providing effective and efficient services, enabling users to learn how to find, evaluate, and communicate information in a variety of digital platforms. In fact, academic libraries can be considered as the hearts of universities in the digital era. Subject Librarians have always had a key role in the dissemination of information and application of knowledge in digital literacy skills' development through effective digital literacy programs (Ganaie 2013: 95).

Given the principle that digital literacy is a survival skill among university students as universities are moving towards multimodal learning, this study examined the extent to which subject librarians use ICTs in digital literacy instruction.

1.3 Research objectives

This study sought to achieve the following objectives:

- To ascertain ways in which Subject Librarians use Information and Communication Technologies (ICTs) for digital literacy instruction in academic libraries in KwaZulu-Natal.

- To ascertain whether Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal.

1.4 Research questions

The critical questions of this study were:

- How are Subject Librarians using information and communication technology for digital literacy instruction in academic libraries in KwaZulu-Natal?

- Do Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal?

1.5 Significance of the study

The current study explored the extent to which Subject Librarians use ICTs in digital literacy instruction. It was hoped that the outcomes of this study will have value for academic libraries' management in traditional universities and universities of technology in KwaZulu-Natal. Further, it was hoped that the outcomes of this study will also have value for library and information literacy researchers.

The interest of the researcher was to highlight and pin-point the need for and importance of using ICTs in digital literacy instruction. Digital literacy "builds on prior knowledge and experiences of Subject Librarians, enabling critical thinking around the use of Information and Communications Technologies" (Pillai 2020: 13). Information is used and reproduced to create valuable research that benefits everyone who uses it (Pillai 2020: 13). As such, this research contributes to readings related to the importance of digital literacy instruction in academic libraries. The library staff members, particularly the Subject Librarians and library management would benefit from recommendations derived from the study if they chose to implement them.

1.6 Scope of the study

This current study targeted Subject Librarians in academic libraries in traditional universities and universities of technology in KwaZulu-Natal. The selection was based to the explanation by Feldman (2016: 4) that "Subject Librarians provide reference and research services in their specialty field". They collaborate with academic staff to provide literacy instruction and acquisition decisions for academic materials in their subject focus area. Therefore, Subject Librarians were perfectly suited to provide the best information required for the study.

1.7 Overview of the research methodology

The researcher consulted various sources to simplify the purpose of this study, providing insights into the research methods related to sampling, data collection, and data analysis. The full overview of the methodology that was adopted in the current study is further displayed in the diagram below:

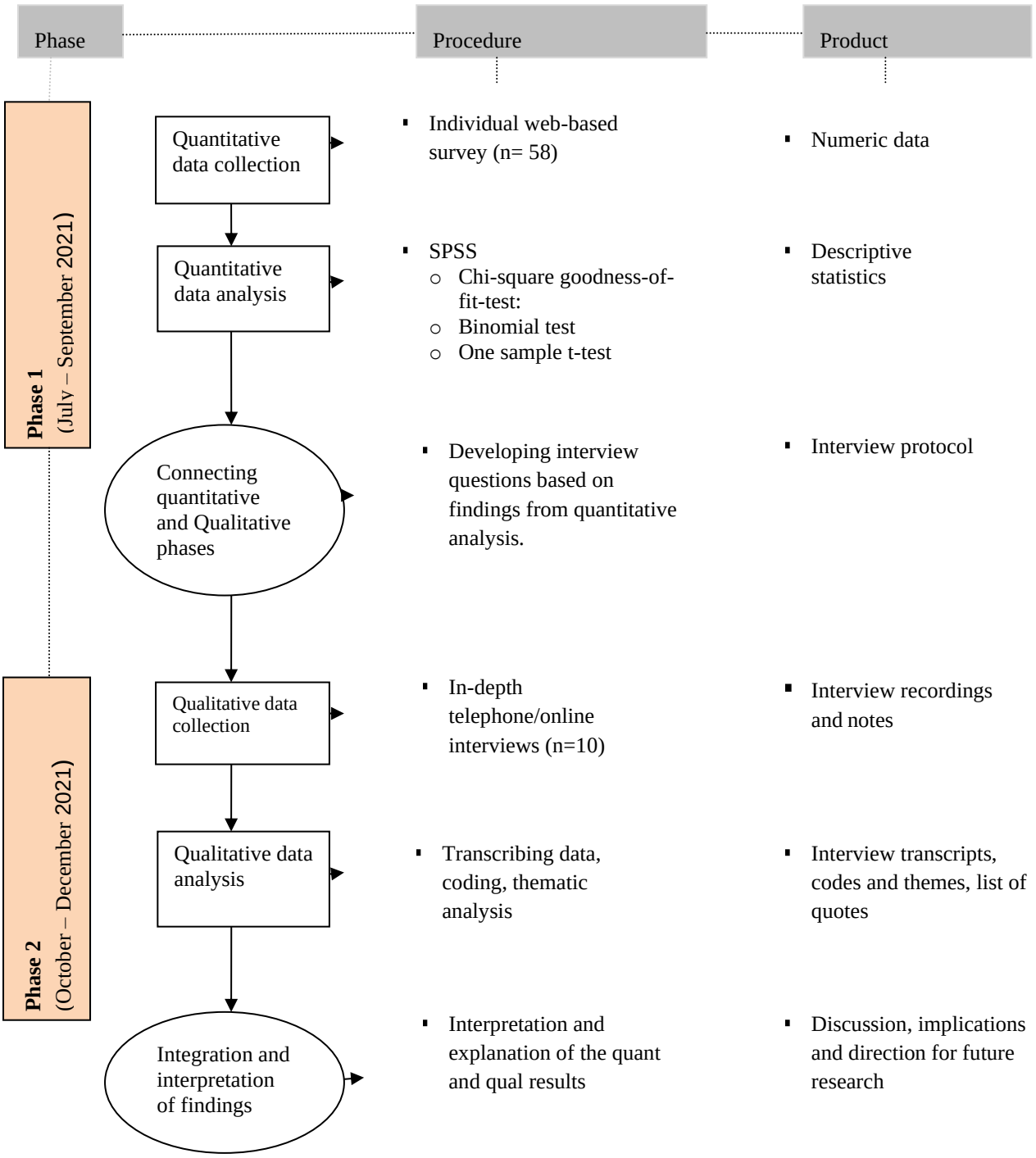


Figure 1: Overview of the research methodology

1.8 Ethical considerations

The main concern is that the study should not subject human objects to any physical or psychological harm, the participants should give their fully informed consent before partaking in the study (Creswell and Creswell 2018: 94). In this study, participants were not exposed to any situation considered as mentally or physically harmful. Participants only answered the online questionnaire and further participated in telephone and online interview sessions. No medical or any other kind of examination was required. Participation during this study was completely voluntary and participants were fully informed in writing that they may withdraw from the study at any time without having to disclose their reasons.

The researcher met all the ethical requirements of the Institutional Research Committee (IREC) (see Appendix C) at the Durban University of Technology. The researcher contacted all participating institutions to seek approval to survey Subject Librarians. Assurance was given to participants that their rights were protected during the selection process, and during the data collection process. The collected data was anonymized to protect respondents and participating institutions. The researcher provided participants with the written assurance that the answers would be kept confidential, and that their identities would be kept anonymous. Participants who made a final sample for the second phase of data collection were informed about their selection to participate in the interview portion of the study. Prior to the interview, interviewees were fully informed that their responses will remain confidential with complete anonymity.

1.9 Limitations and de-limitations of the study

The study focused on Subject Librarians in traditional universities and universities of technology in KwaZulu-Natal. Those included were from the University of KwaZulu-Natal; University of Zululand; University of South Africa; the Durban University of Technology, and Mangosuthu University of Technology. The major limitation acknowledged is that the study was undertaken during the Covid-19 pandemic. As such, some comments and responses were made (or may have been made) based on the fact that Subject Librarians were working remotely on various online platforms; and utilizing various ICT resources. There is a possibility that some responses were

based to Subject Librarians' current state of working environment other than their experience with ICTs.

1.10 Structure of the research report

The report consists of six chapters. Chapter one discusses the research context, the research questions, the research objectives, the research motivation, an overview of the research methodology adopted in the study, and the limitations of the research. The second chapter provides the comprehensive review of relevant literature. Chapter three discuss the methodology that was adopted to conduct the study, and chapter four focuses on the presentation of quantitative and qualitative findings. The fifth chapter discuss and interpret the research findings, and Chapter 6 summarizes the main findings of the study and draw conclusions and recommendations.

1.11 Summary

This chapter provided the research introduction and background, problem statement, objectives of the study and its critical questions, motivation of the study, overview of the research methodology adopted, ethical considerations and the scope of the study. The next chapter will review literature that is relevant to the study.

Chapter 2: Literature review

2.1 Introduction

The second chapter provides a comprehensive discussion of the theoretical framework which serves as a foundation to which the study was built. In this sense, the current study adopted the Edith Cowan University (ECU) Digital Literacy Framework (2019) as developed by the library of Edith Cowan University, Australia in 2019. Furthermore, this chapter provide an extensive review of relevant literature pertaining to information literacy in academic libraries with emphasis on digital literacy instruction. The chapter is organized around the research objectives and questions which serve as the basis for this study as discussed in chapter one.

Machi and McEvoy (2016: 5) refer to the review of literature as an argument that supports the research position by constructing a case based on solid evidence from previous studies. A review of the literature in question provides the preconditions and foundations for current knowledge on the subject and determines the rationale for defending the conclusions it draws. In relation to that, Machi and McEvoy (2016: 5) therefore defined literature review as “a written document that presents a logically argued case founded on a comprehensive understanding of the current state of knowledge about a topic of study. This case establishes a convincing thesis to answer the study’s question” (Machi and McEvoy 2016: 5). Similarly, Creswell and Creswell (2018) state that the review of literature plays an important role in determining whether the topic of interest is worth researching and gives an idea of how research may be narrowed down to areas of interest.

This literature review begins with a brief historical account of the evolution of digital literacy. This historic account includes the growth of Information and Communications Technologies (ICTs) and the expanding definition of digital literacy. In addition, the literature discussed in this section covers the following topics: the importance of digital literacy in the digital age; the literacy instruction in academic libraries; digital literacy instruction in academic libraries; the integration and use of ICT by Subject Librarians in digital literacy instruction; skills of Subject Librarians in the digital era; and collaboration between academic staff and Subject Librarians in digital literacy instruction.

2.2 Theoretical Framework

Grant and Osanloo (2014: 13) referred to the theoretical framework as the foundation of the dissertation inquiry. It serves as a basis for developing and supporting the research study and serves as a guide for determining the way to which the study can be approached both philosophically and scientifically.

Further, Grant and Osanloo (2014: 12) emphasized the importance of using a theoretical framework in the study, pointing out that “the theoretical framework is the foundation from which all knowledge is constructed (metaphorically and literally) for a research study. It serves as the structure and support for the rationale for the study, the problem statement, the purpose, the significance, and the research questions.” The theoretical framework provides a grounding base, or an anchor, for the literature review, and most importantly, without the theoretical framework to guide the methods and analysis of the study, the structure and vision remains unclear. By contrast, a research project that has a theoretical framework allows the study to be perfectly structured with an organized flow across chapters (Grant and Osanloo 2014: 12).

Grant and Osanloo (2014: 17) emphasized the importance and necessity of selecting the most appropriate theoretical framework, as such, this study adopted the ECU Digital Literacy Framework (2019) developed by the library of Edith Cowan University (ECU), Australia in 2019. ICT skills serves as a basic pillar of the ECU Digital Literacy Framework which is formed around the utilization of “digital technologies, information, academic, media and data literacy, digital creation and communication, digital citizenship and identity, and digital learning” (Edith Cowan University 2019 and Johnston 2020: 97).

ECU Digital Literacy Framework refers to digital literacy as the “ability to use digital technologies to access, evaluate, create and communicate information in a socially responsible and ethical manner”. This involves the elements of “information, media and data literacy, digital creation and communication, digital citizenship and identity, digital technologies, and digital learning (Lifelong)” (Johnston 2020: 95). The five elements of ECU Digital literacy framework are viewed as important digital literacy skills among students and staff. They (students and staff) require these digital literacy skills to be effective in digital environments, academic lives and beyond. The digital

literacy framework by the ECU places a high degree of importance on the utilization of ICTs in students' development. This digital literacy framework seeks to equip students with relevant digital literacy skills that they will require to achieve in university and succeed in their future world of work.

Figure 2.1: Five elements of the ECU digital literacy framework (Johnston 2020: 95).

As shown in the Figure 2.1, the five elements serve as the foundation for the ECU Framework for facilitating the digital literacy skills' development (Johnston 2020: 98). These elements of the ECU Digital Literacy Framework are discussed below:

1. **Digital technologies**

"The digital technologies element suggest that library staff and wider university community should be equipped with the digital literacy skills required to meet the digital learning needs of students."

This element stresses the importance of equipping library staff with relevant digital literacy instruction and provide opportunities for the development of digital literacy skills among academic staff, in addition to developing digital literacy and online training materials for staff. With reference to the digital technologies' element of ECU Framework, the library management must utilize various and relevant resources to

provide training opportunities for Subject Librarians so that they can be equipped with digital literacy skills. By so doing, Subject Librarians will be in a good position to contribute immensely towards students' digital literacy skills' development (Edith Cowan University 2019 and Johnston 2020: 98).

2. **Information, academic, media and data literacy *(define concepts)***

"Ensure that students develop information, academic, media and data literacy skills."

This element suggests the need for Subject Librarians to work collaboratively with other university departments in developing and embedding the student curriculum that encompasses information, academic, media and data literacy. This element prioritizes collaboration between Subject Librarians and other stakeholders who utilize their skills to collaborate with academics in embedding digital literacy in students' curriculum.

3. **Digital citizenship & identity**

"Educate students about digital citizenship and their digital identity." (Explain concepts)

The digital citizenship and identity element emphasizes the need for academic libraries to "continue to improve and upgrade digital learning programs" (Johnston 2020: 98). This element further highlights the importance for Subject Librarians to collaborate with academic staff in making sure that the curriculum integrates the concept of digital safety which emphasizes the need to respect other people when communicating on digital platforms. This element highlights that it is important that students always "understand the implications and impact of their digital footprint."

4. **Digital creation and communication**

"Enable students to be able to create and communicate in digital environments."

This element requires Subject Librarians to train students with relevant digital literacy skills necessary to partake in social and digital environments, which may include online discussion forums, social networking, and webinars. This element highlights the need to improve students' ability to adopt new approaches to digital learning environments and be able to use ICTs to develop new ideas in their field of learning and beyond.

5. Digital learning (professional and lifelong)

"Promote digital literacy as a lifelong learning concept and equip students with digital literacy skills needed in the workplace."

Digital literacy skills are very important, and they are a necessity in students' lives in the digital era (Johnston 2020: 99). Therefore, this element encompasses developing digital literacy programs in collaboration with relevant service centers and "equipping students with the relevant skills related to managing an academic and professional identity", including for example, building CV or e-portfolio of work and professional profile (Johnston 2020: 99). Subject Librarians should teach students about the importance of digital literacy throughout their lives. They (librarians) need to make students aware of the legal and ethical implications of participating in the digital environment.

The ECU Digital Literacy Framework is appropriate for this study because it encourages the utilization of ICTs by Subject Librarians in the digital literacy instruction. As discussed above, this framework provides Subject Librarians with strategies to be adopted to "equip students with the skills to be able to communicate with other students in digital learning and social environments as well as providing students with access to and education about new digital learning technologies" (Johnston 2020: 95). The ECU Digital Literacy Framework recognizes the need for a "shared understanding of the role of libraries in helping bring students, staff and employers closer together to build digital capability in higher education institutions" (Johnston 2020).

The ECU Digital Literacy Framework outlines 5 elements as strategies and actions to be adopted by academic librarians to develop students and staff digital literacy skills; and is underpinned by the use of ICT in digital literacy instruction (Johnston 2020: 95). Collaterally, the current study; therefore, is driven by the desire to establish strategies adopted by Subject Librarians to conduct digital literacy instruction, and the manner through which they use ICTs in digital literacy instruction.

The current study recognizes the notion that digital literacy skill is important in the current technological era. The study builds on the argument by Littlejohn, Beetham, and McGill (2012: 547) that digital literacy "means the capabilities required to thrive in

and beyond education, in an age when digital forms of information and communication predominate". The current study emphasizes the importance of the acquisition of relevant digital literacy skills among Subject Librarians. The study argues that if Subject Librarians are well equipped with necessary digital literacy skills, they will be able to adopt various strategies and utilize ICTs effectively in their digital literacy instruction. As such, the study is aligned with the ECU Library Digital Literacy Framework which reflects on the same arguments and implies that in the digital era, digital literacy is the essential skill required to succeed in higher education, the workplace and beyond. The ECU Library Digital Literacy Framework defines digital literacy in a way that integrates all the essential aspects of digital literacy to meet the digital needs of students and academic staff.

2.3 Digital Literacy

The evolution of technology introduces various changes in information landscape resulting to a paradigm shift in higher education sector. Information and Communication Technology (ICT) has affected every aspect of modern society significantly. As a result, there have been many changes in the manner we carry out our day-to-day traditional tasks (Ukwoma, Iwundu and Iwundu 2016: 703). Many establishments in current times seek to "employ individuals who are well equipped and grounded in the use of ICTs to perform their duties and participate in the digital economy" (Ukwoma, Iwundu and Iwundu 2016: 703). As such, this poses a challenge for universities to produce graduates with 21st century skills.

Many institutions of higher learning are turning towards online learning which makes digital literacy an essential skill in the administration of e-learning. This argument is supported by Blummer and Kenton (2015) as they mention that in the digital era, students require digital literacy skills to be successful in their academics. Therefore, it is important that students in universities are offered relevant digital literacy skills' training to prepare them to succeed in academia and be fit enough for future work environment.

Academic libraries which serve as a bridge between students and digital literacy skills development, have been entitled to respond swiftly to the technologically changing

environment, thereby providing adequate and relevant digital literacy instruction. This calls for Subject Librarians to accept new roles, as most of the literacy development forms huge part of their responsibilities. “It is the Subject Librarian position that has proven to be dynamic in nature, responding to the charge by taking on new roles while continuing to offer the traditional support still demanded by the university community” (Bright 2018: 76). However, to have a comprehensive understanding of the concept of digital literacy, it is necessary to review prior literature to explain and define digital literacy and its importance in academic libraries.

The concept of “digital literacy” was introduced by Paul Gilster in 1997 who explained it as “the ability to both understand and use digitized information” (Gilster 1997). Initially, Glister based the concept of digital literacy to the principles of network interaction of users, and its components focuses on media, information and communicative literacy, and creative competence (Glister 1997; Savina et al. 2019). Further developments in this concept focused on the change of the accents between the technological and information elements (Manovich 2017; Savina et al. 2019). According to Tekale (2018: 153) the concept of “digital literacy was built upon the discourses of visual literacy (using non-textual symbols and images to make sense of knowledge); technological literacy (the ability to use a particular technology or technologies); computer literacy (which had developed in the 1980s as a response to the launch of personal computers and which described the computer as a means to achieving a specified outcome); and information literacy (finding, evaluating, using and sharing information).”

Today, the concept of digital literacy has gained much attention and from the technical point of view, it has expanded to a more comprehensive understanding of the possibilities of using digital technologies in socio-economic and cultural fields (Sharikov 2016). The definition of digital literacy has attracted considerable interest. Leaning (2019: 4) noted that “digital literacy is often used as an 'umbrella' term for a range of distinct educational methods intended to equip users to function in digitally rich societies”. Leaning (2019: 4) reflected to Paul Gilster’s (1997) early definition of digital literacy and referred to this concept as a variety of skills encompassing the use of information and communications technology. Leaning (2019: 4) further articulated that digital literacy covers a wide range of skills and competencies which include the use of digital media and various ICT resources. Mishra (2019: 77) believes that Digital

Literacy simply means being able to retrieve and use digital information effectively, efficiently, and ethically. In a nutshell, we can refer to digital literacy as various methods of using digital information in every aspect of our lives (Mishra 2019: 77).

Law et al. (2018: 6) collected and reviewed various frameworks from governmental and non-governmental organisations and revealed that the following notions recurred constantly: “access”, “manage”, “understand”, “integrate”, “communicate”, “evaluate” and “create”. Therefore, the authors proposed the definition for digital literacy as follows:

> *“Digital literacy is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competences that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy.”*

On the other hand, The International Computer, and Information Literacy Study refers to digital literacy as the ability of an individual to utilize ICT resources for research, and for effective creation and communication of information at school and beyond (Fraillon et al. 2019: 16).

Digital literacy is the knowledge of what you see on your computer screen when using network media. It is generally understood to include (or has included) some other form of knowledge such as computers, internet, media and information (Leaning 2019: 4). Digital literacy gives a person key skill to be successful in life. “It is a critical enabler of economic transformation as it promotes employment opportunities through the ability to access digital content and online services” (Chetty et al. 2018: 6). Digital literacy is the important element of academic success that enable individuals to be capable of learning and working in a digital environment (Mishra 2019: 77).

Digital literacy is an important 21st century skill that substantially improves chances of employability for graduates (Van Laar et al. 2020: 2). Therefore, digital literacy skills are essential for Subject Librarians and students, and failure to possess such can lead to adverse outcomes for libraries and users. Libraries need to conduct effective digital literacy instruction so they can stay up to date in this technological age and contribute towards student development. Odu and Omosigho (2017: 17) assert that digital literacy should be the main focus for Subject Librarians. Digital literacy includes ICT

skills for internet use and critical thinking skills related to the selection, access, and use of information (Odu and Omosigho 2017: 17).

In view of the above explanation of digital literacy, therefore this study refers to digital literacy as various literacies related to the utilization of digital and modern technologies. These technologies, according to Mohammadyari and Singh (2015: 14) comprises of computer devices and all other ICT resources used by Subject Librarians for digital literacy instruction. They include “mobile devices (i.e. tablets, laptops, mobile phones, notebooks, and smartphones), desktop computers; data logging equipment; Web 2.0 tools and other resources on the Internet. The collaborative and communication resources, such as Moodle, Microsoft Teams, Skype, blogs, wikis, concept-mapping technologies, such as Spicy-Nodes, storage spaces, such as Sky Drive and Dropbox, and learning applications that are either commercially sold or freely available from the Web” (Mohammadyari and Singh 2015: 14).

2.3.1 The importance of Digital Literacy in the digital age

Digital literacy is increasingly viewed as a critical skill for university students in the 21st century. Digital literacy enables the integration of society's intellectual capital into sustainable development. Kimani (2014: 29-31) believes that today’s information age calls for all individuals to be highly competent with digital literacy if they are to survive in the digital era. Therefore, this highlights the importance of digital literacy in higher education and the society at large. Although the word ‘literacy’ itself usually refers to information literacy skills associated with reading and writing; but when preceded with the concept of ‘digital’ the term encompasses much more. In the rapid advancement of technology and digital information sources, digital literacy skill becomes a must-have skill (Odede and Jiyane 2019: 2). Hadimani and Rajgoli (2009: 71) state that “digital literacy has a greater significance for economic growth, educational achievement, and social, cultural, and personal wellbeing.” The work by Salleh et al. (2011: 507) and Hadimani and Rajgoli (2009: 70) point out that Digital literacy forms a foundation of the learning process that can be practiced in any discipline, any learning environment, and at any level of education. Moreover, Hadimani and Rajgoli (2009: 70) added that “digital literacy enables students to master the context and extend their investigations and become more self-directed.” In view of this, the study by Salleh et

al. (2011: 507) mentions that many countries in both developed and developing regions of the world acknowledge the importance of literacy for their citizens and have implemented programs to impart digital literacy skills and abilities for students of all levels. As a result, funds have been allocated to academic libraries to purchase computers and establish Internet connections, and a variety of digital literacy approaches have been used (Gross 2011: 157).

Likewise, Hallam; Thomas and Beach (2018: 51) argue that digital literacy is the foundation of the future success of institutions of higher learning. Although there is no generally accepted definition of 'digital literacy', but it is utmost important for institutions of higher learning to acknowledge the contributions that can be made by digital literacy to the successful outcomes at the individual and collective levels (Hallam; Thomas and Beach 2018: 51). On the other hand, Odede and Jiyane (2019: 2) emphasized the importance of student' skills development and mentioned that students are expected to develop evaluative thinking when exploring digital content. An important approach is essential for the correct use of online resources. If students lack critical assessment of digital content, then they risk a possibility of being directed by technology instead of being the one who directs the enquiry (Odede and Jiyane 2019: 6). As digital technologies continue to proliferate worldwide, the digital literacy becomes the essential skill for everyone to participate in the digital world. Odede and Jiyane (2019: 7) emphasized that the lack of digital literacy skills may lead to digital inequality. Digital literacy is a concept of modern information and communications technology and is very essential in information literacy. Therefore, digital literacy now takes prominence because information literacy and all subsequent literacies are a part of the whole literacy topic group (Adam-Turner 2017: 35). Digital literacy is essential for learning, personal growth, communication, employment, and collaboration.

Digital literacy is a foundational life skill in today's digital information society (Mohammadyari and Singh 2015: 14). Digital literacy is the essential skill in the 21st century, more especially in academic institutions. This is sustained by Maphosa and Bhebhe (2019: 193) who infer that digital literacy is essential as it allows students, lecturers, and academic librarians to access current information and offers alternative ways to use the information to make appropriate decisions. Digital literacy skills are therefore critical for management of information, the transfer of knowledge and

participation in educational activities (Hamilton 2015). When students enter the work environment, they may not be provided with the same digital literacy support as available in the university setting. Therefore, digital literacy instruction in higher education should be taught in a manner that allow students to be able to apply digital literacy skills to any practice setting (Hamilton: 2015). Julien, Gross and Latham (2018: 179) assert that "digital literacy is important as it represents the set of skills, knowledge and attitudes needed to access digital information in an efficient, effective, and ethical manner." This includes the ability to use information effectively to make informed decisions.

Dewan and Sarkar (2017) discussed measures taken in South Asia to supplement education with 21st century skills training. Their report highlights the need to increase students' digital literacy skills and to pay special attention to these skills in all levels of their education ranging from primary to higher education. Whether Subject Librarians in traditional universities and universities of technology in KZN are paying attention to digital literacy skills of students is the question at the heart of this study. Naik (2014: 94) stated in his discussion of the need for digital literacy that, "it has become increasingly clear that students cannot learn everything they need to know in their field of study in a few years at college". Digital literacy offers essential skills needed by students to become lifelong independent learners. Naik (2014: 94) further adds that we often make assumptions that students become digital literate when they write research papers and read textbooks. however, that is not always the case. What is most important in the introduction of digital literacy is the parallel digital curriculum that can provide a solid foundation for a university degree (Naik 2014:94).

In their study to examine information and communications technology and digital literacy skills as mechanism for effective learning in Nigerian colleges. Omosekejimi et al. (2018: 68) revealed that the benefits of the use of ICT and digital literacy instruction include: faster lecturer-student communication; cooperative learning among students; helps to locate/find teaching materials; complementing classroom instructional materials; encourages individual learning; improves students' knowledge retention; saves time with the use of grading software and collaboration and knowledge sharing among lecturers. Similarly, the current study seeks to find out if Subject Librarians recognize the importance of digital literacy and further investigate their efforts in equipping students with digital skills necessary for lifelong learning.

2.4 Preparedness of Subject Librarians for digital literacy instruction

Today's information landscape suggests the need for students to be knowledgeable and understand how to navigate a wide range of information to find, evaluate and use information for lifelong learning. Digital Literacy instruction is an important service in academic libraries, and Aharony, Julien and Nadel-Kritz (2020: 970) believe that Subject Librarians are normally the ones who are expected to provide digital literacy education in academic libraries. Subject Librarians cannot escape the ramifications of the knowledge economy and the pervasiveness of information technology that affects our lives. Ciccone and Hounslow (2019: 2) state that Subject Librarians must be prepared to teach students how to cope in the knowledge society and how to develop the necessary information and digital literacy skills to be productive members of society in a digital environment.

As digital literacy is considered to be the key to success in everyday life including the public participation and the workplace, it is important to adopt the best methods of implementing digital literacy instruction (Aharony, Julien and Nadel-Kritz 2020: 970). In view of this, Thanuskodi (2019) conducted a study in India to "examine information literacy skills among the Library and Information Science (LIS) professionals in India." The findings revealed a great awareness of the concept and value of information literacy among librarians in higher education institutions in India. They were confident that they have the ability to manage information literacy.

Information literacy instruction can be delivered in the form of special courses or individual courses. Such guidance is often provided in the form of short seminars that are not optical due to the complexity of new technologies and tools (Bartol et al. 2018: 375). Although many research scholars in information literacy share the same sentiment that digital literacy trainings should be introduced as an individual training course (Johnson-Grau et al. 2016; Petermanec and Sebjan 2017), academic libraries may face problems when attempting to implement information literacy in various fields (Farrell and Badke 2015: 326). In most cases, information literacy is closely associated with efforts of Subject Librarians to help students develop literacy skills as required in the 21st century (Shao and Purpur 2016: 674).

Academic libraries play a critical role in equipping students with information management skills through various literacy programs and activities, as students' ability to use information is becoming increasingly important. Information literacy training is the most relevant and valuable service in university libraries (Fernández-Ramos 2019: 242). Nevertheless, the pedagogical role in the professional activity of Subject Librarians in university libraries remains special. Julien, Gross and Latham (2018) surveyed information literacy instructional practices in U.S. academic libraries and concluded that “academic librarians have significant responsibility to help students to become information-literate.” The study by Fernández-Ramos (2019: 248) asserts that libraries display a “very high perception of the importance of information literacy instruction.” Shao and Purpur (2016: 673) in their investigation of the effects of information literacy skills on student writing and course performance; concluded that “it is important for librarians to provide well-integrated library instruction programs and services to improve student information literacy skills.”

Information literacy is an on-going journey. Thanuskodi (2019: 23) considered it as important to make information literacy programs a core activity for universities and institutions of research and development. “Information literacy programmes need to be implemented mainly by the library staff in schools, universities, public and other libraries in order to achieve library goals and to convert their users to lifelong learners and critical thinkers” (Thanuskodi 2019: 23).

Studies on information literacy have been undertaken in various countries across the globe. In Israeli, Aharony, Julien and Nadel-Kritz (2020) investigated practices of information literacy instruction in academic libraries. The results of their online survey revealed that librarians with instructional responsibilities are of a view that literacy instruction should be a collaborative effort other than being their responsibility alone. Jabeen et al. (2016) investigated literacy instruction in China and revealed that “information literacy instruction through library orientations and tours is used successfully, in addition to face-to-face instruction”.

2.5 Digital Literacy instruction in academic libraries

Academic libraries have always focused on their primary duties of developing the library collection, offering user education and reference services, and conducting

awareness services through traditional approaches. Thus, in the advent of ICTs, librarians are expected to understand the new dimension of service delivery (Ayoku and Okafor 2015: 502). In the same vein, Sandhu (2018: 292) pointed out that "academic libraries have the expertise and mind-set of being early adopters of new technologies to perform activities such as digital curation, digital preservation, digital archiving etc". Therefore, academic libraries serve as a basis for digitally transforming institutions of higher learning. Universities that recognise the power of digital technologies and place the emphasis on the digital transformation will be successful in the digital era. Indeed, "academic libraries should act as a platform for digital transformation" (Sandhu 2018: 292).

Implementing and advocating best practices for digital literacy instruction can be deemed as a matter of importance as the literature implies that students in higher education institutions, they lack digital literacy skills (Aharony, Julien and Nadel-Kritz 2020: 964). Gross and Latham (2012: 581) mentioned that "college students who are called 'digital natives' do not enter college with sophisticated information searching or information evaluation skills". As such Subject Librarians have an important role of developing students' digital literacy skills. This responsibility can be difficult because the role of Subject Librarians has changed from focusing on user education to more complex goals such as teaching critical literacy skills and evaluating information (Aharony, Julien and Nadel-Kritz 2020: 964).

Rafi, JianMing and Ahmad (2019: 204) point out that "academic libraries 'crunch' new generation talents in the ocean of ideas to build a better citizen through digital literacy education". They (academic libraries) help to accelerate digital literacy education even outside university libraries (Rafi, JianMing and Ahmad 2019: 204). Academic libraries play a key role in teaching and learning in various ways, including working collaboratively with e-learning and teaching centres.

Ciccone and Hounslow (2019) explored academic librarians' experiences as digital curriculum librarians at the University of South Australia. In this article, these authors mention that "librarians must be prepared to teach students how to cope in this knowledge society and how to develop the necessary information and digital literacy skills to be productive members of society in a digital environment."

Bartol et al. (2018: 374) emphasized the need to systematically provide digital education to all students in educational institutions to improve their academic performance. This was further supported by Young (2018: 11) who mentions that “providing students with specific content, knowledge, and skills related to digital literacy can have a positive impact on students' general skills”.

2.6 The integration and use of ICT by subject librarians in digital literacy instruction

ICTs have become an important tool for improving library services around the world. ICT is important in the digital literacy skills’ development. Siddiq et al. (2016: 59) highlight that ICT is generally becoming more and more integrated in our society. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2016) indicated that “the use of ICT in digital literacy education can enhance the uptake of literacy skills for a number of reasons.” Samie (2005) conducted a study that surveyed the use of ICT in illiteracy eradication in Egypt. In this study, Sami (2005: 23) suggests that the use of computer programs may meet the needs and interests of the student. UNESCO (2016:16) adds that “learners can work independently, flexibly, and at their own pace, developing both oral and aural skills at the same time as learning to read.” Several software tools have been developed to support and improve learning. “The range extends from software which assists learners with letter recognition and phonics instruction, to programs which enhance vocabulary building” (UNESCO 2016: 17).

ICTs are viewed as a powerful tool for the transformation and reform of education. When ICTs are properly used, Fernández-Gutiérrez, Gimenez and Calero (2020) suggests that they can be an active process that connects teaching and learning to real life by increasing access to education, increasing the relevance of education for the digital workplace, and improving the quality of education. A study conducted by Klomsri and Teddre (2016) at the University of Dar es Salaam, Tanzania, found that ICT is being increasingly used in Tanzanian education. Klomsri and Teddre (2016: 304) recommended that in the future, “digital literacy and ICT training should be integrated so that the students can take maximum advantage of all that ICT has to offer, as sheer access to technology does not itself create information literate in-

dividuals". To that end, this current study seeks to examine the extent to which ICT is used by Subject Librarians in the digital literacy instruction.

In this regard, the efforts of Subject Librarians in the integrating ICT; digital resources and conducting information literacy instruction has always been exemplary. Ghavifekr and Rosdy (2015: 175) refer to the integration of ICTs in education as "the use of computer-based communication that incorporates into daily classroom instructional process". In addition to preparing students for the modern digital age, Subject Librarians are considered to play a key role in the use of ICTs in digital literacy instruction.

A distinctive feature of the development of education in the modern world is the active use of ICTs (Tolstova 2019: 166). Kapur (2019: 1) states that the utilization of ICT in digital education has a positive impact on the quality of education. Using ICTs allows people to increase their awareness and knowledge in various aspects (Kapur 2019: 1). Therefore, it is necessary to integrate ICT tools in curricula and pedagogy (Kapur 2019: 1). The use of ICT contributes to a supportive learning environment where librarians and students can participate and work satisfactorily in collaboration to achieve academic goals (Saxena 2017: 502; Kapur 2019: 2). Saxena (2017: 503) adds that the use of ICT creates significant differences in the way students learn. Ting (2015: 31) found that autonomous ICT education improves the digital literacy skills of students.

Although literature reviewed found the integration and the use of ICT in digital literacy to be effective (Saxena 2017: 502) with other studies noting that the use of ICT contributes immensely to the students' success (Kapur 2019; Mohammadyari and Singh 2015; Ting 2015); the study by Tolstova (2019) found an ineffective use of ICT literacy instruction. As a result, Tolstova (2019: 167) declares that the effective use of ICTs in teaching and learning, professional development, increasing the scale of successful innovations in the field of education throughout life, the contribution of technologies to the creation and dissemination of knowledge, recognition of the means and results of online training, monitoring and evaluation of successful practices are the main problems of modern education. Therefore, the effective use of ICTs must help to solve the urgent issues in the field of education (Tolstova 2019: 167). However, to overcome the challenge of an ineffective use of ICT in digital literacy instruction, it is very important for modern pedagogy to uncover the potential of the use of ICTs in

teaching and learning. In the same connection, Alvarez et al. (2013: 377); Siddiq et al. (2016: 60) suggested “embedding technology within the existing digital literacy education”. In view of the revolution of technology, this current study seeks to explore the role of Subject Librarians in fostering digital literacy instruction to university students and the types of ICTs they use in digital literacy instruction.

According to Reddy, Sharma, and Chauhhary (2020) “ICT was integrated into higher education learning to achieve a sustainable and lifelong learning hence transforming the traditional flexible and distance learning to real-time web facilitation.” There have been a number of interventions such as “smart and flipped classrooms, learning with mobile devices such as tablet learning and smartphones where students are taught using educational videos and audios, e-lectures and online classes” (Reddy, Sharma, and Chauhhary 2020).

The rapid development of information and communication technologies (ICTs) and its integration in all spheres of people’s life offers possibilities for a fast and unlimited access to vast information which is constantly enriched, transformed, and actualized (Shopova 2014: 26).

When ICT is integrated into lessons, students become more engaged in their work. On this note, the integration of information, communication, and technology (ICT) in education refer to the use of computer-based communication tools that incorporate into the daily classroom instructional process. Accordingly, the use of ICTs in teaching and learning ensures a technology-based teaching-learning process which is linked to the utilization of learning technologies in teaching-learning activities. “It further brings innovative learning environments and helps students to deal with knowledge in active, self-directed, and constructive ways” (Bhusal 2020:19).

The correct and appropriate use of ICTs in digital literacy instruction has a potential to promote developments in various dimensions and has great potential to overcome various digital illiteracy challenges. Similarly, Reddy, Sharma and Chaudhary (2020: 68) articulated that “when ICTs are used effectively, they can help organisations to optimize the use of resources and become more competitive and productive.” The appropriate use of ICTs in digital literacy can help in expanding access to education through faster information distribution and availability anytime and anywhere.

2.7 Skills of subject librarians in the digital era

Utilizing and managing digital resources and services requires digital literacy skills. Accordingly, “there is an urgent need for assessing the level of digital skills among librarians at academic libraries” (Hamad, Al-Fadel and Fakhouri 2020).

Digital technologies have transformed the manner through which information can be searched. “This prompted the libraries to adapt and change their routines and operations by starting to offer new services such as reference services, chat services, individual consultations, email, and social networking services” (Khan and Bhatti, 2017: 580). As such, this suggests that Subject Librarians should acquire new skills to handle the everchanging user information needs and continuous developments of library environment. “Subject Librarians are encountering increasing opportunities and expectations to provide digital literacy instruction as part of their pedagogy relating to information literacy” (Mourer 2017: 2). There is a growing demand for digital literacy skills for Subject Librarians (Shongwe 2015; Musangi 2015; Baro and Godfrey 2015). However, Raju (2017: 255) considers that while academic librarians are encouraged to behave like teachers and think for themselves, they receive little professional training in how to teach.

Emiri (2015: 153) mentions that there is a need for librarians to embrace the ever-changing technology. In the course of the digital age, Subject Librarians will have to acquire digital literacy skills like never before. Skills related to learning and innovation; Information media and technology are skills set that are also important for Subject Librarians to master digital literacy and be able to carry out digital literacy instruction in the 21st century (Emiri 2015: 155). In view of this, the current study hopes to reveal whether Subject Librarians in academic libraries in KwaZulu Natal possess digital skills required in the digital era.

Hamad, Al-Fadel and Fakhouri (2020) conducted a study investigating the “influence of digital skills on technology acceptance among librarians in Jordan”. The results indicated that digital literacy skills among librarians were very high. These results are similar to the study by Baro et al. (2019) which affirmed that “librarians working in academic libraries in Africa possess a high level of digital literacy skills”. Even so, Hamad, Al-Fadel and Fakhouri (2020) further revealed that financial difficulties are a major challenge for librarians to acquire the necessary skills. Most importantly, the

level of digital skills has a positive effect on the perception and use of technology by librarians in science libraries (Hamad, Al-Fadel and Fakhouri 2020).

Adeleke (2016: 1) claimed that “librarians need skills and competencies to establish and maintain a digital repository, including traditional library skills and knowledge, management and technical skills, familiarity with metadata creation, and knowledge of copyright”. Martzoukou and Elliott (2016: 111) reported a set of digital skills that were contemplated as important by librarians. This included “development of information technology (IT) skills and encompasses different communication media and tools, such as e-books, online databases, and social media platforms” (Martzoukou and Elliott 2016: 111).

Similarly, Tiemo (2019: 91) concluded that “the level of digital technology skills acquired among library personnel in Nigerian academic libraries in managing online resources for effective library services is high. However, they still need more training on their digital technology skills to manage and improve their online resources and services”. In line with this, Ayoku and Okafor (2015: 521) reported a lack of digital skills among Subject librarians. The authors then recommended the “management support for IT skills training and/or continuous professional development to improve the librarians’ ICT skills”. This recommendation is similar to the one by Emiri (2015: 158) who recommended that “management of university libraries should provide training for librarians so as to help update their knowledge in application of digital skills”.

Khan (2020: 185) reveals that the “present level of DIL skills is not matching with its required level and thus training is needed”. He further suggests that authorities should organize training programs on DIL skills. In the same vein, the study by Khan and Bhatti (2017: 573) revealed that “training programs offered by Higher Education Commission (HEC), library associations, library schools, in-house trainings, use of online tutorials and trainings offered by skilled professionals are highly important and useful for university librarians to acquire digital competencies”. Khan and Bhatti (2017: 590) also concluded that digital skills of university librarians to provide digital contents are low. The authors recommend that “librarians should attend training opportunities and workshops to acquire digital skills” (Khan and Bhatti 2017: 590). While this current study seeks to find out if Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal; it is also important to

have a holistic view of the digital literacy training needs of Subject Librarians in academic libraries in KwaZulu Natal.

2.8 Digital literacy activities in academic libraries

In studies dating back to 2008, the activities of Subject Librarians have been associated with the collection development; reference service; user education; and information skills training (Agyen-Gyasi 2008). In contrast, Zanin-Yost (2018: 151) understood the role of Subject Librarians to be one of "developing and delivering library services to faculty, students and staff within specific subject areas." This suggests that changes in technology, work environments along with user needs have shaped the role of a Subject Librarian to be inclusive of making connections and helping students and faculty.

However, Jaguszewski and William (2013: 6) argued against the notion that Subject Librarians' role only encompasses collection development, reference services and user education. These authors asserted that the base level of knowledge that a "Subject Librarian must possess is much broader than familiarity with a reference collection or facility with online searching; instead, they must constantly keep up with evolving pedagogies and research methods, rapidly developing tools, technologies, and ever-changing policies that facilitate and inform teaching, learning, and research in their assigned disciplines"

This argument is corroborated by Attahir (2019: 112) who argued that the rapid changes in technology are altering Subject Librarians' traditional ways of performing activities. As such, "it is essential for Subject Librarians to provide digital literacy training to their users and educate them on the effective use of digital information sources offered by libraries" (Attahir 2019: 112). Substantially, the traditional responsibilities of the Subject Librarian not only include the activities of collecting and organizing information but have expanded to include new activities such as delivering digital literacy instruction. This is often seen in job descriptions where applicants are required to have pedagogic skills, information expertise, ICT skills, knowledge of virtual learning environments and the ability to design courses of instructional material.

In 2008, Agyen-Gyasi noted an unclear job description as a major problem of subject librarianship, which in turn results in a poor performance. Agyen-Gyasi (2008:11)

pointed out that Subject Librarianship suffers poor job definition or specifications, and performance is often very inadequate. This affirms that a clear job description with fully defined and specified responsibilities is of paramount importance as it ensures adequate and effective performance.

The study undertaken by Chanetsa (2014) in Africa discovered that Information literacy instruction and reference/research support were activities that were most undertaken by Subject Librarians. Chanetsa (2014: 220) revealed that “68.6% of respondents spent more than 10% of their time on reference support activities and 66.1% of respondents spent the same amount of time on the information literacy instruction.”

One of the major responsibilities of a subject or liaison librarian is to provide research support and consultation to students and the faculty members that include developing collections to meet their needs and providing research consultations and other relevant services (Madhusudhan and Lamba 2021: 88). This responsibility also comprises developing easily accessible online materials (e.g., LibGuides) available to anyone at any time. A report about Transforming Liaison Roles in Research Libraries by Jaguszewski and William (2013) interviewed many libraries which discussed ways to support a shifting range of needs related to research. Some of them noted an increased focus on supporting interdisciplinary research, assisting faculty who are branching out into new disciplines but are unfamiliar with key articles, core journals, and potential collaborators. Therefore, this implicates that research support and consultations is one of the core activities that Subject Librarians undertake most often. Therefore, this current study seeks to explore digital literacy activities undertaken by Subject Librarians in academic libraries.

2.9 Subject Librarians’ involvement in E-learning

E- Learning is defined by Bhongade and Sarode (2018:180) as an “acquisition of knowledge and skills using electronic technologies such as computer, internet-based courseware and local and wide area network.” “E-learning is a way of providing training and development to the employees through various electronic media such as internet, audio, video” (Bhongade and Sarode 2018:180). Furthermore, eLearning also includes “learning at all levels both formal and non-formal that uses an information

network– the Internet, an intranet (LAN) or extranet (WAN). The components include e-portfolios, cyber infrastructures, digital libraries, and online learning object repositories" (Ratheeswari 2018: 45). All the above components create a digital identity of the user and connect all the stakeholders in the education. It also facilitates inter disciplinary research.

E-learning encompasses the use of strategic measures needed to support teaching and learning in an online environment. While e-learning can be summarized as the learning that is specifically delivered via the internet; Bhongade and Sarode (2018:181) further explain e-learning as the learning that utilizes electronic technologies to access educational curriculum outside of a traditional classroom. This explanation is further embraced by Kolhe (2018: 85) who argued that "e-learning is the utilization of innovative technologies by academic libraries to provide access to resources and services in support of learning, teaching, and research."

Reddy, Sharma and Chaudhary (2020:85) noted that e-learning was introduced as a result of changes in pedagogical practices which in turn changed the role of facilitators. On the other side, Bhongade and Sarode (2018:182) argued that e-learning can be helpful to reduce the illiteracy. In the similar note, Kolhe (2018: 85) correlated that e-learning in academic libraries has benefited both students and faculty so that they can undertake learning and research without being in the library.

Certainly, libraries have played a critical role in the planning and execution of e-learning programs and activities. When it comes to the systems and services that suit the needs of users, academic libraries are always at the forefront.

Jaguszewski and William (2013: 10) asserted that "libraries recognize the importance of their role in supporting teaching and learning." As such, Subject Libraries are becoming more involved in e-learning. In digital literacy, e-learning may mean the use of information and communications technology to raise digital literacy skills. This encompasses using devices or soft wares to engage or create self-managing learning opportunities to suit various learning pathways. In considering the importance of Subject Librarians' involvement in e-learning as suggested in the above discussion; the current study asked respondents if they were involved in e-learning in anyway; and if they were involved, respondents were further requested to explain in detail about their involvement in e-learning at their respective institutions.

Mgquba and Underwood's (2015) study on the use of e-learning technologies for the purpose of enhancing information research and learning skills (IRLSI) at Monash University Library, revealed that Monash University Library uses many platforms for e-learning. However, Moodle was the most used platform. Many institutions of higher learning across the globe are considering e-learning as another method for teaching and learning. Therefore, the current study hopes to establish the involvement of Subject Librarians in the e-learning.

2.10 Collaboration between Academic staff and Subject Librarians

A successful implementation of digital literacy instruction is dependent upon the effective collaboration between academics, Subject Librarians, and other information professionals. All parties must show interest and be actively involved for a program to be effectively implemented. According to Pham and Tanner (2014: 15) "universities recognize the importance of collaboration between librarians and academics in enhancing the academic success of students and research capacity". The same level of importance is further emphasized by Nguyen and Tuamsuk (2020a: 42) who concluded that the collaboration between Subject Librarian and academic staff is important for improving the quality of education. However, Zanin-Yost (2018: 161) points out that Subject Librarians should not be the only ones who carry the burden of digital literacy instruction, a collaborative environment must be created where digital literacy can be taught and applied effectively. Further to that, Pautz and Gauder (2017: 1018) suggest that when Subject Librarians work collaboratively with academics, "such collaboration can improve students' information literacy and thus their coursework and overall learning".

The collaboration between Subject Librarians and academics according to Zanin-Yost (2018: 152); ranges from "redesigning a course, imbedding information literacy skills, developing grading rubrics, and helping with grading". A study by Nguyen and Tuamsuk (2020b: 3) further identified four main academic–librarian collaborative activities – namely: "curriculum partnerships, research and academic partnerships, collection development, and the creation of information products and services." Nguyen and Tuamsuk (2020a: 34) believe that the collaboration between Subject Librarians and academic staff to integrate digital literacy in higher education should be seen as a continuous activity which play a critical role in improving students' digital

literacy skills. Although this collaboration strengthens the role of Subject Librarians, Zanin-Yost (2018: 153) implies that this can also be misleading and even create a lot of confusion, especially when Subject Librarians help academics integrate information literacy skills. In the same vein, Lan and Tuamsuk (2018: 86) argue that the faculty-librarian collaboration is a complex and time-consuming process and needs effort to initiate and maintain relationships. Even so, studies by Pham (2017: 190); Scripps-Hoekstra and Hamilton (2016: 6) insinuate that the faculty-librarian collaboration improves lifelong learning and students' digital literacy skills. Similarly, Stone, Quirke and Lowe (2018: 176) concluded that "librarian/faculty collaboration is a key component to student success". This collaboration accelerates the assessment design for digital literacy and enable Subject Librarians to be engaged. Collaboration enables the "pooling of expertise and exploitation of available resources and technologies in ways that maximize learning opportunities for students. A particularly important role of collaboration is in restructuring work practices, which is crucial for the innovation of educational environments" (Pham and Tanner 2014: 16).

Nguyen and Tuamsuk (2020c: 8) explored the factors that influence the collaboration between faculties and libraries in Vietnamese universities. The results of this article suggest that successful collaboration should be based on people's ability to cope with "current tasks, common goals and clarity, mutual respect, tolerance and trust, working in a common space and continuous communication". The results from a three- year study of Junisbai, Lowe and Tagge (2016: 604) denote that the collaboration between Subject Librarians and academic staff has a significant impact on students' digital literacy skills. "Through collaboration both in class and behind the scenes, librarians and academic staff jointly provide strategic, systematic instruction to produce information-literate graduates and—in the longer run—engaged, socially responsible citizens" (Junisbai, Lowe and Tagge 2016: 608). As such, the current study hopes to reveal the extent to which Subject Librarians in academic libraries in KwaZulu-Natal collaborate with faculty academics in digital literacy instruction.

2.10.1 Successful faculty-librarian collaborations

There have been notable examples of successful faculty-librarian collaboration. Hawes and Adamson (2016) conducted a case study to shine a light on the flipped

classroom paradigm and exemplify successful faculty-librarian collaboration. The results of this study revealed successful faculty-librarian collaboration. Sullivan and Porter (2016) shared experiences and lessons learned in their collaboration with academic staff as Subject Librarians. The aim of this article was “to inform and guide others seeking to build successful collaborations to promote information literacy on their campuses”. Accordingly, Sullivan and Porter (2016: 37) noted successful faculty-librarian collaboration in their report. Furthermore, Sullivan and Porter (2016: 37) assert that their collaboration evolved from an “ineffective traditional one-shot session to a successful- fully embedded team-taught model”. Successful faculty-librarian collaboration was further noted in the study by Junisbai, Lowe and Tagge (2016) which sought to assess the impact of programmatic changes and librarian course integration on students' information literacy (IL) skills. Junisbai, Lowe and Tagge (2016: 605) reported that when Subject Librarians collaborate with academic staff in fostering digital literacy skills, the results demonstrate a significant improvement in students’ digital literacy competences. Furthermore, Junisbai, Lowe and Tagge (2016: 609) concluded that “faculty-librarian collaboration on assignment and syllabus development, followed by one or two strategically placed library class sessions, produced the greatest gains”.

Although many studies found faculty-librarian collaboration to be successful (Junisbai, Lowe and Tagge 2016; Sulliva and Porter 2016; Hawes and Adamson 2016; Nguyen and Tuamsuk 2020a; Stone, Quirke and Lowe 2018), but Kamau and Adika (2018: 1) reported a lack of proper collaborative effort between Subject Librarians and academic staff in literacy instruction, in which the faculty engages librarians in scheduling literacy trainings and research tasks and assessing the reliability of student tasks. Librarians conduct information literacy classes and help students assess the authenticity of assignments. However, more faculty-librarian collaboration is needed (Kamau and Adika 2018: 1). Another limited faculty-librarian collaboration was noted in the study by Zanin-Yost (2018) which concluded that “librarians should not base their collaborations according to their titles, but rather focus on the scope of their mission within their institution” (Zanin-Yost 2018: 161). Similarly, Khan (2020) conducted a study in Pakistani examining the modern required levels of digital literacy skills among librarians. Khan (2020: 167) declared the limited collaborative effort between Subject Librarians and academic staff as one of the barriers in the attainment of digital literacy

skills, including librarians' lack of interest to conduct digital literacy instruction programs. Pautz and Gauder (2017: 1027) concluded that "librarians and faculty members need to look to each other as partners and get beyond the stand-alone approach that has historically dominated the faculty-librarian relationship". This conclusion is similar to the findings of Yu et al. (2019), who reported that "if the faculty did not mandate collaboration, it was hard for librarians to collaborate at Hong Kong universities". Meanwhile, a Taiwan faculty member complained that his or her "institutional administrators and leaders did not understand or care about the functions of the library" (Yu et al. 2019: 116). "It was consequently difficult for librarians to implement any collaborative project with faculty members" (Yu et al. 2019: 116). Furthermore, a study by Nguyen and Tuamsuk (2020c) noted a number of factors that had a negative impact on the faculty-librarian collaboration. Based on the results of the descriptive statistical data of Nguyen and Tuamsuk (2020c), it was observed that individual dimensions were the key factor influencing collaboration. Pham (2017: 204) believes that "leaders need to review development strategies and missions to build a dynamic and flexible work environment, establish a professional and harmonious work culture based on mutual understanding, and respect differences". Therefore, the current study hoped to establish whether the collaboration between Subject Librarians and academic staff in digital literacy instruction has been successful.

2.11 Summary

This chapter offered a comprehensive discussion of digital literacy within the academic library context. The positive influence, benefit and value of digital literacy were demonstrated by the literature. The role of academic libraries in enhancing the digital literacy skills is evident as they are key role players. Although acquiring digital literacy skills can be established as the domain of academic libraries, there is a need for more research to link academic libraries to digital literacy, as the research pertaining to this area was found to be very limited. The reviewed literature showed that to some extent Subject Librarians in most institutions worldwide make an effective use of ICTs in digital literacy instruction. However, there are concerns that to a particular extent, Subject Librarians may still fail to effectively use ICT in digital literacy instruction as a result of lack of adequate digital literacy skills.

The reviewed literature brings to light many issues as related to this study and helps to provide the study with relevant context, both nationally and internationally. The literature reviewed in this study enabled the researcher to clearly understand the research problem and was further applicable in designing the data collection instruments for the study. The third chapter will discuss the methodology and the research design that was adopted in this study.

Chapter 3: Research methodology and design

3.1 Introduction

The third chapter provides the comprehensive discussion of the research method adopted to collect and analyse data for the study. The methodology chapter covers the study's research design, population, sampling, first phase quantitative data collection procedure, second phase qualitative data collection procedure; quantitative and qualitative data analysis, data integration and overview of the research methodology.

Igwenagu (2016: 5) defines research methodology as a "set of systematic techniques used in research". This can simply be referred to as the guide to conducting research. It describes the "analysis methods, throws more light on their limitations and resources, clarify their pre- suppositions and consequences, relating their potentialities to the twilight zone at the frontiers of knowledge" (Igwenagu 2016: 5). Research methodology is the "general research strategy that outlines the way in which a research project is to be undertaken and, among other things, identifies the methods to be used in it" (Igwenagu 2016: 8). Research methodology is the general principle that sought to guide the research process, and it is generally concerned with answering specific research questions. In this study, two critical questions needed investigation. These questions covered briefly, the application of ICTs by Subject Librarians in their digital literacy instructions; and the necessary skills possessed by Subject Librarians as required for digital literacy instruction.

3.2 Study research design

The research design is explained by Creswell (2014: 295) as a "plan and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis". It involves the intersection of philosophical assumptions, designs, and specific methods. "The selection of a research design is also based on the nature of the research problem or issue being addressed, the researchers' personal experiences, and the audiences for the study" (Creswell 2014: 31). The concept of the research design is further re-iterated by Kumar (2018: 95) who denotes that a "research design is a plan, structure and strategy of investigation

so conceived as to obtain answers to research questions or problems." A research design is a plan and a procedure employed by the researcher to solve the research problem in a valid and accurate manner (Kumar 2018:95). In reference to these definitions, Kumar (2018: 96) suggests that a research design has two main functions. The first function relates to the "identification and/or development of procedures and logistical arrangements required to undertake a study, and the second emphasizes the importance of quality in these procedures to ensure their validity, objectivity, and accuracy" (Kumar 2018:96). Hence, through a research design according to Kumar (2018:96); you:

- "Conceptualize an operational plan to undertake the various procedures and tasks required to complete your study".
- "Ensure that these procedures are adequate to obtain valid, objective, and accurate answers to the research questions".

3.2.1 Mixed methods design

Pillai (2020: 44) points out that in recent times, researchers have realized that "qualitative and quantitative methods were not entirely different and opposing one another as originally thought; instead, they could complement and strengthen each other, giving the prospect of obtaining a more wide- ranging picture of social phenomena, when both methods are used together". As such, mixed methods studies are becoming more popular in the field of information literacy. For example, Shannon (2017) used a mixed method approach to conduct an exploratory study to examine the assessment of digital literacy in higher education. While on the other side, Pillai (2020) used a mixed method approach to "explore the impact of library instruction (LI) on the Human Sciences Research Council (HSRC) staff, in support of achieving their research and academic goals". In another study, Li et al. (2015) used a mixed methodology approach to "examine the current technology usage of digital generation student teachers". In the same vein, this study used a mixed method approach to examine the extent to which Subject Librarians in academic libraries use ICTs in digital literacy instruction. The same view is shared by Khaldi (2017: 22) who pointed out that this research paradigm is "used extensively in educational research for its many merits". Thus, in mixed methods, "researchers' use both types of data because these combined provide the best understanding of a research problem" (Khaldi 2017: 22).

Mixed methods design is defined by Creswell and Plano Clark (2017: 52) as “an approach to inquiry that combines both qualitative and quantitative forms of research. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing or integrating of both approaches in a study”.

Schoonenboom and Johnston (2017: 4) argue that the “overall goal of mixed methods research, of combining qualitative and quantitative research components, is to expand and strengthen a study’s conclusions and, therefore, contribute to the published literature.” According to Schoonenboom and Johnston (2017: 4) “the use of mixed methods should contribute to answering one’s research questions”. In this study, the mixed method was used to answer the following questions:

- How Subject Librarians are using information and communication technology for digital literacy instruction in academic libraries in KwaZulu-Natal?
- Do Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal?

This current study employed a mixed methods design because of its complementarity, whereby the researcher sought to gauge a complete understanding of the research problem and/or to clarify a given research result, as explained by Hesse-Biber (2016: 7).

3.2.2 Explanatory sequential mixed method design

This study made use of mixed methods sequential explanatory design (QUANTITATIVE → qualitative = explanation), which comprised of an online survey as a first phase of data collection and the follow-up interviews as a second phase of data collection with the priority on the quantitative phase. The qualitative results were useful in explaining the initial survey results and built a comprehensive understanding of the significant quantitative findings. Creswell (2014: 274) describes the explanatory sequential mixed methods design as a “design in mixed methods research that appeals to individuals with a strong quantitative background or from fields relatively new to qualitative approaches”. This approach has two distinct phases: “a preliminary quantitative phase which is used to develop a general understanding of the problem, followed by a qualitative phase which elaborates on the quantitative data by exploring participants’ views in depth” (Creswell 2014: 274). This is further supported by

Edmonds and Kennedy (2016: 197) pointing out that “the explanatory-sequential design is a *sequential* approach and is used when the researcher is interested in following up the quantitative results with qualitative data”. Therefore, the qualitative data is used to interpret and clarify the quantitative findings. “This two-phase approach is particularly useful for a researcher interested in explaining the findings from the first phase of the study with the qualitative data collected during Phase 2” (Edmonds and Kennedy 2016: 197).

The rationale for this approach is that the quantitative data and their subsequent analysis provide a general understanding of the research problem. “The qualitative data and their analysis refine and explain those statistical results by exploring participants’ views in more depth” (Creswell 2014: 274). This study aimed to explore the in-depth, conceptual analyses of the use of ICT in digital literacy instruction by Subject Librarians in traditional universities and universities of technology in KwaZulu-Natal.

This view is also supported by Leedy and Ormrod (2015: 331) who recommended mixed methods sequential design and said that “in the first phase, the quantitative study yields only numbers (e.g., percentages and/or averages).” In the second phase, the “follow-up for example by asking a subsample of phase 1 contributors to describe what they were thinking during an experimental invention or to expand on their answers to survey questions can support the researcher to add greater substance and meaning to the numbers” (Leedy and Ormrod 2015: 331).

3.3 Population

A population is a whole group of people or subjects of interest to a researcher. Pandey and Pandey (2015: 40) relate the population to the “universe” and explain that “population or universe, is the entire mass of observations, which is the parent group from which a sample is to be formed”. According to Pandey and Pandey (2015: 40) the term population or universe “conveys a different meaning than a traditional one”. Thus, in research methodology, population or universe means characteristics of the actual group.

The population for this study was Subject Librarians in traditional universities and universities of technology in KwaZulu-Natal. Traditional universities included the

University of KwaZulu-Natal (UKZN); the University of Zululand (UNIZULU) and the University of South Africa (UNISA) KwaZulu-Natal Campuses. Universities of technology included the Durban University of Technology (DUT) and Mangosuthu University of Technology (MUT). The decision to only include Subject Librarians was due to the fact that Subject Librarians provide reference and research services in their specialty field. “They work with faculties to provide information literacy instruction and make purchasing decisions for materials in their subject collection area” (Feldman 2016: 4). Subject Librarians provide comprehensive research assistance to students; they serve as ‘intermediary’ between students and the technical staff. The total population size for traditional universities was 40 and the total population size for universities of technology was eighteen. This made the total population of this study to comprise of 58 Subject Librarians, as displayed on the table below:

Table 3.1: Population of the study

	Traditional University			**University of Technology**	
Institution	University of KwaZulu-Natal	University of Zululand	University of South Africa	Durban University of Technology	Mangosuthu University of Technology
Number of Subject Librarians	30	6	4	15	3
Total	**40**			**18**	
Total Population size	**58**				

3.4 Sampling

Cohen, Manion and Morrison (2016) state that “the quality of a piece of research not only stands or falls by the appropriateness of methodology and instrumentation but

also by the suitability of the sampling strategy that would have been adopted". Adopting the correct and applicable sampling method minimizes chances of bias, ensures accuracy, and allows the researcher to conduct the study in an efficient way (Pandey and Pandey 2015: 27).

3.4.1 First Quantitative Phase

Given the relatively small size of the population; no sampling was done in the first quantitative phase and data was collected from all 58 Subject Librarians, making for what this current study refers to as a census. In census survey or a total population sampling, "the count of individuals (men, women and children) is known as population" (Pandey and Pandey 2015: 40). A census obtains data from everyone, at the same time. This method can be described as the enumeration of the entire population. The same sentiment is shared by Sekaran and Bougie (2016: 265) who define census as a count of all elements in the human population. Equivalently, Pandey and Pandey (2015: 40) extended that "census deals with the investigation of the entire population with data being collected from every unit of the universe". This method provides more accurate and exact information as no unit is left out (Pandey and Pandey 2015: 40)

3.4.2 Second qualitative phase

Creswell (2014: 274) shared a view that "the quantitative results typically inform the types of participants to be purposefully selected for the qualitative phase and the types of questions that will be asked of the participants". However, for the purpose of the current study, only respondents who indicated their interest to participate in the follow-up interviews were selected as a sample for the second phase of data collection.

3.5 Data collection

As a result of an explanatory sequential design, the data was collected in two phases with an initial quantitative phase which was then followed by the qualitative phase. According to Creswell (2014: 275) in an explanatory sequential design, "data collection proceeds in two distinct phases with rigorous quantitative sampling in the first phase and with purposeful sampling in the second, qualitative phase". The key idea is that

the qualitative data collection builds directly on the quantitative results (Creswell 2014: 275).

3.5.1 Quantitative data collection

However, for the initial quantitative phase, data was collected by means of online questionnaires which were sent to all 58 participants. The goal of the quantitative phase was to establish whether Subject Librarians use Information and Communications Technology in digital literacy instruction in academic libraries in traditional universities and universities of technology.

3.5.1.1 Questionnaire design

The questionnaire is the important part of the research process. An improper and disorganised questionnaire will not yield the required data and may even produce inaccurate results (Brace 2018: 43). The overall structure of the questionnaire affects the rest of the survey process and similarly, whatever is going to happen in the research process affects the overall design of the survey instrument. A questionnaire is described by Babbie (2016) as the interrogative form of core statements entailed in both the problem statement and objectives of the study. The similar sentiment is shared by Brace (2018:44) who said that the “questionnaire writer should ask the questions that are relevant to the objectives and not be tempted to ask questions of areas that might be interesting but are not relevant”.

A questionnaire must be well planned out and properly reviewed so it can provide accurate information. The manner through which the questionnaire is designed is essential for its success as a method of collecting accurate data. “If the layout is not clear to any of the various users of the questionnaire, the wrong responses may be recorded, or the wrong questions asked” (Brace 2018: 43).

Questionnaires are based on descriptions and measurements as they provide a wealth of descriptive data pertaining to individuals or groups. The researcher utilized the free survey software *Cognito Forms* to create and disseminate the survey. “Online survey software enables researchers to ask follow on questions, based on a previous answer and thus it enables respondents to skip questions without compromising the integrity

of answers" (Leedy and Ormrod 2015:175). The initial set of survey questions identified for this study were designed based on the review of related literature. Nevertheless, the ECU Digital Literacy Framework (2019) discussed in Chapter two informed and enriched the process of preparing the survey data collection instrument.

3.5.1.2 Pilot Study

It is always a good idea and a recommendation to conduct the pilot testing for the questionnaire prior to the actual data collection. "Whether it is a new questionnaire written to meet a set of specific objectives or a set of questions that have been used before and adapted or arranged for a new study; testing it out before committing to a large-scale study is an essential precaution. Questionnaires are rarely the best that they could be at the first attempt" (Brace 2018: 163).

For the purpose of this study, academic library staff members excluding Subject Librarians were used for testing the online survey. On the 23rd of March 2021, the researcher distributed a total of six online surveys to two universities for testing. Three online questionnaires were sent to the Durban University of Technology Library and three online surveys were sent to the University of KwaZulu Natal Library.

The respondents were asked to:

- Make comments on the questions and instructions that needs more clarity
- Identify omissions, irrelevant and duplication of questions
- Record the time spent in completing the online survey.

All the questionnaires were completed and returned on the 23rd and 24th of March 2021. Comments provided by respondents were useful to finalize the questions for the online survey.

3.5.1.3 Distribution of the online survey

A web-based survey was utilized to gather quantitative data from participants. The survey was distributed to all 58 participants. Emails were sent to all participants on the 07th of July 2021 requesting them to participate in the study. A link to an online survey was also attached on this email. Respondents were given at least two months to complete the survey. On the 5th of August 2021, follow-up emails were sent to participants as a reminder to submit the survey and return the consent form.

Out of 58 surveys administered to the participants, 49 were returned, making a return rate of 84%. Data acquired from the questionnaire provided information indicating the extent to which Subject Librarians use ICT in the digital literacy instructions. Further revealed was whether Subject Librarians possess necessary skills and established the extent to which Subject Librarians collaborate with faculty staff.

3.5.2 Qualitative data collection

For the second qualitative phase, data was collected by means of structured interviews from participants that indicated their interest to participate in the study. According to Sekaran and Bougie (2016: 227) “structured interviews are those conducted when it is known at the outset what information is needed. The interviewer has a list of predetermined questions to be asked of the respondents either personally, through the telephone, or through the medium of a PC. As the respondents express their views, the researcher would note them down. The same questions will be asked of everybody in the same manner”. Basically, interviews are dialogues between the interviewer and the interviewee, wherein the researcher asks questions to gather information that will elicit the participants’ perspectives about a particular aspect of the core research variables or unit of analysis (Matatiele 2020: 56). In the context of the current study, the researchers wanted to further understand and explain the survey results in more depth through a follow-up interview. The interview protocol for this study was designed based on review of the literature, the research questions being explored, and the results of the quantitative data analysis.

3.5.2.1 Recruitment of participants

The interview sessions for the second qualitative phase were conducted telephonically and online via Microsoft Teams. Participation in the second phase of data collection for this study was voluntary. The second phase of data collection included participants who were willing to partake in the follow-up interview session.

On the 18th of October 2021 emails were sent to all respondents requesting their participation in the follow-up interview session. However, a total of twelve (12) respondents indicated their interest to participate to the second phase of data collection. At a later stage, two respondents submitted their withdrawal from the second phase of the study, mentioning tight schedules as the reason for their inability

to participate in the second phase of data collection. A total of ten (10) respondents made a final sample for qualitative data collection; whereby six (6) of them were from traditional universities and four (4) of them were from universities of technology. Therefore, all traditional universities and universities of technology in KwaZulu-Natal were represented in the second phase sample. Interested participants were requested to indicate the platform convenient to them between the telephone, Microsoft Teams, and Skype. They were further requested to indicate the date and time they will be available to participate in the interview session. The interviews were recorded with the consent of the participants. The interviews were conducted as from 27 October 2021 to 20 November 2021. The Table below shows the exact date, time platform and duration of each interview:

Table 3.2: Interview dates and duration

Interviewee	Date of Interview	Time of Interview	Interview Platform	Duration
SL1	27/10/2021	09H00	Microsoft Teams	20Min
SL2	27/10/2021	17H00	Microsoft Teams	15Min
SL3	28/10/2021	09H00	Microsoft Teams	14Min
SL4	28/11/2021	12H00	Microsoft Teams	15Min
SL5	03/11/2021	11H00	Zoom	19Min
SL6	09/11/2021	14H30	Microsoft Teams	13Min
SL7	12/11/2021	10H00	Telephone	14Min
SL8	16/11/2021	14H00	Skype	15Min
SL9	18/11/2021	15H00	Microsoft Teams	13Min
SL10	20/11/2021	10H00	Microsoft Teams	18Min

3.6 Data analysis

Data analysis is the process of collecting, modifying, and modelling data to find useful information, to draw conclusions and to support decision-making. “Data analysis involves the interpretation of collected data for the purpose of drawing conclusions that reflect the interests, ideas and theories that initiated the inquiry” (Babbie and Mouton 2001).

In the explanatory sequential design, the quantitative and the qualitative databases are analysed separately where quantitative results are used to plan the qualitative follow-up. “One important area is that the quantitative results cannot only inform the sampling procedure, but it can also point toward the types of qualitative questions to ask participants in the second phase” (Creswell 2014: 275).

3.6.1 Quantitative data analysis

The quantitative data files were downloaded from Cognito forms into an excel file and uploaded into *Statistical Package for the Social Sciences (SPSS)* version 27*. SPSS* is a statistical software package used for statistical analysis. The statistical tests were utilized to analyze data used to explore the use of ICT in digital literacy instruction by Subject Librarians in traditional universities and universities of technology.

The tests used in the analysis included the following:

- Descriptive statistics including means and standard deviations, where applicable. Frequencies are represented in tables or graphs.

- Chi-square goodness-of-fit-test: A univariate test, used on a categorical variable to test whether any of the response options are selected significantly more/less often than the others. Under the null hypothesis, it is assumed that all responses are equally selected. “The chi square goodness-of-fit test is among the oldest known statistical tests, first proposed by Pearson in 1900 for the multinomial distribution” (Rolke and Gondora 2021: 1885). “A goodness-of-fit test is concerned with the question whether a data set may have been generated by a certain distribution” (Rolke and Gondora 2021: 1885)

- Binomial test: Tests whether a significant proportion of respondents select one of a possible two responses. This can be extended when data with more than two response options is split into two distinct groups. “The Binomial Test procedure is useful when you want to compare a single sample from a dichotomous variable to an expected proportion” (Singh et al. 2013: 6).

- One sample t-test: Tests whether a mean score is significantly different from a scalar value. “The One-Sample procedure is used to test the null hypothesis that a sample comes from a particular distribution” (Singh et al. 2013: 11).

3.6.2 Qualitative data analysis

For the second qualitative phase, data was coded and analysed by using thematic analysis with an aim of following up the quantitative results and explore the results in more depth by closely examining the data to identify emerging themes – topics, ideas and patterns of meaning. Thematic Analysis (TA) is “an accessible, flexible, and increasingly popular method of qualitative data analysis” (Braun and Clarke 2012: 57).

Thematic Analysis is a method of identifying and analysing patterns of meaning in a dataset. “It illustrates which themes are important in the description of the phenomenon under study” (Braun and Clarke 2012: 57).

3.7 Quantitative and qualitative data integration

Integration is the stage in the research process where the quantitative and qualitative data are mixed. “The possibilities range from mixing in the beginning stage of the study while formulating its purpose and introducing both quantitative and qualitative research questions- to the integration of the quantitative and qualitative findings at the interpretation stage of the study” (Creswell 2014). In the mixed-methods sequential designs, the “quantitative and qualitative phases are connected in the intermediate stage when the results of the data analysis in the first phase of the study inform or guide the data collection in the second phase” (Hanson et al. 2005). In the sequential explanatory design, “a researcher typically connects the two phases while selecting the participants for the qualitative follow-up analysis based on the quantitative results from the first phase” (Creswell 2014).

In the current study, the quantitative and qualitative phases were connected while developing the interview questions for the qualitative data collection based on the results of the first quantitative phase. The results of the quantitative and qualitative phases were integrated during the discussion of the outcomes of the entire study. In the discussion section, the results from both phases were combined and interpreted to fully answer the research questions and develop a more robust and meaningful picture of the research problem.

Table 3.3: Sequential Explanatory Design Procedures

Phase	**Procedure**
Phase 1	
Quantitative data collection	Web based questionnaires
Quantitative data analysis	Statistical Package for the Social Sciences (SPSS). Statistical tests were used to analyze data
Connecting quantitative and qualitative phases	Developing interview questions based on the quantitative data analysis
Phase 2	
Qualitative data collection	Individual structured interviews
Qualitative data analysis	Coding and thematic analysis
Integration of quantitative and qualitative results	Interpretation and explanation of the quantitative and qualitative results

3.8 Evaluation of the research methodology

For this study, the adopting online survey and remote interviews as data collection methods was adequate in generating data. However, the challenge experienced in this

study was mainly that of distribution of questionnaires and second phase recruitment. The fact that the study relied on emails to reach out to the participants was a challenge. For many respondents, several follow-ups were made to request them to complete the online survey.

The biggest challenge experienced was related to the fact that the study was undertaken during the time of the Covid-19 pandemic where all participants were working remotely, mostly via emails. As a result, it was understood that participants were receiving a bulk number of emails in a day, resulting to the delay in response rate. Emails were sent to all participants who participated in the first qualitative phase to request their participation in the second phase of data collection. However, many of them did not respond to the call for second phase participation. Several follow-ups were made to participants to request their participation to the second phase of data collection, but very few responses were received. Despite all that, the findings of this study are still useful in revealing the use of ICTs for digital literacy instruction in academic libraries, thereby achieving the aims and objectives of the study.

3.9 Summary

This chapter provided a comprehensive discussion of the research methodology which was adopted in this study. In a nutshell, this chapter discussed the population of the study and data collection, and also covered data analysis and evaluation of research methodology. The next chapter presents the findings of the study.

Chapter 4: Presentation of findings

4.1 Introduction

The previous chapter was based on the research methodology and data collection procedures that were adopted for the current study. This chapter presents the findings emanating from the online questionnaire that was used to survey Subject Librarians in universities and universities of technology in KwaZulu-Natal. The chapter will further present qualitative findings from follow-up interviews with Subject Librarians as a result of an explanatory sequential design.

As previously explained in Chapter 3, a total of 58 online questionnaires were administered to Subject Librarians. A total of 49 (84%) online questionnaires were returned and used for data analysis. The study sought to achieve the following objectives:

- To ascertain ways in which Subject Librarians use information and communication technologies for digital literacy instruction in academic libraries in KwaZulu-Natal.

- To find out if Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal.

4.2 Quantitative data analysis

Questions for the quantitative data were asked from Subject Librarians and were administered via online questionnaires. Some responses to the questions were grouped together because of their similarity and relation. Statistical tests were utilized to analyze quantitative data, and, where possible, frequency distributions are presented in tables and graphs. The study utilized content analysis to analyze responses emanating from open-ended items, and findings are presented in a narrative form. Results are reported in the same sequence as the questionnaire was set up.

4.2.1 Demographics

The first questions of the online survey were basically asked with the sole purpose of welcoming and introducing the study; thereby 'easing' participants into the questionnaire.

4.2.1.1 Employer

Table 4.1: Indication of the employer

Please indicate your employer		
Institution	No. of Respondents	Percentage (%)
UKZN	28	57.1
UNISA	2	4.1
UniZulu	5	10.2
DUT	12	24.5
MUT	2	4.1
Total	49	100.0

N= 49

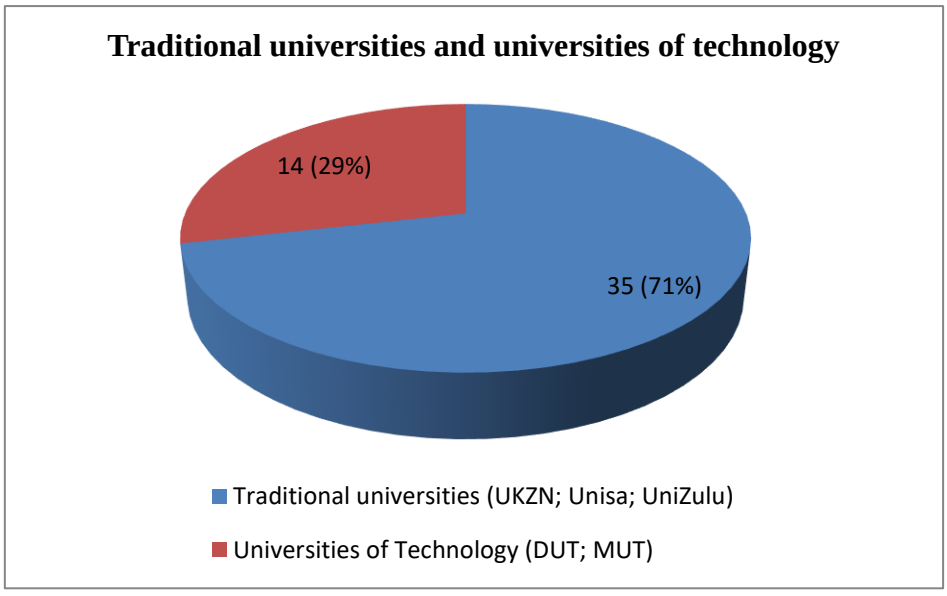


Figure 4.1: KZN universities and universities of technology

The study requested respondents to indicate their employer. The purpose of this question was to allow the possible comparison of any distinctions in digital literacy instruction between traditional universities and universities of technology in KwaZulu-Natal. As shown in *Table 4.1* and *Figure 4.1*, of 49 respondents, 71% of them were from traditional universities (UNZN- 28; UNISA – 2; UniZulu- 5) and 29% were from universities of technology (DUT- 12; MUT- 2).

4.2.1.2 Academic Library working experience

Respondents were asked to indicate their number of years working in an academic library. The findings from this question are presented in Figure 4.2:

N= 49

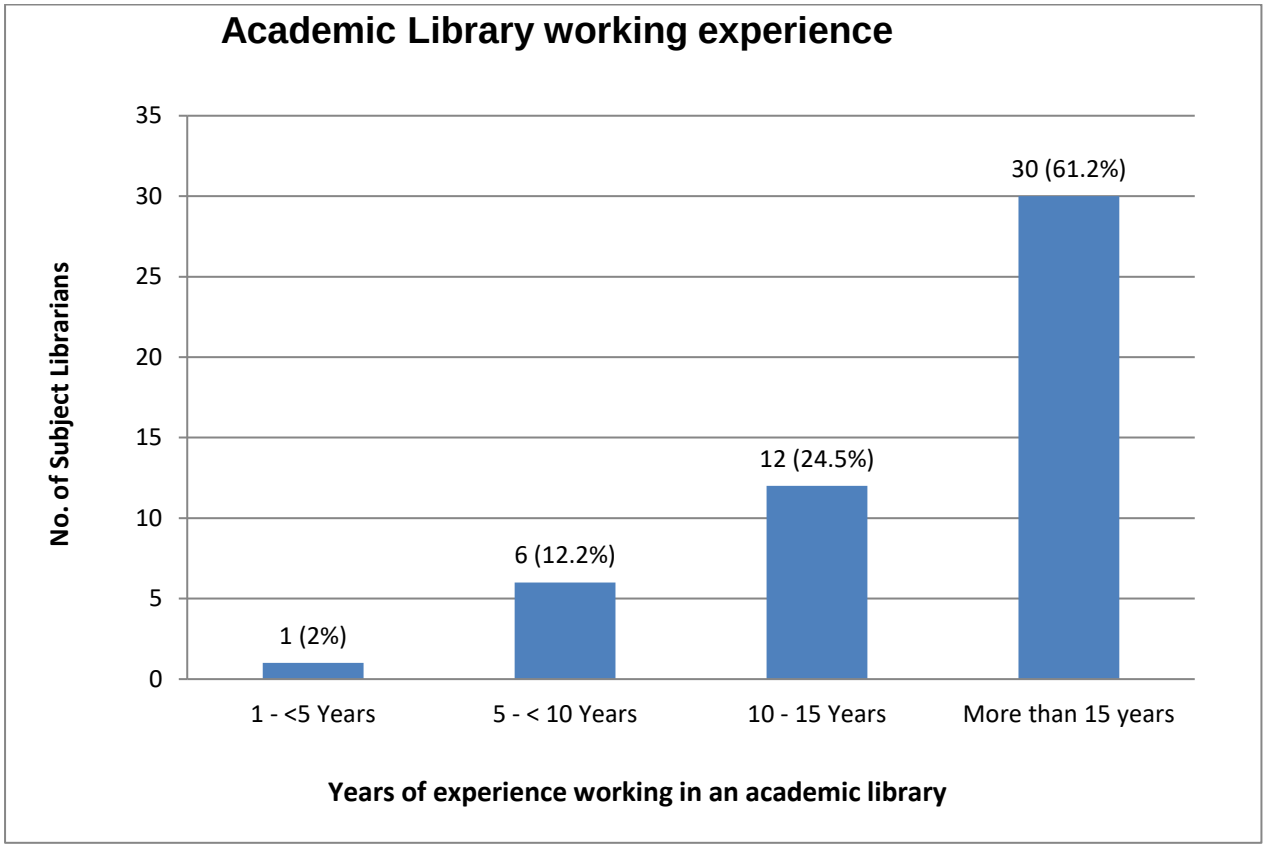


Figure 4.2: Work experience in an academic library

As shown in figure 4.2; thirty (61.2%) respondents have been working in an academic library environment for more than 15 years, twelve respondents have been working in an academic library for a period of 10-15 years, 6 respondents have been in an

academic library for 5 - <10 years and one respondent has been working in an academic library for less than five years.

4.2.1.3 Subject Librarian working experience

Respondents were asked to indicate their number years working as Subject Librarians. The findings from this question are presented in Figure:

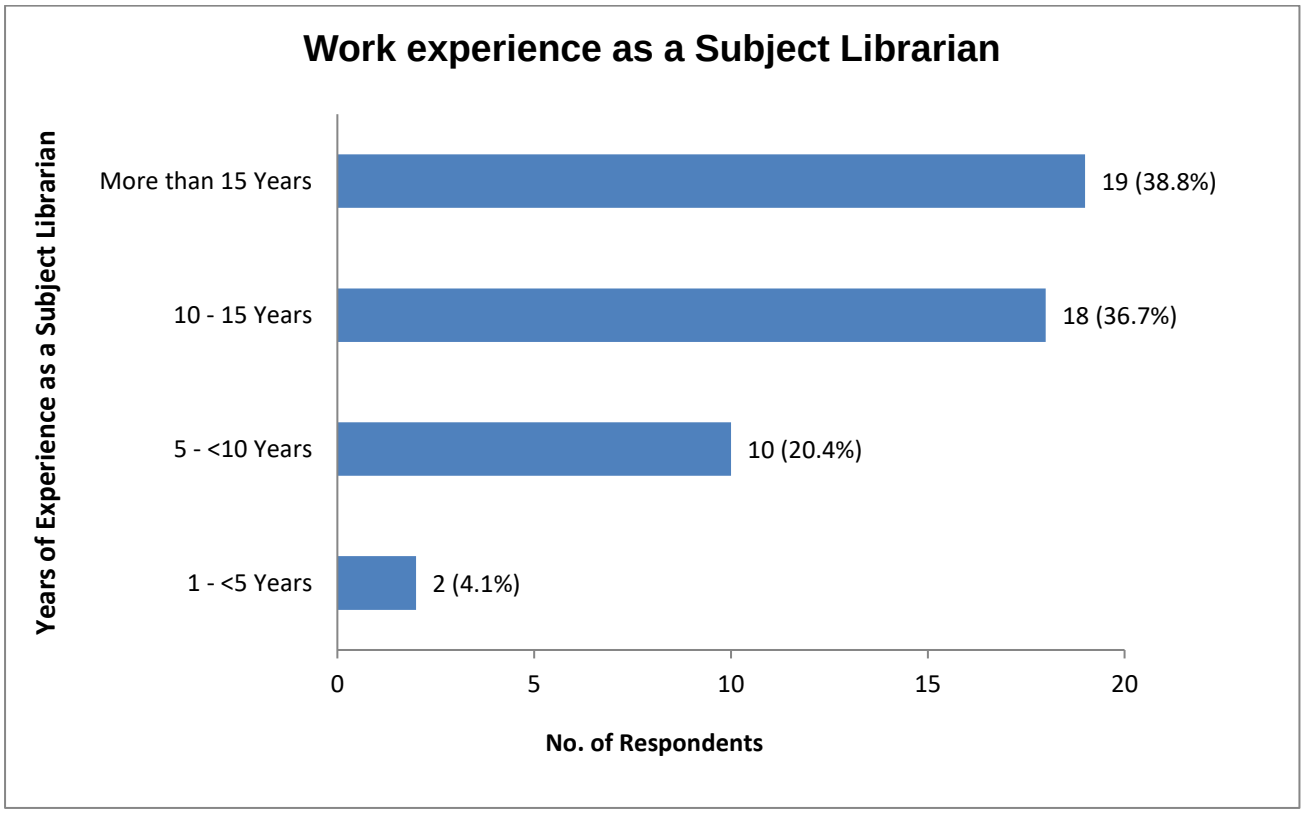


Figure 4.3: Work experience as a Subject Librarian

The findings in Figure 4.3 show a significant number of nineteen (19) (38, 8%) Subject Librarians have been in this role for more than fifteen years, with 18 (36, 7%) of them having been in the position for 10 to 15 years. At least two (4%) respondents have been in the Subject Librarian position for less than five years. In some cases, it is a good idea to preserve employees with a number of years of experience as a result of the commitment and dedication they put into their work, however, in other cases employees with many years of experience can sometimes end up too comfortable in their positions and be resistant to change (Beard and Land 2012: 239).Thus, in this

study, 19 (38, 8%) respondents have been in the Subject Librarian position for over 15 years.

All responses were beneficial to the study regardless of their academic library experience and experience as a Subject Librarian. Even so, it was more advantageous that 30 (61.2%) respondents had more than 15 years of experience in an academic library environment and 19 (38, 8%) respondents had over 15 years of experience as Subject Librarians. This indicates that respondents with many years of experience answered the survey questions from their comprehensive knowledge and experience. Nevertheless, the responses from respondents with less than 5 years of experience were also useful and necessary as they are believed to have been able to throw-in some new and fresh ideas to various issues as investigated in the study.

4.2.2 Academic Library Model

This study built on the five academic library classifications as suggested by Martin (1996: 160) to ask respondents to indicate the academic library model at their respective institutions. The sole purpose of this question was to explore the model that is currently adopted by academic libraries in KZN universities, and whether this model has any impact in Subject Librarians' digital literacy instruction. The most common academic library models are:

Faculty-liaison model where Subject Librarians partner with faculty to carry out resource-based teaching and learning; the *Dual model* whereby Subject Librarians only carried out subject work, the *Hybrid model* whereby Subject Librarians carried out both subject and non-subject work; the *Subject-centered model* whereby Subject Librarians teamed up with other library staff to perform library work on a subject basis; *Matrix management model* where Subject Librarians provide their services and expertise on an informal basis, across subject areas, instead of focusing on one fixed subject area to the exclusion of all others; and the *Digital model*: where the specialist information professional provides some or all of the Subject Librarian services solely through a digital environment.

Table 4.2: Academic library model

N=49

In your opinion, which academic library model best describes Subject Librarians at your university? (Select ONE option only)		
Academic Library Model	**No. of respondents**	**Percentage**
Faculty-Liaison	37	75.5
Subject centered	7	14.3
Dual Model	2	4.1
Hybrid- Model	2	4.1
Digital-	1	2.0
Total	49	100.0

Literature shows that terms such as “hybrid model” and “dual model” have been used to distinguish the current academic library models from that of the past. In contrary, Table 4.2 above shows that a significant 75.5% of respondents indicated that the faculty-Liaison model best describes subject librarians at their university. However, there is not one right library model for all, at least one (2%) respondent indicated that a digital model describes Subject Librarian at their university.

4.2.3 Job Description

A job description comprises of a written narrative that outlines the general duties and responsibilities of a particular position. Without a comprehensive job description, Subject Librarians would not be able to carry out their duties effectively. A solid and a clear job description ensures that Subject Librarians understand exactly what is expected of them, and it aligns them with the goals of their institutions. In this study, respondents were asked to indicate their level of agreement that they as Subject Librarians had a clear job description.

Table 4.3: Job description

N=49

Indicate your level of agreement that, as a Subject/Information Librarian you have a clear job description		
	No. of respondents	**Percentage (%)**
Strongly disagree	2	4.1
Disagree	1	2.0
Neutral	1	2.0
Agree	39	79.6
Strongly agree	6	12.2
Total	49	100.0

As shown in Table 4.3; there is significant agreement that subject librarians have a clear job description. At least 79, 6% of respondents agreed that they have a clear job description. For employees, job descriptions are important because they provide an understanding of duties and responsibilities of the position and highlight the employer's expectations for a particular position. For the management, the job description allows the determination of proper actions required to achieving the goals of the organization.

4.2.3.1 Digital literacy and job description

Table 4.4: Job description and digital literacy

N= 49

Does your job description include digital literacy?		
	No. of Respondents	**Percentage**
Yes	49	100.0
No	0	0

Having asked respondents if they have a clear job description, it was necessary to ask them if their job description included the concept digital literacy. This was to establish if respondents were knowledgeable of the concept being investigated.

Respondents were given an option of either 'YES' or 'NO'. As shown in *Table 4.4* above, all 49 respondents indicated that their job description included the concept of digital literacy. This therefore, was beneficial to the study as it implicates that respondents are knowledgeable of the concept of digital literacy as investigated in the study.

4.2.4 Digital literacy instruction

It is evident from the literature that digital literacy is a critical skill for university students in the 21st century. Digital literacy offers an opportunity to integrate the intellectual capital of the society sustainable development. Digital literacy instruction is the use of information and communications technologies for teaching and learning.

"Most incoming undergraduate students do not possess digital literacy skills to complete the required coursework that tertiary education requires" (King 2007: 60). Based on the findings of this study, it is argued that there are students who are originally coming from disadvantaged communities where there is limited to zero infrastructure such as libraries, computers and network connection, as such; these students will always need more assistance with regards to digital literacy. As a result,

it is essential for academic libraries to provide effective digital literacy trainings to their users.

4.2.4.1 Digital Literacy duties

Respondents were asked how often they carried out certain digital literacy duties which were listed in the questionnaire. The Linkert scale was used, having the following options for respondents to select: Never; less than once a month; at least once a month; at least once a week; at least once a day. The findings of this question are shown in the Table 4.5 below:

Table 4.5: Digital literacy duties

Digital literacy duties	Responses as Frequency (%)				
	Never	**Less than once a month**	**At least once a month**	**At least once a week**	**At least once a day**
Digital literacy instruction for students	1 (2.0)	4 (8.2)	***30 (61.2)***	11 (22.4)	3 (6.1)
Subject –specific digital literacy instruction for students	0	4 (8.2%)	**31 (63.3%)**	11 (22.4)	3 (6.1%)
Research support/consultations with staff/students	0	5 (10.2%)	**19 (54.3%)**	**16 (33%)**	9 (18.4%)
Literature searches for all students	0	0	**27 (55.1%)**	15 (30.6%)	7 (14.29%)
Library orientation/induction of students	1 (2.0%)	**26 (53.1%)**	**20 (40.82%)**	2 (4.1%)	0
Individual digital literacy training (students)	0	3 (6.1%)	**30 (61.2%)**	13 (26.5%)	3 (6.1%)
Classroom digital literacy training (students)	0	4 (8.2%)	**35 (71.4%)**	10 (20.4%)	0

Advanced digital literacy training (students)	0	2 (4.1%)	**37 (75.5%)**	8 (16.3%)	2 (44.1%)
Online digital literacy training (students)	0	2 (4.1%)	**33 (67.3%)**	11 (22.4%)	3 (6.1%)
Digital literacy promotion (students)	1 (2.0%)	4 (8.2%)	**36 (73.5%)**	5 (10.2%)	3 (6.1%)

Table 4.5 shows that all the digital literacy tasks listed are carried out at least once a month by a significant number of respondents. Furthermore, the digital literacy task of research support/consultations with staff/students is also carried out at least once a week by a significant 33% of the respondents. Another significant 53.1% of respondents indicated that they carry out the task of library orientation/induction of students less than once a month.

These findings are further detailed on the ranking table below:

Table 4.6: Ranking of digital literacy tasks

Digital literacy related tasks	**Rank order (frequency)**
Research support/consultations with staff/students	1
Literature searches for all students	2
Individual digital literacy training (students)	3
Online digital literacy training (students)	4
Subject –specific digital literacy instruction for students	5
General digital literacy instruction for students	6
Advanced digital literacy training (students)	7
Classroom digital literacy training (students)	8
Digital literacy promotion (students)	9
Library orientation/induction of students	10

Table 4.6 shows a ranking scale of 1-10; where one (1) represent tasks that are carried out most often and 10 means tasks that are carried out less often.

From Table 4.6, it is evident that research support/consultations with staff/students; and literature searches for all students, are tasks that are carried out most often. The library orientation/induction of students is the only task that is carried out less often, as per the ranking order displayed on the table above.

4.2.5 E-learning

E-learning is a digital platform that allows students to access a variety of learning resources, such as discussion forums, assessments, content repositories, and document-sharing systems.

4.2.5.1 Subject Librarians' involvement in e-learning

E- Learning, especially in the form of web-based technologies, is increasingly used by many universities to teach their students, mainly because it lowers the cost of delivering contact-based trainings, increases the flexibility of learning in terms of place and time, encourages self-management of learning and enables on demand training. Considering the fact that many universities around the world have also adopted e-learning as another method for teaching and learning, it was a necessity for this study to ask the respondents about their involvement in the e-learning. With this question, the study wanted to find out if respondents were involved in e-learning in their respective institutions. The findings for this question are presented in Table 4.7 below:

Table 4.7: Subject Librarians' involvement in the e-learning

Item	Frequency (%)		**No. of respondents**
	Yes	**No**	
Are you involved in e-learning at your university?	37 (76%)	12 (24%)	49

The results from Table 4.7 above show that a significant 76% of respondents were involved in e-learning at their respective universities.

4.2.6 Details of Subject Librarians' involvement in e-learning at their university

This question was only applicable to those respondents who indicated that they are involved in e-learning at their university. E-learning is a form of instruction by an online approach other than the face-to-face mode, there is physical separation between the instructor and the student, and instruction takes place through a variety of ways including digital media. E-learning is a generally the use of ICT resources for teaching and learning. This implies that, digital literacy is imperative in running the e-learning programmes, as e-learning is mainly technology driven. When designing e-learning, the technological features of information and communications technology should be put into consideration. The objective of this study was to ascertain ways in which Subject Librarians use ICTs in digital literacy instruction. In order to achieve this objective, it was paramount for the study to ask the respondents to explain their involvement in e-learning at their university, thereby detailing the ways through which they use Information and Communications Technology in their online literacy training. The open-ended responses were grouped together according to their similarity and summarized as follows:

Of 37 respondents, 35 (95%) of them reported that they are involved in e-learning by conducting their literacy classes remotely, utilizing various online platforms as recognized by their institutions:

> *"We support the teaching and learning programme in whatever format is required; do library training in resources online through MS Teams".*
>
> *"Our department makes use of the Blackboard eLearning channel as a platform to share our library instructions to the University as a whole. We also put videos, MS PowerPoint etc".*
>
> *"Involve in supporting the academics and uploading needed information on the VLE*
>
> *"Library support is embedded the electronic teaching management systems in the case of UKZN it is Moodle (Learn@UKZN)".*

"I utilize Blackboard eLearning and MS Teams as platforms recognized and approved by the university to share our library instructions to students. I conduct my digital literacy sessions and other literacy related consultations online".

What was common among 35 respondents was that they all conduct their literacy instruction online; either via Microsoft Team; Moodle; Blackboard eLearning; or VLE.

One respondent explained that their involvement on the eLearning is based on training students to access resources and to supervise thesis projects: *"I am involved by training students to access and use e-resources. I also supervise thesis projects".*

Another respondent indicated that his/her involvement in e-Leaning was brought and enforced by the Corona Virus Pandemic, and they were left with no choice but to utilize online platforms to engage with students:

"The corona virus pandemic forced us to fully embark on the online learning where we conduct our training sessions and consultations remotely, through various recognized platforms".

4.2.7 Importance of digital literacy

Among the most prominent views of digital literacy today is that "digital literacy may be understood as an inter-related set of skills or competencies necessary for success in the digital age" (List 2019: 147). Digital literacy is a vital life skill in the current technologically oriented society. This study wanted to establish whether Subject Librarians in academic libraries in KZN acknowledge the importance of digital literacy among students. Respondents were asked to indicate their level of agreement that digital literacy among students is important. The findings to these questions are presented below:

Table 4.8: Importance of digital literacy

Indicate your level of agreement that digital literacy among students is important		
	Frequency	**Percentage**
Strongly disagree	3	6.1%
Disagree	0	0%
Neutral	0	0%
Agree	35	71.4%
Strongly agree	11	22.4%
Total	49	100%

Table 4.8 shows that there is a significant agreement that digital literacy among students is important. At least 71.4% of respondents indicated that they are in agreement with the importance of digital literacy among students. Eleven participants (22%) indicated their strong agreement regarding the importance of digital literacy among students. In contrast, 6% indicated their strong disagreement that digital literacy among students is important.

4.2.8 Usage of ICT in digital literacy instruction

Perhaps some respondents may not be involved in e-learning at their institution, but still use ICTs in their digital literacy instruction. Therefore, it was a necessity for the study to ask respondents whether or not, they use ICTs in their digital literacy instruction. The findings for this question are presented in Table 4.9:

Table 4.9: Usage of ICT in digital literacy instruction

Do you use ITCs in digital literacy instruction?		
	Frequency	**Percentage (%)**
Yes	48	98.0%
No	1	2.0%
Total	49	100%

As shown in Table 4.9, 48 (98%) Subject Librarians use ICT in their digital literacy instruction. Only one (2%) Subject Librarian indicated that he/she does not use ICTs in digital literacy instruction.

4.2.8.1 How often do you use ICT in digital literacy instruction?

The purpose of asking this question was to establish the extent to which Subject Librarians use digital literacy in their digital literacy instruction. This question was only applicable to respondents who indicated that they use ICTs in their digital literacy instruction. Respondents were given options to indicate whether they use ICTs in all digital literacy classes, in most digital literacy classes or in a few digital literacy classes. The results are presented:

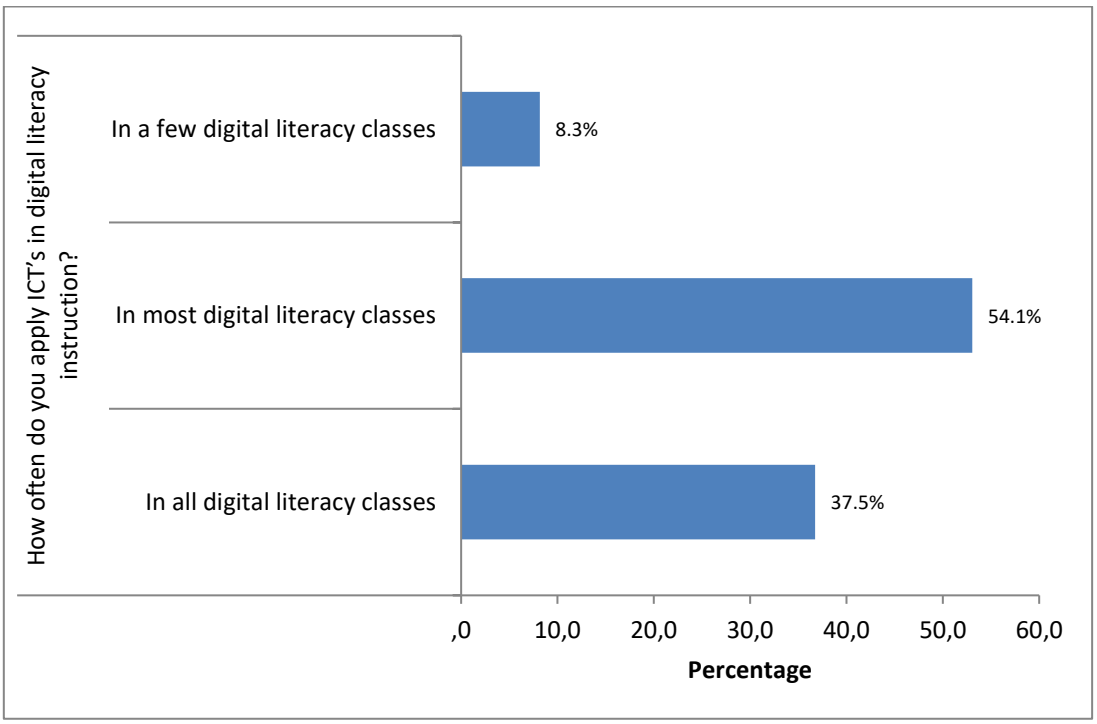


Figure 4.4: The extent to which ICT is used in digital literacy instruction

As shown in Figure 4.4, of 48 respondents who indicated that they use ICT in digital literacy classes, at least 26 (54.1%) of respondents use ICTs in most digital literacy classes; 18 (37.5%) of them use ICT in all digital literacy classes. Four (8.3%) respondents indicated that they only use ICT in a few digital literacy classes.

4.2.9 Challenges of digital literacy instruction

Respondents were asked to indicate whether they experience any challenges when carrying out digital literacy instruction. Respondents had to select either a ‘YES’ or ‘NO’ from options that were provided. The findings to this question are presented below:

Table 4.10: challenges of digital literacy instruction

Do you experience any challenges when carrying out digital literacy instruction?		
	Frequency	**Percentage (%)**
Yes	24	49.0%
No	25	51.0%
Total	49	100.0%

As shown in Table 4.10, 25 (51%) of respondents indicated that they experience challenges when carrying out digital literacy instruction. Twenty-Four (49%) respondents indicated that they do not experience any challenges when they carry out digital literacy instruction.

4.2.9.1 Challenges associated with digital literacy

As with any other library instruction, digital literacy also comes with challenges. This question only applied to respondents who indicated that they do experience challenges when carrying digital literacy instruction. Respondents were given list of challenges on a scale and then had to indicate their level of agreement on whether they experienced any of the challenges that were listed. Findings to this question are presented below in a scale of 1 to 5, where 1, 2, and 3 represent the significant disagreement, whereas 4 and 5 represent the significant agreement.

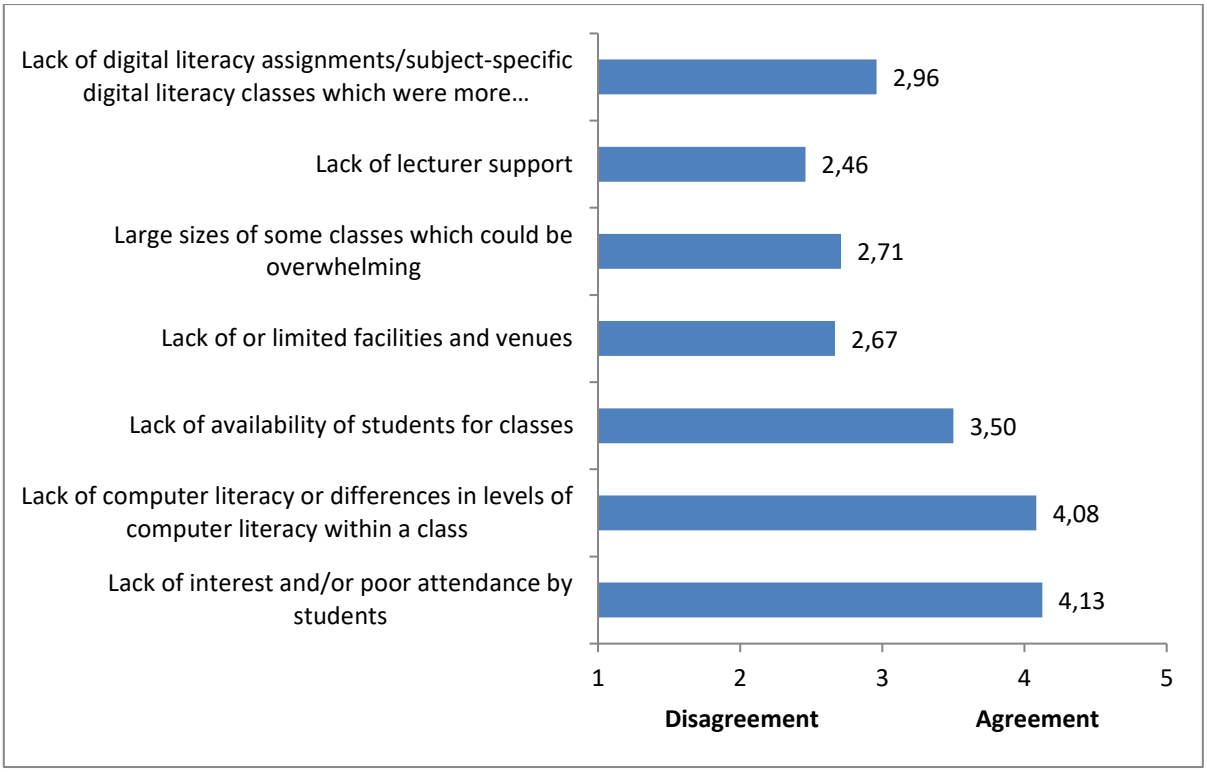


Figure 4.5: Challenges associated with digital literacy

As shown in Figure 4.5, there is a significant agreement that among challenges experienced by respondents when carrying out digital literacy instruction; the following are challenges which are mostly experienced:

- *"Lack of interest and/or poor attendance by students"*
- *"Lack of computer literacy or differences in levels of computer literacy within a class"*

However, the Figure 4.5 further shows a significant disagreement that the following challenges are experienced by respondents when carrying out digital literacy instruction:

- *"Lack of or limited facilities and venues"*
- *"Large sizes of some classes which could be overwhelming"*
- *"Lack of lecturer support"*
- *"Lack of digital literacy assignments/subject specific digital literacy classes"*

4.2.10 Skills of Subject Librarians

Digital literacy skills are necessary to work and manage electronic library infrastructure and services. Accordingly, there is an “urgent need for assessing the level of digital skills among librarians at academic libraries” (Hamad, Al-Fadel and Fakhouri 2020). Respondents were asked about their management; interpersonal; and technological skills as to which one they possessed and which they believed are important to have.

4.2.10.1 Skills that Subject Librarians should possess

The survey listed various interpersonal skills and asked respondents on a 5-point agreement scale to indicate their level of agreement on whether they agree or disagree that Subject Librarians needed the skills that were listed. The findings to this question are presented in *Figure 4.6* in a scale of 1 to 5; where 1, 2, and 3 represent the significant disagreement; 4 and 5 represent a significant agreement.

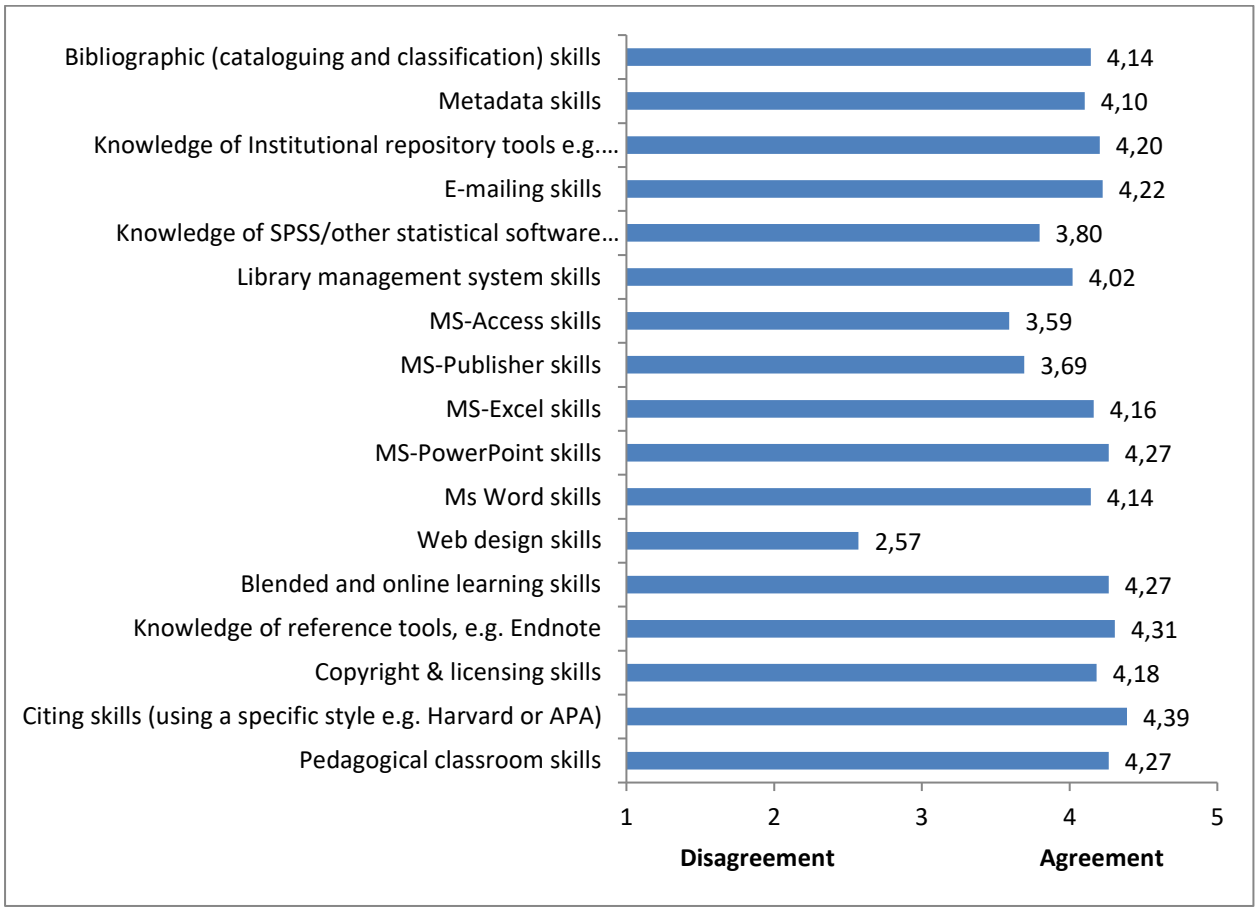


Figure 4.6: Skills that Subject Librarians should possess

With an exception for MS Publisher skills, *MS* access skills and Web design skills, there is a significant agreement that it is very important for Subject Librarians to possess all other skills listed. The Figure 4.6 further shows the significant level of disagreement that Subject Librarians should possess web design skills.

4.2.10.2 Competency levels

The survey listed a number of interpersonal and management skills and asked respondents to rate their level of competence in a scale of 1 to 5, where 1= not at all competent and 5= extremely competent. The findings to this question are presented below. Skills in the table below are grouped into 3 sections. First section: skills with a significant competency level (1- 10). Second section: skills which are neither competent nor incompetent (11-12). The third section: skills with a significant lack of competency (13 to 17).

Table 4.11: Competency levels in various management and digital literacy skills

Skills	Competency level	Rank
Ms Word skills	4.02	1
E-mailing skills	4.00	2
MS-PowerPoint skills	3.98	3
Citing skills (using a specific style e.g. Harvard or APA)	3.92	4
Blended and online learning skills	3.76	5
Pedagogical classroom skills	3.69	6
Knowledge of reference tools, e.g. Endnote	3.67	7
MS-Excel skills	3.51	8
Knowledge of Institutional repository tools e.g. DSpace	3.51	9
Bibliographic (cataloguing and classification) skills	3.33	10
Copyright and licensing skills	2.90	11
Metadata skills	2.78	12
Library management system skills e.g. Millennium, ITS	2.55	13
Knowledge of SPSS/other statistical software packages	2.23	14
MS-Publisher skills	2.16	15
MS-Access skills	2.14	16
Web design skills	1.65	17

As shown in Table 4.11, out of 17 management and interpersonal skills that were listed on the survey, at least in 10 of them, Subject Librarians indicated a significant level of competency. Whereas in 5 of them; they indicated a significant level of incompetency.

4.2.10.3 Necessary skills

The questionnaire listed various management; interpersonal & technical skills, respondents were asked to indicate their level of agreement that it is necessary for Subject Librarians to possess all the skills that were listed. The findings to this question are presented in a chart below, in a scale of 1 to 5; where 1, 2, 3 represent significant disagreement; 4 and 5 represent significant agreement:

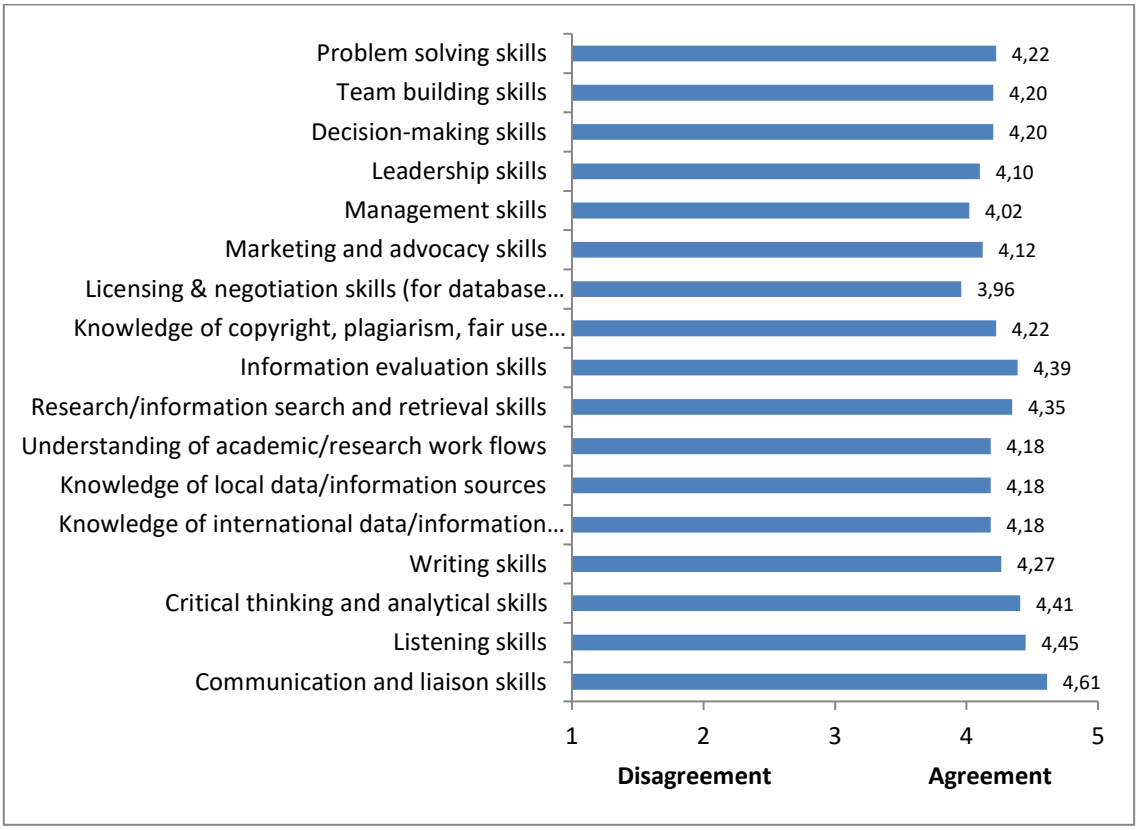


Figure 4.7: Skills that are necessary for Subject Librarians

As shown in Figure 4.7, there is a significant agreement that it is necessary for Subject Librarians to possess all the management, personal and technical skills that were listed.

4.2.11 Subject Librarians' collaboration with faculty staff

As previously discussed, the literature implies that the successful implementation of digital literacy instruction is dependent upon the effective collaborative effort between Subject Librarians, academic staff, and relevant stakeholder. Therefore, it was a necessity for the study to ask respondents if they collaborate with faculty staff to carry out digital literacy instruction. Respondents were given options to select either a 'YES' or 'NO'. The findings for this question are presented below:

Table 4.12: Subject Librarians' collaboration with faculty staff

Do you collaborate with faculty academics in the digital literacy instruction?		
	Frequency	**Percentage (%)**
Yes	47	95.9%
No	2	4.1%
Total	49	100.0%

As shown in Table 4.12, 47 (95.9%) of the 49 respondents indicated that they collaborate with faculty staff to carry out digital literacy instruction.

Only two (4.1%) respondents indicated that they do not collaborate with faculty staff to carry out digital literacy instruction.

4.2.11.1 The extent of collaboration

The study wanted to measure the extent to which Subject Librarians collaborate with faculty staff. As such, respondents were asked how often they collaborate with faculty staff. This question was only applicable to respondents who indicated that they collaborate with faculty staff in their digital literacy instruction. Respondents selected from *never; less than once a month; at least once a month; at least once a week; at least once a day*. As shown below:

Table 4.13: The extent of collaboration

N= 47

How often do you collaborate with faculty academics in the digital literacy instruction?			
	Observed N	**Expected N**	**Residual**
Never	0	0	0
Less than once a month	20	15.7	4.3
At least once a month	22	15.7	6.3
At least once a week	5	15.7	-10.7
At least once a day	0	0	0
Total	47		

As shown in Table 4.13, of the 47 respondents who indicated that they collaborate with faculty staff, 22 respondents indicated that they collaborate with faculty staff as least once a month. 20 respondents indicated that they collaborate less than once a month. However, fewer than expected (5) indicated that they collaborate with faculty staff at least once a week.

4.2.11.2 Successful faculty-librarian collaboration

Having established the extent to which Subject librarians collaborate with faculty staff in their digital literacy instruction, the study went on to ask the respondents whether their collaboration with faculty staff was successful or not. This question was also applicable only to respondents who indicated that they collaborate with faculty staff in their digital literacy instruction. Respondents were asked to rate how successful their collaboration with faculty staff was. Respondents were provided options to select from, in a scale of 1= not at all successful to 5= extremely successful. The findings to this question are presented below:

Table 4.14: Rating scale: successful collaboration between Subject Librarians and faculty staff

Rate how successful your collaboration generally is?		
	Frequency	**Percentage (%)**
1	0	0%
2	2	4.3%
3	13	27.7%
4	29	61.7%
5	3	6.4%
Total	47	100.0%

As shown in Table 4.14 there is significant success in Subject Librarians' collaboration with faculty staff.

4.2.12 Digital literacy instructions by faculty staff

As discussed in the literature, Subject Librarians around the world believe that it is also important for faculty academics to carry out digital literacy instruction. The study wanted to find out if Subject Librarians in KZN universities believe whether faculty staff should also carry out digital literacy instruction or not. Using an agreement scale, respondents were asked to indicate their level of agreement that faculty staff should teach digital literacy skills. The results to this question are presented below:

Table 4.15: Should Faculty academics teach digital literacy?

N= 49

Indicate your level of agreement that faculty academics should teach digital literacy skills		
	Frequency	Percentage (%)
Strongly disagree	1	2.0%
Disagree	0	0
Neutral	2	4.1%
Agree	43	87.8%
Strongly agree	3	6.1%
Total	49	100.0%

As shown in Table 4.15 there was a significant agreement that faculty staff should teach digital literacy skills. At least 87.8% of respondents were in agreement that digital literacy instruction is also an equal responsibility of faculty staff.

However, one (2%) respondent was in a strong disagreement that faculty staff should also teach digital literacy skills.

4.2.13 Additional comments, suggestions, or concerns with regards to Digital literacy

Respondents were given an opportunity of cast their comments, suggestions or any concerns regarding digital literacy. Twenty-one respondents of a total of 49 respondents did not answer this question, whereas eight respondents reported that they did not have any comments. One respondent raised an alarm that their responses and comments might have been made taking into account the environment that Subject Librarians found themselves operating under.

> *"Please note that the comments and selection of the responses were made taking into consideration the current environment librarians find themselves operating under the pandemic."*

However; at least twelve respondents provided positive and constructive comments regarding the concept of digital literacy. These comments are grouped together below, based to their similar or common patterns.

4.2.13.1 Digital literacy skills

Some respondents felt that although various training workshops are offered for Subject Librarians, there is more that needs to be done. They believe that more digital literacy training is needed for Subject Librarians. They felt that this will make them relevant in the 21st century and allow them to provide relevant and proper digital literacy trainings for students.

> *"As the use of digital resources continues to rise within institutions of higher learning in the advent of Multimodal learning, digital literacy skill is a basic requirement for students to function effectively in the institutional level and*

broader information society. Therefore, this calls for more and more digital literacy training for subject Librarians, so they provide proper and relevant digital literacy trainings."

"Library management should arrange several ICT trainings for Subject librarians so as to enable them to be more relevant in the 21st century".

"Subject Librarians require more workshops for digital literacy skill developments".

"There is a need for library management to arrange professional development and relevant digital literacy training for subject librarians in order to educate them so they can further train their students to be digital citizens."

4.2.13.2 University Curriculum

Three respondents felt that, somehow the academic curriculum needs to be revised so that it can be inclusive of digital literacy. Although academic libraries are reported as perfectly suited for the student literacy development, as noted by Murray and Perez (2014); respondents felt that Universities should not only rely on Subject Librarians for the student literacy development. They felt that there should be a module specializing in digital literacy, and be lectured by faculty academics.

"I believe that digital literacy is one of the most important skills for students in the fast-growing knowledge society. Universities should make efforts to strongly cultivate the development of digital literacy skills through institutional curriculum so that lecturers can also focus on teaching digital literacy skills."

"I think that university curriculum will somehow need to be revised and made to be inclusive of digital literacy skills training for students in higher education since digital literacy is the cornerstone and foundation for using Information and Communications Technologies and it is part and parcel of information retrieval."

"In my opinion, universities should not rely only on subject librarians to teach students digital literacy skills, but it should also be introduced in the institution's curriculum."

4.2.13.3 Faculty librarian collaboration

One respondent pointed out the importance of Faculty-Librarian collaboration. S/he mentioned that Subject Librarians rely on Faculty staff in the successful implementation of digital literacy instruction.

> *"Librarians depend on academics for successful implementation of literacy classes"*

4.3 Qualitative data analysis

This section analyses the second phase qualitative data which was collected by means of interviews. The qualitative interviews were used to clarify and expand some of the aspects brought by the quantitative results. Most importantly, interviews were used to answer the following related research question:

- How Subject Librarians are using information and communication technology for digital literacy instruction in academic libraries in KwaZulu-Natal?

In traditional universities, 35 respondents responded to the survey and returned their consent forms. Therefore, they were eventually included to the qualitative sample. In universities of technology, fourteen respondents answered the survey and returned their consent forms, and they were eventually included in the sample. This, therefore, made a total of 49 respondents who were regarded as a qualitative sample.

The researcher intended to interview 49 respondents who participated in the online survey and further regarded as a sample for second phase of data collection. Emails were sent to the 49 respondents to request their participation in the second phase of data collection. However, due to the poor response to the call for second phase participation, numerous follow-up emails were sent to respondents, but the researcher managed to secure only ten participants who eventually made a final sample for second phase data collection.

The interviews were intended to provide an in-depth and expanded view of the questionnaire responses. Results were analyzed using Microsoft Word. Data was grouped and then coded thematically, to create tables representing the responses received. The interview schedule was designed based on the first objective of the study which is to ascertain ways in which Subject Librarians use ICTs for digital literacy

instruction in academic libraries in KwaZulu-Natal; and based to the questions from the quantitative responses that needed to be further explored and clarified. In the following analysis, the abbreviation 'SL' is used to refer to Subject Librarians who were interviewed in this study.

4.3.1 The use of ICT in digital literacy classes

Respondents were asked whether the use of ICT in their digital literacy classes has been helpful. During the coding process, four themes emerged to justify that using ICTs in digital literacy instruction has been helpful. Those themes are: effective teaching and learning; Information searching and lesson planning; understanding ICTs; and effecting communication.

4.3.1.1 Effective teaching and learning

The use of ICTs in digital literacy instruction is very helpful in promoting effective teaching and learning. Respondents pointed out that when ICTs are used for digital literacy instruction, sessions become interesting and more enjoyable by students. Students interact best with ICTs; therefore, it is much easier for them to understand the content of the lesson if ICTs are used for teaching and learning. The use of ICTs in digital literacy instruction has a potential of stimulating Subject Librarians' confidence in teaching digital literacy. Responses to this theme are displayed in the table below:

Table 4.16: Interview responses about effective teaching and learning

Subject Librarian Code (SL)	***Response shared***
SL1	*"Yeah, it's for me. It's been extremely helpful uhm! I've been using it to teach information literacy and integrated it quite well into my programs".*

SL4	*"Yes I can definitely say that ITC has been very helpful in my digital literacy instruction. In my own opinion ICTs helps us to conduct our literacy instruction more confidently".*
SL5	*"…but using it (ICTs) for the purpose of teaching, it makes our classes more interesting and interactive….So, you will definitely want to teach using the internet, ICTs and all, because we want to change, improve and add new dimensions to our teaching…"*
SL6	*"ICT present a number of tools and methods that Subject Librarians can use to display as part of teaching and help to interact with students and engage them in a more meaningful manner".*
SL7	*"Using ICT has been very helpful, not only in digital literacy instruction, but even in general teaching and learning as well. The use of ICT for teaching and learning makes our literacy instruction more interesting, easier and more diverse, more fun for us and students and more enjoyable and motivating".*
SL8	*"Yeah I can say that ICT has been helpful. It helps us perform our teaching better…"*
SL9	*"Yes it has been. I mean I can present materials better to my students. For example, by having a projector, students can learn more because it is more interesting".*
SL10	*"Yes I can say that using ICT has been helpful. I also think that ICTs can often provide entertaining way to teach certain concepts".*

4.3.1.2 Information searching and lesson planning

The use of ICTs in teaching and learning has a potential of motivating students towards learning and attending sessions regularly. This therefore suggests the importance of making ICTs to be part of students' learning experience. Subject Librarians can use information and communications technology to explore various teaching and learning strategies which in turn play a key role in developing students' digital skills. The findings from interviewees confirmed that using ICTs for digital literacy instruction is helpful as it assists Subject Librarians in planning and developing their lessons and teaching materials. The ability to use ICTs properly increases the quality of activities assigned to students. Using ICTs provide value in teaching and also makes information searching to be very convenient. The responses of Subject Librarians regarding information searching and lesson planning are displayed in the table below:

Table 4.17: Interview responses about information searching and lesson planning

Subject Librarian Code	***Response shared***
SL4	*"We utilize it (ICTs) in our lessons planning; we search for information in various databases".*
SL5	*"I use ICT to even increase the quality of activities that I assign to students, because, in most cases, students interact best with ICTs".*
SL6	*"ICTs give us (Subject Librarians) the opportunity to transform the way learning happens, which in turn enable the student development".*
SL7	*"I use ICT to structure my teaching materials. For example, when I prepare for my lessons, I make enough research by consulting various databases, and make research about whatever topic I will be covering on a particular day".*

SL8	*"…. (ICTs) also makes it easy and more convenient for us (Subject Librarians) to prepare our learning materials".*
SL10	*"Yeah, it has been helpful. I use ICTs for developing my lesson, delivering content and sharing content".*

4.3.1.3 Understanding ICTs

Respondents believe that the ability to successfully use ICTs in digital literacy instruction is dependent upon one's attitude towards ICTs. They believe that if you like ICTs then you will integrate it quite well in your instruction. Developments in Information and Communications Technologies always bring positivity. For Subject Librarians to be able to successfully use ICTs in their digital literacy instruction, they first have to believe in the potential and positivity that ICTs have to bring to their digital literacy instruction. There are many ICT resources available for utilization in the teaching and learning process, however, understanding how ICTs can be used for teaching and learning is very important. Responses to this theme are illustrated in the table below:

Table 4.18: Interview responses about understanding ICTs

Subject Librarian Code	***Response shared***
SL2	*"You see, most probably, in order to be able to use the ICT for successful teaching, you need to know how to utilize various ICT resources and be able to know how to access various services available even over the internet. As for me, the use of ICT in my classes has been successful simply because, I really believe in the ICTs. I really believe that ICT is a new way of doing things. You know you've got to love this thing so that it can successfully work in your favour".*

SL3	*"Absolutely yes; every new development in ICTs comes with benefits and so much positivity. But however, it is not just computers alone that make a difference and a huge benefit in digital literacy instruction but understating how they are used is important. You will not be able to use UCTs if you do not understand them, so for me, I do understand a few ICT resources, mostly the ones that are relevant for teaching and learning. So yes, the use of ICT in my literacy classes has been most useful".*

4.3.1.4 Effective communication

Information and communications technologies play a big role in the way we communicate in our everyday life. Two (2) respondents mentioned that using ICTs allows them to communicate effectively with students. In general terms, participants linked their communication to technical communication skills, which include ICT related techniques and procedures used for effective teaching and learning. Responses to this theme are displayed in the table below:

Table 4.19: Interview responses about effective communication

Subject Librarian Code	***Response shared***
SL6	*"…using ICTs has been helpful in my digital literacy classes, and not only digital literacy classes, but even in my interaction with students".*
SL10	*"…. I use it (ICT) for communication with my students, creating and delivering presentation…"*

4.3.2 Ways of using ICT in digital literacy instruction

As previously mentioned, ICTs have become an integral tool in the enhancement of Teaching and Learning, and it can be used as a tool for acquisition of digital literacy skills. Nevertheless, ICTs cannot be able to enhance teaching and learning; and effectively promote digital literacy skills if not used properly. This view is further supported by the third respondent (Table 4.18 SL3) who mentioned that it is not just ICTs alone that make a difference, but the manner through which it is used is of utmost importance. It is with the same reasons that this study asked a question to explore the manner in which Subject Librarians use ICTs in digital literacy instructions.

Furthermore, this question was asked in respect to the objective of the study which is *to ascertain ways in which Subject Librarians use information and communication technologies for digital literacy instruction in academic libraries in KwaZulu-Natal.*

The fourth respondent (SL4) explained that ICTs offer various teaching methods which can be adopted to enhance students' retentive memory.

> *"With ICT, for example, various teaching methods can be used to teach and enhance student retentive memory; we can easily explain complex instructions and ensure comprehension for students; we (Subject Librarians) can create interactive classes and make lessons more enjoyable, which could improve student attendance and concentration. ICT can also improve the creativity critical thinking and analytical skills of the students" (Interviewee 4).*

It is evident from the interview responses that there are many ways to use ICT in digital literacy instruction. For example, the 3rd interviewee (SL3) mentioned a personal computer as a way of using ICT in digital literacy instruction. She explained that she uses her computer for information searching with a purpose of retrieving materials from the internet for digital literacy instruction preparation. The same sentiment was shared by the fourth interviewee (SL4) who mentioned that she uses internet and other educational ICT resources to plan and prepare her lessons. She suggests that this practice affords students different ways to learn, engage and better understand the content of the lesson. Similarly, the seventh interviewee (SL7) pointed that with the advent of ICTs they do not have to rely on print-based materials for educational needs, because ICTs provide many opportunities including using internet and databases to

access many learning materials. These responses are further displayed in the table below:

Table 4.20: Interview responses about ways of using ICTs

Subject Librarian Code	***Response shared***
SL3	*"I use my computer to search for information, to look for other materials from the internet in preparation for my literacy instruction".*
SL4	*"I use the internet and other educational technology resources to plan and prepare my lessons because they also provide different ways for students to learn; engage and even understand better the content of the lesson".*
SL7	*"In the advent of ICTs, we no longer have to rely on solely on print based materials and all other physical materials for our educational needs. We use the internet and databases to access the vast learning materials. Take for example; previously I used to make print based copies for my lesson notes. I had to hand out these copies to students. With ICT, we no longer have to write on the board or even hand out printed copies for our lessons, but rather, we are using our laptops to create PowerPoint presentations and project them during our sessions".*

The perfect use of ICT in digital literacy instruction can help to explain complex lessons and ensure comprehension for students. Interview responses to this question are further discussed below under two themes that emerged, namely: Multimodal learning; communication and dissemination of information.

4.3.2.1 Multimodal learning

It is an undeniable fact that there are many ways to learn. Sometimes some students would remember everything they read, whereas others may prefer to watch something to be able to replicate it perfectly. Sometimes for other students, seeing videos or pictures is the best way to get through to them. For the context of this study, multimodal learning is a method and a strategy that mostly relies on the use of a variety of media and ICT related teaching tools, particularly Learning Management Systems (LMS) in digital literacy instruction. Multimodal learning system gives students the best opportunities to learn. While it can be pretty much easier to instruct in one mode of teaching and learning, like presenting the session style, or relying mainly on reading out of notes, a multimodal learning offers many benefits to students. It helps students to learn in a variety of ways. When interviewees were asked about ways in which they use ICTs in digital literacy instruction, the first interviewee (SL1) mentioned a blended approach to teaching and learning as a manner he uses ICT in digital literacy. SL1 mentioned using Library guides (Libguides) to embed videos, put content like PowerPoint presentations and PDFs. The second respondent (SL2) mentioned Blackboard discussion forum as a way they use ICTs whereby they post a topic of discussion and allow students to engage on that topic.

Other interviewees associated their ways of using ICTs with online learning. Microsoft Teams and Moodle were identified as effective platforms for online teaching and learning. LCD Projectors was also one of the way Subject Librarians use ICTs in their digital literacy instruction. One interviewee mentioned Question Pro which is software mainly used for designing surveys as another method of using ICTs in digital literacy instruction. These findings are further detailed below:

Table 4.21: Multi-modal teaching and learning strategy and number of occurrences

Multimodal teaching and learning strategy	Number of occurrences
MS Teams	3
Blackboard Learning	2
Moodle	5

Subject Guides or Library Guides	2
LCD Projector	1
PowerPoint presentation	3
Question Pro	1

Table 4.21 show the Multimodal learning strategies that Subject Librarians mentioned as ways through which they use ICTs in their digital literacy instruction. It is evident that Subject Librarians use ICTs in their digital literacy in many ways. As shown in the table, five respondents mentioned Moodle as one of the ways they use ICT in digital literacy instruction. It is believed that using ICTs in various ways to carryout digital literacy instruction, students can get a complete and remarkable grasp of the lesson. The similar view was shared by SL9 who mentioned that the benefits of using ICTs in digital literacy instruction are most dominant in the multimodal learning. The advantages of using ICTs in various ways for digital literacy instruction are its flexibility, allowing students an easy access to information, and their ability to promote collaborative learning. Interview responses regarding multimodal learning are displayed in the table below:

Table 4.22: Interview responses about multi-modal teaching and learning

Subject Librarian Code	***Response shared***
SL1	*"…I've been using a blended approach in teaching information…. I know, you know, or you should know about Lib-guides, so I was putting or embedding videos on the Lib-guides. I was embedding tutorials. I was putting content like PowerPoint presentations and PDF's. And I was teaching students in the class simultaneously, and then they had to go outside the class and actively engage with the content. And then there were quizzes that I put on, etc".*

SL2	*"I use various learning management systems and digital communication technologies like Moodle, MS Teams in order to arrange assessments and conduct teaching. Back then; even before we were forced by Covid-19 to strictly use remote teaching, I have been involved in multimodal learning because I used Blackboard system mostly if there was a topic that I wanted students to discuss".*
SL4	*"I use a variety of ICT tools, including video, e-mail, video conferencing, PowerPoint and interactive whiteboard to teach".*
SL6	*"In many occasions, I use ICT in digital literacy classes in various ways, for example, I normally upload videos on Moodle so that students can watch them and thereafter engage on whatever is discussed on that video. I also use videos if maybe there is a concept that I want to explain better. I have come to realize that students interact best with videos".*
SL7	*"I can associate my use of ICT in digital literacy instruction with remote learning and teaching. I use MS Teams and Moodle to carry out my ICT sessions. I also use ICT to access remote learning resources. In the advent of ICTs, we no longer have to rely solely on print-based materials and all other physical materials for our educational needs…. we are using our laptops to create PowerPoint presentations and project them during our sessions".*
SL8	*"I use ICTs as presentation tools through LCD projectors, MS Teams and Moodle platforms, where*

	students simultaneously view the same resources on computer screens".
SL9	*"The benefits of using ICT are most dominant on the multimodal learning, mostly now in the presence of the pandemic which forces us to be fully online. We find ourselves having to adopt and employ several ways of using technology to teach. I use ICT resources to engage with students, embark on online teaching and learning. I upload online materials; communicate with students using various remote methods."*
SL10	*"There are so many ways you can use Technology for Teaching. For example; I did something on Question pro, which is software and I basically asked students about the approach that I was using and they were happy with it. And then I was using lots of the learning management systems as well, so it was Blackboard initially and then it was Moodle. So I created links straight from the module. So it was a module called say technical literacy for engineering students. Uh, there was a link to the library, so I have different departments within the Faculty of Engineering. There's electronic, there's mechanical, industrial etc. So for each of those different departments I had a link to their subject guide or lib guide. They would have the content there, including all the tutorials, all the presentations. If there were games etc. that they needed to access to learn".*

4.3.2.2 Communication and dissemination of information

This theme links with the first question (Has the use of ICT been helpful to your digital literacy classes?) where respondents mentioned that using ICTs does not only help

them in carry out their digital literacy instruction, but it also helps them in communicating with students. Similarly, when asked about ways in which they use ICTs in digital literacy instruction, some interviewees mentioned that they use ICTs for communication and dissemination of information. Their responses are displayed in the table below:

Table 4.23: Interview responses about communication and dissemination of information

Subject Librarian Code	***Response shared***
SL2	*"Well I use ICTs in various ways and for various reasons. I use it for communication, and to share information…* *There are also certain communication tools that I use like Lib-Chat, where students ask question for several of reasons."*
SL3	*"… I use ICTs to communicate with my students, to create discussion forums and to even conduct remote classes"*
SL5	*"Most often, I use ICTs for 'routine information literacy tasks which include lesson planning and development, information presentation, and basic information searches on the Internet. I also use ICT to communicate with my students, to arrange discussion forums."*

4.3.3 ICT resources mostly used for digital literacy instruction

This question was asked with an aim of getting an in-depth understanding of information and communication resources that Subject Librarians use more often in their digital literacy instruction. Using ICTs in digital literacy instruction can never be overlooked as it is deemed as a most effective way of promoting students' digital literacy skills. Using ICTs in digital literacy instruction has the potential to empower both Subject Librarians and students to overcome and troubleshoot ICT related challenges. As a result, the use of ICTs in digital literacy instruction is of utmost

importance. The findings from interviews show that respondents are confident with their abilities to use ICTs in digital literacy instruction. Responses to this question were closely related to those of question 2. Interviewees mentioned quite a number of ICT resources which they use in their digital literacy instruction. The use of ICT resources like Microsoft Teams and PowerPoint projection is deemed as an effective ICT tool which helps students to visualize learning materials. Findings to this question are further detailed below:

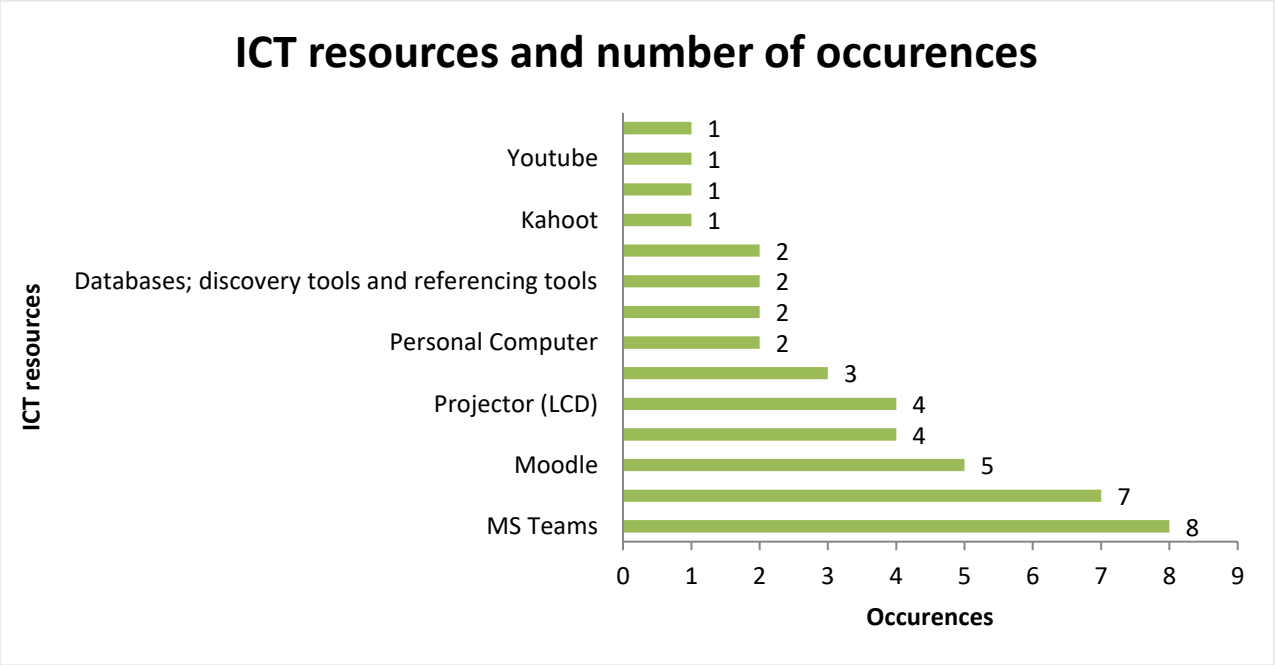


Figure 4.8: ICT resources and number of occurrences

Certainly, not all ICT resources will be relevant and effective for digital literacy instruction. The over flooding of technological innovations can be overwhelming and calls for careful consideration of information and communication technologies that are the most effective for the digital literacy instruction. As shown in figure 4.8, the Learning Management Systems (LMS) are the most used ICT resources. *Microsoft Teams* in particular, is an optimal e-learning platform among Subject Librarians in traditional universities and universities of technology in KwaZulu-Natal. Moodle and Blackboard are also the most popular open-source learning management subsystems. The interview responses show that Subject Librarians use various LMS in their digital literacy instruction, as shown above. LMS in this regard are frameworks that support

teaching and learning and are usually used to support classroom education. Interviewees indicated that they use MS Teams to display their PowerPoint presentations during their digital literacy instruction. They further mentioned that they upload their *PowerPoint* slides on *MS Teams* for students to access them whenever they need it. One of the benefits of using MS Teams is its ability to record sessions which allow students to be able to access the recording for the lesson at a later stage. Interviewees further mentioned that they use Blackboard and/or Moodle to also upload videos, PDF's and PowerPoint Presentations. Some interviewees mentioned that they use Blackboard and or Moodle as discussion forums where they post topics and then allow students to post their discussion about the posted topic. However, it was noted from the responses that interviewees who used Moodle did not use Blackboard, and those who used Blackboard did not use Moodle. Blackboard and Moodle are two Learning Management Systems which have many common features, but they also have key differences which make them special in their own way. It is therefore believed that universities in KwaZulu-Natal are either using Moodle or Blackboard, but not both of them at once as these two platforms appear to be similar. One interviewee mentioned in the second question that at their university, they were initially using Blackboard which was later replaced Moodle (Refer to question 4.3.2, Table 4.22, SL10). Interview responses about ICT resources that Subject Librarians mostly use are shown below:

Table 4.24: Interview responses about ICT resources that are mostly used

Subject Librarian Code	***Response shared***
SL1	*"I use a lot of ICT resources. There are so many ICT tools that you can use for teaching. With me it obviously goes with curiosity. I am always thinking about new ways, new technologies that I can use to conduct my lessons in a simpler yet easily understandable way. So, like I have previously mentioned, I use lib-guides for embedding videos and tutorials. I use MS Teams and*

	Moodle to upload PowerPoint presentations and PDF's. I use several applications like I've mentioned. Applications like pear deck and so on".
SL2	*"I mostly use digital whiteboards to project my PowerPoint presentation for the purpose of my digital literacy instruction. But that was before Covid-19 visited us. Now that there is this pandemic thing, ICT has also become integral to our teaching and learning. The idea of digital whiteboards and all other forms of projecting methods were replaced by the remote measures. I now use MS Teams to conduct my classes, which in a way works similarly with whiteboards, the difference being the fact that Teams is for online and remote sessions. I am sure you know about Blackboard learning? I also use that as well".*
SL3	*"In most cases; approximately in all my literacy classes I use my Personal computer, the projector and PowerPoint. These help me to project whatever I have prepared for that particular lesson. I also use Email as the most effective way of formal communication. Currently, what I use given the fact that we finding ourselves operating remotely, is MS Teams. I use this platform to carry out my sessions and even to interact with my students".*
SL4	*"I use several ICT resources in my digital literacy instruction. I use the LCD projectors as visual means of presenting information. I prepare my slides then I use my projector to display whatever I have prepared for a particular session. Currently, I am using Microsoft Teams platform for teaching and Moodle for conducting discussion forums".*

SL5	*"It's just not miss-facilitating or lecturing online. I would, uh, engage them in the class, so I'll use an application like pear deck after my sessions and I'll put questions up and I can see each of them answering and the type of answers they putting in. Whether it's for referencing or whether it's for using endnote or learning how to use a database or discovery tools such as summon that we're using Or now we are using the EbscoHost discovery tool. I have lectures throughout the semester and then I have a test through a quiz in Moodle. And then besides all of that, I taught all my colleagues 90% of them how to use Moodle, how to use the Lib-guides, how to integrate all of them; I taught them how to use all these different applications".*
SL6	*"ICTs have a potential of encouraging and supporting independent learning among students. Using ICTs in digital literacy instruction allow students to become more involved in the teaching and learning process. I used quite a number of ICT methods for my digital literacy instruction, like blackboard and many others. Sometimes I use educational platforms that are based on games and questions. I create questionnaires, discussions, and even surveys that complement my sessions and content of my lessons. Occasionally, I use platforms like Kahoot which allow for game-based learning, which increases students' engagement and create a dynamic, social and fun educational space. I post questions and quizzes, and then students will answer while playing and learning at the same time".*
SL7	*"The ICT platforms that I use the most are Microsoft Teams and Moodle. I also use Library Guides and tutorials, Lib-chat to communicate with my students.*

	Students become more familiar with online learning resources as their use become widespread. Then, it is also important to employ different methods of online teaching. This will also develop students' digital literacy skills as well. That is why I use various methods of teaching so that my lessons can be more interesting to students. You know if you want 100% attendance to your sessions, you have to ensure that students are not bored. There must something interesting all the time, something new, so that even students can find it interesting to attend or to participate".
SL8	*"See, ICTs has become biggest part of our everyday lives. In our digital literacy instruction we use ICTs in one way or other. I really do not think one can carry out digital literacy instruction without using ICTs in any way. Here we use blended learning, which entails both face to face and online learning. So whenever I am conducting a face to face session, usually I will be using PowerPoint presentations and a projector. In most cases I conduct my lessons in the LAN where by all students will also be using computers, either I am teaching them Information searching using various online databases; referencing using Endnote, etc. But when I am online, I use Blackboard learning. In most cases I will be posting questions there for students to discuss. Since the advent of Codiv-19, I am also using MS Teams and Moodle for online teaching, and sometimes I also use Zoom, just to familiarize my students with other video conferencing platforms".*
SL9	*"For me, the ICT resources I use depend on the platform I am conducting my digital literacy session on that particular day. The ICT I use for contact-based sessions*

	will be different from those I use for online sessions. I mostly use Blackboard for online classes and MS Teams as well. But whenever my sessions are contact based, then I normally use my laptop and a projector to share my PowerPoint presentation with students. I really think that for many of us, blended learning is the effective way of developing students' digital literacy skills."
SL10	*"My best ICT teaching method or resource is Blackboard. I really enjoy using Blackboard with the speech because I can conduct my literacy classes remotely. I upload PowerPoint presentations and YouTube videos. One of the benefits of using blackboard is that students can constantly check their grades and their progress. I also use other ICT resources, like MS Teams, but Blackboard has been the one I use the most, even post Covid-19".*

4.3.4 Subject Librarians' experience with the use of ICT for digital literacy instruction

This question was asked with an aim of understanding interviewees' journey with the use of ICTs in digital literacy instruction. Responses to this question are categorized as curiosity with ICTs; experiences with the use ICT for teaching; ICT based activities and materials used for teaching; challenges to using ICTs in digital literacy instruction.

4.3.4.1 Curiosity with ICTs

One respondent associated his experience with the use of ICTs to his curiosity. He mentioned that he was curious about the benefits that ICTs has to offer in the teaching and learning environment. As a result, he studied a lot about ICTs, including taking extra ICT courses.

“Look, I'm quite a curious guy, you know I'm the type of person who will obviously go and learn the technology. So my experience is based on my curiosity. Because I'm curious, and because a lot of this was self-taught, I learned it on my own. I decided to do a formal 'course this year (2021). UCT offered something called teaching with technology. And so, uh, I did that course over the past six months. The part of the course or the main aspect of the course was dealing with the foundational basis of education. So it was understanding pedagogy basically; pedagogical approaches; the theory behind teaching using people like Vygotsky and Dewey and all of those people. Which I think is quite important before we even start teaching information literacy, we need to understand how to design curriculum. Why look at this social cultural context within which we live in? And these are some of the things that were covered in that course and then apply your minds and design causes specifically suited to the needs of our students…” (SL 1)

4.3.4.2 Challenges to using ICTs in digital literacy instruction

Some interviewees associated their ICT experience with the challenges they have since encountered with the integration of ICTs in digital literacy instruction. It was dominant that though the idea of using ICTs in digital literacy instructions sounds easy and interesting, but in its reality; using ICTs in digital literacy instruction is not as easy as it sounds. Among the challenges that were pointed out by interviewees was students’ inability to use ICTs available to them. Some respondents believe that students’ failure to use ICTs is one of the reasons for the limited use of ICTs in digital literacy instruction. Responses about challenges to using ICTs in digital literacy instruction are presented below:

Table 4.25: Interview responses about challenges to using ICTs

Subject Librarian Code	***Response shared***

SL2	*"Regarding my experience with the use of ICT, I can say that there is good and bad. Using ICTs in teaching is not as simple as it may seem. You will want to integrate ICTs in digital literacy, at the same time you also need to be considerate of the fact that students are coming from different backgrounds. Some are not familiar with using certain ICT resources; some may not have data for example to access online materials. Sometimes you will have students who do not have laptops and their phones cannot access internet."*
SL5	*"Well, I have been using ICTs very well in my digital literacy instruction. But what I can reflect on as my experience is that there have been so many challenges. In most cases, many of our students have high levels of understanding of digital technologies, media, and so on. But in some cases, they are not equipped with academic use of technology, and that is the sad truth. They are very good with social networking, instant messaging and just socializing. But they are mostly unable to use the very same devices for academic purposes. So as Subject Librarians, we always have to bridge that digital gap. So I have been using ICTs for many years now in my digital literacy instruction. This helps to ensure that even students from disadvantages communities are well equipped with basic ICT skills. In my experience, I have learned that when ICT is used in teaching and learning methods, the discussion becomes easy because the interest of the learners is apparent and since they know how to manipulate computers, they really involve themselves and participate fully in the learning process"*
SL6	*"Sometimes you can get hooked on the technology aspect, other than the subject content, and end up using*

	wrong ICT methods to disseminate information to students. ICTs also come with their difficulties, like for example; I have experiences challenges of hardware availability; limited number of devices for students to participate in an ICT driven session or online session; lack of well- established access to the internet, mostly with remote sessions."
SL3	*"I personally have knowledge about using ICTs for teaching due to professional development and training. I can say without a doubt that ICTs allows for effective teaching and learning. - It allows learning to be easier and provides new and efficient channels of learning. However, all this is dependent on how you use ICTs for your instruction. I have been using various ways of teaching using ICTs and making studying materials accessible for my students. I have been using a blended approach whereby you employ both remote and contact teaching. But with remote teaching, you face various challenges like that some students are not well equipped with educational applications that we are using. For example, I once used Survey Monkey to create an online quiz; other students struggled with just accessing the quiz. Some obviously will struggle with data; some will complain about network connections."*

4.3.4.3 Experiences with the use of ICTs in teaching and learning

Using ICTs in digital literacy instruction provides opportunities that might have not otherwise been possible. Using ICTs in digital literacy instruction makes digital literacy lessons to be more experiential. Some interviewees explained how interesting their journey with the use of ICT in digital literacy has been, pointing out various ways they have been using ICTs for digital literacy instruction. The issue of the state of readiness

to use ICTs was also pointed out. Interviewees emphasized that it is important for Subject Librarians to be well equipped to use ICTs in digital literacy instruction. Two interviewees mentioned that they have taken upon themselves to acquire extra knowledge about ICTs and their use in digital literacy. Responses about interviewees' experiences with the use of ICTs for teaching and learning are displayed below:

Table 4.26: Interview responses about interviewees' experiences with the use of ICTs

Subject Librarian Code	***Response shared***
SL4	*"I have been involved in digital literacy instruction for over 5 years now. I have interesting experience with the use of ICT in digital literacy instruction. In most cases, I used my personal Laptop, and a projector to conduct my sessions. I normally used PowerPoint presentations due to their ease of preparation, and the fact that they require limited technical skills to execute. I always found PowerPoint presentations to be an easier and convenient way of Integrating ICTs in digital literacy instruction. I have been doing that for so long, and with technologically changing environments, obviously you would want to find other ways of carrying out your sessions because, using one method, also becomes boring for students, so I also use Think-Learn Zone (now called Moodle), mostly to conduct interactive discussions with students. What I did there is that I would post a discussion topic, a quiz or post a video then ask a question based to the content of that video then allow students to engage. It is more like a discussion room, but the good thing is that it is online and student can discuss anytime, anywhere."*
SL7	*"I have used ICTs in my digital literacy instruction for many years now. I have used ICTs in various ways to*

	make my sessions easier and more interesting at the same time. Remember, the method used to conduct digital literacy instruction has a larger effect than the mere use of ICT. For example; if you do not develop your method to make best use of ICT, then students will not gain anything form that. So, I took it upon myself to go out there, seek knowledge, and necessary ICT trainings so as to allow me to develop my teaching methods to make effective use of ICT. Also, you got to love ICTs to be able to use it for digital literacy instruction. Obviously you cannot teach using something that you also do not like."
SL8	*"My realisation with the use of ICT in digital literacy instruction is that it provides many opportunities. We are able to conduct blended learning, and even full online learning where students can access teaching materials remotely. But before you even think about students, you need to first look at yourself that are you well ready to use ICT in your digital literacy instruction. It is important that we equip ourselves with necessary skills as Subject Librarians. For instance, I have attended trainings on internet use; general applications and advanced courses in applications; personal learning about ICT; participated in various online ICT conferences. All this allowed me to be able to apply my knowledge and understanding to use ICT in digital literacy instruction."*

Nevertheless, few responses were similar to that of question 2 (In what ways do you use Information and Communication Technology (ICT) in your digital literacy instruction?) where interviewees were explaining their ICT experience in terms of the way they use ICTs in digital literacy instruction.

4.3.5 The importance of using ICT in digital literacy instructions

The use information and communication technology (ICT) in digital literacy instruction cannot be over emphasized as it can increase the quality of education for all countries around the globe. The reviewed literature suggests that the use of ICTs in digital literacy instruction is of utmost importance. Kapur (2019: 13) in particular, explained that the utilization of ICT in digital literacy instruction has rendered a significant contribution in bringing about improvements in the quality of education. As such, this question was asked to follow-up and to further explain the quantitative questions where respondents were asked whether they use ICTs in their digital literacy instruction. It was anticipated that interviewees would provide an in-depth explanation of their views about the importance of using ICTs in digital literacy instruction. Interview responses to this question shows that Subject Librarians acknowledge the importance of using ICTs in their digital literacy, instruction.

The first interviewee in particular, explained how the use of a flipped classroom can develop students' digital literacy skills. In this explanation, the interviewee made an example of how ICTs can be integrated into the classroom.

> *"A simple example I'll give you is: I've been teaching people on how to deliver different aspects of information literacy. One of the things I told them is that if you're having a class and say fake news or plagiarism. What are the ways you can use technology online now because we're working from home; to deliver this to students and one of the things I told them they can do is do group breakaway sessions. So basically, you have a topic called a flipped classroom, so you don't teach the concept you present the topic to the students; you break them up into groups. Then, once you do that, you can then give them a topic and put them into these groups; breakaway sessions on teams or on zoom, and you can let them discuss it and then come back to the main venue in your zoom or team class and give each one of them and they will present on those things. Then after that that's when you will start discussing. Maybe you'll put a PowerPoint up and you'll have a discussion with them about this concept and that's how you can integrate the ICTs with the instruction" (*SL 1).

The same sentiment was shared by the SL-10 who also explained that the importance of using ICTs in digital literacy classes is that students' skills can be equipped. The

interviewee made an example about using discovery tools and various LMS to conduct digital literacy instruction. The use of various learning management systems and discovery tools play a key role in developing students' information retrieval skills.

> *"Look there's huge advantages. There are always the pros and the cons. The advantage is that you know students are not only restricted or limited to that class. Say for some reason student cannot make it; you get the lazy students also who just don't pitch because they know the next day they will have the recording, but it's more than that recording. Another example, I can give you is if I'm doing a lesson on discovery tools versus Google as an example, and I've done the lesson in class. So what I can then do is I can and this is called asynchronous; so then you're working outside the class. Activity is based outside the class whereas a class happened in. So on my learning management system on Moodle, I can pose a question to students, so it's a discussion forum. So on the discussion forum I'll tell the students that look, I'm creating a discussion forum and the question is, uh, which would you prefer using; Discovery tool or Google; and why? So they will give me their responses. Then they're going to be responding, giving their ideas and their perceptions in their views of this topic. At the end of that, what I normally do is I put a video up or put a little synopsis and overview of what I think. And remember, there's no right or wrong answer in this. It's me teaching them two different tools, so I'm teaching them how to use Google and research responsibly and what they can get off using a discovery tool and the type of information they can get from there as well. So they're giving me their perspective, at the same time learning is taking place and they're using the ICT's. They're using their skills of typing using a learning management system. They're going on to Google and they're searching, and their skills are getting developed"* (SL 10).

Few responses to this question associated the importance of using ICT in digital literacy instruction with the students' digital literacy skills development. The Seventh interviewee for example, pointed out that there will be students who come from disadvantaged backgrounds. Those students will normally have limited to no knowledge of digital literacy. This view is similar to that of King (2007: 60) who noted that "most incoming undergraduate student do not possess adequate literacy skills to complete some of the required course-work that tertiary education requires." As such,

the SL-7 believes that if students get a longer exposure to ICTs, then their digital literacy skills can be developed.

> *"It is important to use ICTs in digital literacy instruction. The general understating is that students are coming from different backgrounds. Some are coming from remote areas with no exposure to ICTs. So; that group of students will be at a disadvantage when they get into university, some they do not know even simple things like typing on the computer. Therefore I think that, a longer exposure in the ICT environment can foster students' general computer skills, information retrieval skills, higher critical thinking skills, and other digital literacy skills"* (Interviewee 7).

Interview responses to this question are further discussed in the following themes that emerged:

- Resource sharing, lesson planning and round the clock access to teaching and learning materials.
- Promote collaborative learning

4.3.5.1 Resource sharing, lesson planning and round the clock access to teaching and learning materials

Perhaps some students are afraid to ask questions during lecture time, and sometimes other students get a better understanding if the same session is repeated over and over. However, with contact-based sessions, it is usually not possible to have a repetition of the same session, unless the instructor decides to offer students a revision. As a result, some interviewees mentioned that the importance of using ICTs in digital literacy instruction is that of the possibility of recording sessions for later use. Using ICTs is of utmost importance as it allows Subject Librarians to prepare for their lessons. The use of ICT has become integral to teaching and learning. Interviewees suggested that the use of ICTs in digital literacy instruction requires Subject Librarians to be more creative in adapting and customizing their own teaching materials. One interviewee pointed out that ICTs have the ability to make learning to occur anytime through the use of different Learning Management Systems (LMS). Through the use of learning management systems, the access to education has become limitless as students can learn and get access to educational resources anywhere. Interview

responses about resources sharing, lesson planning and round the clock access to teaching and learning materials are presented in the Table 4.27:

Table 4.27: Interview responses about resources sharing, lesson planning and access to teaching and learning

Subject Librarian Code	***Response shared***
SL2	*"I think ICT has become integral to the teaching-learning interaction, through such approaches as replacing contact-based sessions, with interactive online platforms like learning management systems, using students' own smartphones or personal computers. The ICTs has made possible also the 'flipped classroom' model where students watch video recordings for lectures at home on their computers".*
SL3	*"ICT is beneficial for Subject Librarians to share resources and arrange their lesson plans. With the use of ICT, it is very much easier to plan and prepare lessons and design materials for students. Sometimes, ICT helps us to access up-to-date data, anytime. I strongly believe that teaching using ICT should be modelled as a tool that leads to innovation and creativity to prepare students for the future. In most cases, ICTs allow for classes to be recorded. This then allows students to go back over concepts that they did not understand without disrupting the flow of the class, because they can come back at a later stage to listen to the recording. They can repeat the lesson as much as needed".*
SL4	*"I think the importance of using ICTs in digital literacy is that it helps us in preparing for our teaching, and also helps to interact with students. The effective use of ICT*

	helps us to explain our literacy content in a more precise manner and further stimulates students' participation and engagement".
SL5	*"I think one of the good advantages of using ICTs can also be that ICT provides distance learners the ability to use online instructional materials, access them easily, and provide additional tools for resource-based learning to students. With ICT, and the use of online methods for teaching and learning, Sessions can be recorded for later references. This then means that if a student misses a session, they can come back anytime to listen to the recording".*
SL8	*"The use of ICT in digital literacy instruction not only has a positive effect on the traditional ways of conducting literacy classes, but also requires Subject Librarians to be more creative in adapting and customizing their own teaching materials. ICTs have made it easier for us to plan and structure our teaching materials, like for examples, instead of using whiteboard markers and write all our lessons on the board, rather we use the projecting methods and project our lessons".*
SL9	*"ICT has the ability to make learning to occur anytime at any place. Through the use of ICT; access to education has been widened and limitless, students can learn and have access to educational resources anywhere and at any time, there are varieties of educational materials".*

4.3.5.2 Promote collaborative learning

Few interviewees associated the importance of using ICTs in digital literacy instruction with the collaborative learning environment.

> *"The importance of using ICTs in digital literacy instruction can be associated with the fact that ICT-supported learning encourages interaction and cooperation among students and Subject Librarians regardless of where they are" (SL5).*

Interviewees illustrated that the use of ICTs in digital literacy instruction make literacy sessions more interesting. It is further suggested that using ICTs in digital literacy instruction enable students to work collaboratively and be more engaged and attached to the lesson. The SL-6 asserted that "the use of ICT in digital literacy instruction is important to enable students to collect information and interact with resources, and to encourage communication and collaboration." The same idea is further shared by the SL-9 who claimed that the importance of using ICTs in digital literacy instruction is that teaching and learning becomes interesting, and students get motivation to attend sessions. Responses about the promotion of collaborative learning are shown in the table below:

Table 4.28: Interview responses about the promotion of collaborative learning

Subject Librarian Code	***Response shared***
SL2	*"In fact, ICT empowers students to engage in the learning process and give them an interest in their personal education. By integrating ICT into literacy instruction, students have the ability to learn more effectively, collaborate with each other, and explore the world around them".*
SL4	*"ICT makes digital literacy instruction easier, and not just digital literacy instruction, but in all our teaching and everyday tasks. Another thing is that we know that some students are better to learn via visual or audio, and they can get this via technology. So using ICT in digital*

	literacy instruction makes lessons to be more interactive and engaging".
SL5	*"The importance of using ICTs in digital literacy instruction can be associated with the fact that ICT-supported learning encourages interaction and cooperation among students and subject Librarians regardless of where they are".*
SL6	*"The use of ICT in digital literacy is important to enable students to collect information and interact with resources, and to encourage communication and collaboration. The use of ICTs may also help to increase student motivation, facilitate clearer thinking, and develop interpretation skills with data. In my experience and understanding, ICT enhances students' understanding of the subject matter. Through use of ICTs in literacy instruction, students can work collaboratively, the use of ICT makes students more engaged and attached to the lesson".*
SL9	*"For me, the importance of using ICT in digital literacy instruction is that teaching and learning becomes interesting through ICT. ICT increases students' motivation; makes learning more enjoyable; enhances my teaching abilities".*

4.3.6 Barriers to using ICT in digital literacy instruction

This question was asked to get an in-depth understanding of any foreseen barriers to the use of ICTs in digital literacy instruction. Using ICTs in digital literacy instruction is very important as it enables students to master the context and extend their investigations, become more self-directed. The use of ICTs in digital literacy

encourages, equip and enable students to participate more actively in all areas of new public, social and political life. It is evident from the interview data that Subject Librarians use ICTs mostly as online learning mechanisms. The use of various LMS has been dominant among Subject Librarians. Even so, there are notable difficulties that come with online learning and the use of ICTs in digital literacy instruction. One respondent mentioned that the online learning is very effective and beneficial mostly to students as they are able to participate in digital literacy sessions while enjoying the comfort of their homes. However, given the fact that other South African communities are underdeveloped with a very poor infrastructure, the online learning is also a big disadvantage for students in those underdeveloped areas. The fact that online learning relies on electronic devices, data and network connection is a barrier on its own. Most often, students will face network connection challenges, and some will even face challenges of re-charging batteries for their learning devices. Considering students' different backgrounds, the first interviewee mentioned the importance of making use of ICT services that requires zero data usage. The interviewee made an example of Learning Management Systems that they use at the Durban University of Technology which are zero data rated with some of those LMS utilizing a limited amount of data.

> "*A lot of students come from disadvantaged backgrounds and so how do you make ICT resources available and easily usable to them in a platform where it can be zero data usage? So our Moodle at DUT is zero data usage so I can put videos up there and I can know that once students login, they're not going to be eating their data. And the other issue is connectivity and access devices and stuff. But that's something institutions in South Africa are actually working on" (SL 1).*

The fact that students spend most of their leisure time on their smart phones -watching movies, playing games, using social media is also disadvantageous to using ICT in digital literacy instruction. With online learning, the instructor is unable to see if students are paying attention to the lesson or it is only their devices that are online. SL7 pointed out that for students who are addicted to online gaming and social media, it is very easy for them to be distracted during the lesson as the instruction will require them to be using either their smart phones or personal computers.

"Students regularly use devices for social media, playing games, instant messaging, text messaging and emailing rather than for class work. So it is very easy for them to be distracted and have their attention redirected to other things rather than focusing on that particular session. That is one of the biggest barriers in using ICTs in our instruction" (SL7).

The same concern was shared by the SL8 who mentioned to have observed that when ICTs are used in her lessons, sometimes the flow and time of the lesson will be affected. She related this concern to the case where she is using a computer lab in the library and have students who open computers even when they are instructed to shut them down. At times there will be students who will be pretending as if the computer is not working; and some students will be watching unrelated videos instead of participating on the lesson. The interviewee claimed that such behaviours from students are normally based on their tricks to delay the lesson and for some students it will be the excitement to use the computer.

"*I have observed that in most cases the use of ICTs affects the flow and time of the lesson. Sometimes, lessons are interrupted by regular negotiations that reduce lesson time. This is related to students not putting screens down during instructions, pretending devices don't work and many related challenges; watching videos that are not even related to the content being taught, playing online games and so on…" (SL 8).*

The idea of students logging onto the online lesson but not necessarily participating was further supported by SL10 who raised a concern of laziness among the students. With the use of ICTs in digital literacy classes, particularly Learning Management Systems, you find students who do not attend sessions, and only rely on the recording.

"One of the disadvantages using ICTs in digital literacy instruction is that of laziness. As I have mentioned earlier, you get the lazy students who will not attend online classes and rely on the recording" (SL10).

Furthermore, one interviewee asserted that Subject Librarians' attitude towards ICTs can also be a barrier to the use of ICTs in digital literacy instruction. It is claimed that the successful use of ICTs in digital literacy instruction rely on Subject Librarians' positive attitude and their ability to be comfortable with ICTs.

"The barrier to using ICT can be our attitudes as Subject Librarians. Subject Librarians need to be comfortable with technology to develop positive attitude because for successful use of ICT, the positive attitude towards ICT is necessary" (SL 3).

Moreover, another interviewee explained that the use of ICTs in digital literacy requires time.

"ICT requires time. The time needed to locate internet sources, to prepare lessons, explore and practice using technology, deal with several technical challenges, and time to get enough training. If one does not have time, then you will hardly cope with ICT. Therefore, time limitations can also be one of the barriers to the successful use of ICTs" (SL5).

Additionally, almost all interviewees mentioned that Subject Librarians' professional development as the biggest barrier to using ICTs in digital literacy instruction. These findings are further presented below:

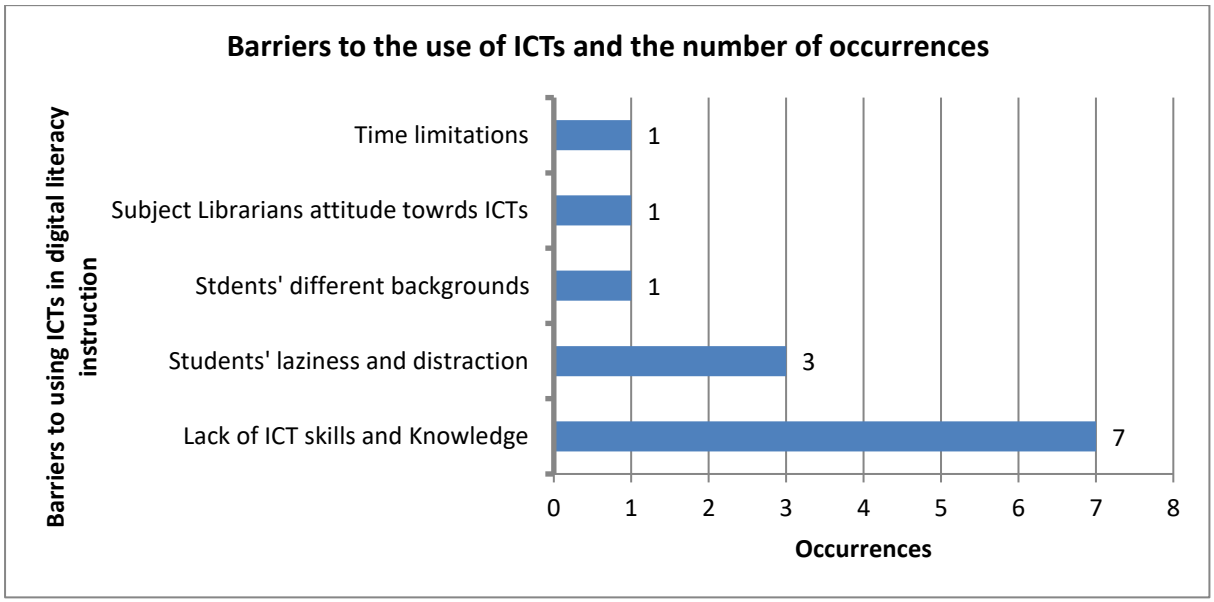


Figure 4.9: Barriers to the use of ICTs

As shown in Figure 4.9, seven interviewees foresee the lack of ICT knowledge and skills as the barrier to the use of ICTs in digital literacy instruction. Subject Librarians need to be equipped with ICT skills so that they can also be able to utilize relevant ICTs in their digital literacy instruction. The quantitative findings of this study in corroboration with the reviewed literature; revealed a lack of ICT skills among Subject

Librarians. Similarly, the interview responses further suggest that lack of ICT skills and knowledge among Subject Librarians is the biggest barrier to using ICTs in digital literacy. As the technology is rapidly changing, Subject Librarians also need to keep up with new technological developments. The proper use of ICTs in digital literacy skills is largely dependent on ICT knowledge and skills to utilize various ICT resources.

When there is no skill to use ICTs, therefore whatever ICT resources that might be available, they become useless. Obviously when Subject Librarians do not have skills and knowledge to use ICTs, they will also have less confidence in using ICT. In view of this, the SL4 pointed out that “lack of ICT knowledge, is capable of making them (Subject Librarians) feel anxious about using ICT in the digital literacy instruction thus not confident to use it in their teaching” (SL4). Interview responses about the lack of skills and knowledge are displayed bellow:

Table 4.29: Interview responses about the lack of skills and knowledge

Subject Librarian Code	***Response shared***
SL2	*“I think one notable barrier will be that of lack of ICT skills among Subject Librarians themselves. As the technology is rapidly changing; we also need to keep up with new developments. Take for example when the pandemic came, we needed to find ways to carry on with our literacy session, yet we were not skilled enough. Of course MS Teams was identified as a most suitable method. But initially we did not have skills to use the platform. Yes in most cases institutions may arrange trainings for various ICTs but we also need to take it upon ourselves to find other self-development measures instead of waiting for the university or library management to arrange trainings. We are the ones who know the skills we need, so we need also to make initiatives to develop ourselves”.*

SL3	*"…another implication is that all Subject Librarians must acquire relevant and appropriate ICT skills and be able to use ICT appropriately in teaching".*
SL4	*"What can be a barrier to using ICT is the Subject Librarians' lack of knowledge and skills to use ICT in literacy instruction. Lack of ICT knowledge, is capable of making them feel anxious about using ICT in the digital literacy instruction thus not confident to use it in their teaching".*
SL5	*"If you want to successfully use ICT and be knowledgeable about it…"*
SL6	*"The notable barrier in using ICT is that there are not enough training opportunities for Subject Librarians in the use of ICT in literacy classes. It is therefore difficult to expect Subject Librarians to play a role in developing students' digital literacy skills while they are also not fully equipped with necessary skills to allow them to fully offer digital literacy instruction".*
SL9	*"Unfortunately for me, lack of ICT skills and knowledge is my problem, I do not have enough skills to incorporate various ICT resources in my literacy instruction. I only use basic ICT resources like projecting my presentation, searching for resources on the internet, using few Microsoft in suit. It's only the few ICT resources that I know and use for my sessions. So yes, proper ICT skills are the biggest barrier to the use of ICT in digital literacy instruction".*
SL10	*"….Ok, look before we even go out and think about students and instruction of literacy; let's talk about ourselves. I think we need to self-reflect as a profession;*

	as academic librarians so we can keep up with the appropriate technologies so then we can deliver instruction". *The second aspect is delivery and planning and designing curriculum and you know, uh, using these ICT etc. But before we do that, I guess we have to be equipped ourselves, to know how to use these technologies and how to get the most out of it".*

Further, qualitative results extended to the quantitative findings that lack of ICT skills among Subject Librarians is a huge barrier to the use of ICTs in digital literacy instruction.

4.3.7 How do you think the use of ICT in digital literacy instruction can enhance students' digital literacy skills?

The reviewed literature suggests that using ICTs in digital literacy instruction has a potential of strengthening students' digital literacy skills. The literature implied that academic libraries and Subject Librarians are perfectly suited for the development of students' digital literacy skills. As such, this question was asked to get Subject Librarians' thoughts and perceptions on whether the use of digital literacy skills can indeed enhance students' digital literacy skills as suggested by the reviewed literature.

The first interviewee to this question reflected back on Subject Librarians' lack of ICT skills. He mentioned that Subject Librarians will need digital literacy skills to be able to conduct digital literacy instruction that can enhance students' digital literacy skills.

> *"Uh, you speak about digital skills which mean so many things. You know it could like as I mentioned earlier, it could mean that, like academic librarians would have to teach such skills. But even before they do that, subject Librarians or information librarians or faculty librarians, whatever you want to call them postgraduate librarians, they would need digital skills in order to deliver instruction in an online environment, or even in a face to face. They need certain skills like we did when Covid-19 hit us. Subject Librarians needed to get started*

to learn how to use things like learning management systems; using things like gamification and online apps to teach and Microsoft Office 365. So therefore, I'm going back to librarians, if we first skill ourselves, then we can talk about developing students" (SL1).

Another interviewee asserted that the use of internet-based methods can motivate students.

"*The students need a bit of motivation in learning. Allowing them to use the Internet in their learning is a motivational push to those who are bothered by traditional methods of delivering information. The Internet allows us to motivate some of the students thereby speeding up the assimilation process" (SL2).*

The third interviewee suggested that the use of ICTs in digital literacy instruction allows students to communicate, share and work collaboratively.

"I think that using ICT can also allow students to communicate, share, and work collaboratively anywhere, anytime conveniently with less costs. For instance, a teleconferencing classroom could allow students to interact together even if they are in different locations. Say the students have a group assessment, they do not need to travel in order for them to get together to discuss their assessment, but they can rather use teleconferencing methods as made possible by the ICTs" (SL3).

The same view was shared by the fourth interviewee who was certain that the use of ICTs in digital literacy instruction can enhance learning.

"*No doubt digital technologies can enhance learning through accessing information and improving communication, as well as providing self-directed and collaborative learning opportunities. ICT skills can also help develop capable, future-ready citizens. Students might be "digital natives", comfortable with and immersed in technology, but they depend on us to learn through digital means" (SL4).*

Similarly, another interviewee believes that the use of ICTs in digital literacy instruction can give students a sense of well-being and capacity to absorb new ideas and increases their social interaction. The proper use of ICTs can develop students' information retrieval skills as they will be using various discovery tools to search for

information, sometimes they will be accessing eLearning Management Systems to retrieve whatever learning materials are shared with them.

> *"I believe that the use of ICT in digital literacy instruction gives students a sense of well-being, and capacity to absorb new ideas, increases their social interaction. The proper use of ICTs in digital literacy instruction can develop students' information retrieval skills; collaborative learning and engagement" (SL9).*

Furthermore, another interviewee highly recommended the use of ICTs in digital literacy instruction, mentioning that when ICT learning tools are well used in literacy instruction, "they can turn a class into a place where students want to be." Therefore, this means that the use of ICTs in literacy classes promote the sense of belonging among students.

> *"Certainly, the use of ICT in the literacy instruction is highly recommended. It has great potential to enhance teaching and learning which in turn improves students' academic engagement and achievement. There are many ICT tools which when well used in literacy instruction they can turn a class into a place where students want to be" (SL5).*

This view was also noted from the eight interviewee who also pointed out that the use of various teaching methods available on the internet can boost students' information retrieval skills.

> *"Based on ICT, learning and teaching no longer depend exclusively on printed materials. Learning can occur anytime and anywhere. Multiple resources are widely available on the Internet, and knowledge can be acquired through video clips, audio sounds, and visual presentation and so on. With ICTs, there are many methods that one can use to carryout lessons. So, using those various teaching and learning methods will obviously boost students' information retrieval skills" (SL8).*

It was clear from interview responses that Subject Librarians are in agreement that using ICTs in digital literacy can enhance students' digital literacy skills. However, one respondent noted that not all technologies will be relevant for certain lessons, as such, choosing the appropriate technology is very important. The 7th interviewee mentioned that while deciding on the appropriate technology to use for digital literacy instruction,

it is of utmost importance to consider all students and their different backgrounds. The respondents go on to say that some students will come to sessions with limited or even no ICT skills. He then suggests the provision of tutorials which will explain to students as to how they can access and operate the system that is being used for the lesson. Students are quicker to learn if tutorials are provided.

> *"So remember not all technology will be relevant for certain lessons sometimes you're going to use technology that it's going to be more complex or difficult for students to have a quick grasp. You need to choose appropriate technology, and while you in the process of choosing appropriate technology for your lessons; you have to consider also the students, and their background. Some students do not know even the most basic ICT skills, so you need to provide tutorials for them so that they can know how to access the system that you are using for your lessons. Then simultaneously, their skills will be developed" (SL7).*

The 10th interviewee claimed that the use of ICTs in digital literacy instruction enables students to be active during the lesson. The idea of using ICTs in digital literacy instruction is absolutely best, but it will not develop students' digital skills if not properly implemented. The ability of ICTs to develop students' digital skills depends on the type of ICTs used for lessons, and the manner they are used. The 10th interviewee made an example that if one wants to develop students' information retrieval skills; therefore they have to give them (students) assessments that will require them to access various discovery tools and library databases.

> *"Using ICT in digital literacy instruction enables students to be active during the lesson. But however, just the idea of using ICT in digital literacy, will not help students to develop their digital literacy skills. But this largely depends on the ICTs that we use and the manner we use them. For example, if you want to develop students' information retrieval skills, then you will have to give them quizzes that will require them to go access various databases. Therefore, depending on the way in which ICTs are used in digital literacy instruction, their use can indeed enhance students' digital literacy skills" (SL 10).*

4.3.8 Additional comments about the use of ICT in digital literacy instruction

This was the last question of the interview schedule. Interviewees were offered a chance to comment either on the interview process, and the use of ICTs in digital literacy instruction. Four (4) interviewees did not provide responses to this part of the interviews with some of them simply appreciating the chance to participate and wishing the researcher well throughout the research process. Six (6) interviewees who provided comments as required by the question highlighted areas such as training for Subject Librarians to equip them with relevant ICT skills. One interviewee suggested that if Subject Librarians can reflect on their own skills, they will be able to provide more effective teaching methods to students which will help and enhance their ICT skills.

Another respondent said that students are not equipped with basic ICT skills. Many of them they struggle with the use of Microsoft Office suite; they are unable to type assessments, and even use devices like the mouse, or keyboard. The interviewee suggests that institutions should provide ICT commons which will specialize in teaching students' basic ICT skills. He linked this idea of ICT commons to the end-user computing module that normally specializes in teaching first year students the basic functions of the computer. These responses are shared below:

Table 4.30: Interviewees' additional comments

Subject Librarian Code	***Response shared***
SL1	*"Yeah, I know you're speaking from an academic librarian perspective. So I think first and foremost is self-reflection, you know; and I mentioned this before that we need to reflect upon our own skills and what we have because if we do that and we are critical of that, then we would be able to provide more effective teaching methods to students that will help and enhance them, grow and develop and give them these lifelong skills of digital literacy or ICT skills that they may require and they will use in their work or in their communities, etc".*

SL2	*"What I can say is that as Subject Librarians we really need specific professional development opportunities in order to increase our ability to use ICT for formative learning assessments, individualized instruction, accessing online resources, and for fostering student interaction and collaboration. I strongly believe that ICT training can impact Subject Librarians' attitudes towards using ICTs in the literacy instruction".*
SL5	*"There is a lack of training for Subject Librarians in terms of ICTs. I mean, the general understanding is that when we are digitally literate, and qualified to use ICT, then our knowledge will contribute to certain higher-order thinking skills, be able to provide students with innovative opportunities to cope with everyday changing technology".*
SL6	*"It is important to develop a common vision about the role of ICT in education with stakeholders and creating a shared community of practice. Without any holistic improvement to Subject Librarians' support and training that will address several ICT issues, then we are most likely to be encouraging a generation of digitally illiterate students. Subject Librarians will obviously need the knowledge and skills to use new digital tools to help all students achieve high academic standard".*
SL9	*"As Subject Librarians, it is important that we upgrade ourselves in ICT and assist each other with using ICT in teaching and learning . It is our responsibility to keep up and blend our traditional teaching methods with ICT. Further, institutions should also do more in terms of providing these skills. They should arrange ICT*

	workshops and promote innovative methods of teaching".
SL10	*"So when I talk about digital skills about the students, I'm thinking ICT skills and specifically, I'm thinking about how to use a computer, how to use Microsoft Office applications, how to use the Internet, etc. And then there's a fear that students do not have that. They don't know how to use computers and that is where the university has to come into play. So before they even come for any instruction, whether its library based or whether it's a lesson that they attend for a cause; the institution needs to create you know they normally have research common and learning Commons. They need to create an ICT Commons for student. By the first time student who comes from a disadvantaged community; and you know, we're talking about the digital divide now and not having digital skills, and they have this device in front of them. You know students would very easily know how to use a phone; go on to Facebook but when it comes to using these skills for education they find it very difficult. So they need to create this ICT Commons, so in these Commons you'll have tutors or you have labs available where they're having open sessions all the time on how to use different Microsoft Office applications, how to use a laptop, etc. How to use a tablet, whatever it may be, how to connect to the Wi-Fi in the institution. These are things that need to come up in terms of bridging the digital divide".*

4.4 Conclusion

This chapter presented and analyzed the findings of the study. The presentation and analysis were based on data collected by means of online survey and remote interviews. The findings showed a positive response to the use of ICTs by Subject Librarians in academic libraries in KwaZulu-Natal. The next chapter discusses and interprets the findings of the study. Qualitative findings will be used to further explain the quantitative results in more depth.

Chapter 5: Discussion and interpretation of findings

5.1 Introduction

In the previous chapter, the quantitative and qualitative data were presented and analyzed. This chapter discusses and interprets the findings of this study. The study sought to achieve the following objectives:

- To ascertain ways in which Subject Librarians use information and communication technologies for digital literacy instruction in academic libraries in KwaZulu-Natal.

- To find out if Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal.

5.2 Demographics

5.2.1 Employer

Participants in this study were from traditional universities and universities of technology. Thirty-five participants were employed by traditional universities and fourteen participants were employed by universities of technology (refer to Figure 4.1 and Table 4.1).

5.2.2 Academic Library working experience

It was revealed that Subject Librarians have immense experience working in an academic library environment. The significant 61.2% of respondents have been in an academic library for more than 15 years, while 24.5% have been in an academic Library for at least 10-15 years. Only one respondent indicated less than five years of experience in an academic library. Most often, the position of a Subject Librarian requires approximately three to four years of working experience in an academic library, particularly the liaison position. This is mostly to ensure that “successful candidates already had knowledge of the academic environment, and are aware of the teaching, learning and research support needs of students” (Chanetsa 2014: 154).

5.2.3 Subject Librarian working experience

The findings of this study revealed that nineteen participants have been working in the Subject Librarian's role for over fifteen years, eighteen participants have been in the Subject Librarians role for a period of 10-15 years. There were only two participants who have been working as Subject Librarians for less than five years. In some cases, it is a good idea to preserve employees with a number of years of experience as a result of the commitment and dedication they put into their work, however, in other cases employees with many years of experience can sometimes end up too comfortable in their positions and be resistant to change (Beard and Land 2012: 239).Thus, in this study, 19 (38, 8%) respondents have been in the Subject Librarian position for over 15 years.

All responses were beneficial to the study regardless of their academic library experience and experience as a Subject Librarian. Even so, it was more advantageous that 30 (61.2%) respondents had more than 15 years of experience in an academic library environment and 19 (38, 8%) respondents had over 15 years of experience as Subject Librarians. This indicates that respondents with many years of experience answered the survey questions from their comprehensive knowledge and experience. Nevertheless, the responses from respondents with less than 5 years of experience were also useful and necessary as they are believed to have been able to throw-in some new and fresh ideas to various issues as investigated in the study.

5.3 Academic library model

This study explored the academic library model that is currently adopted by academic libraries in KZN universities. The rapid development of Information and communications technology along with its wide-spread integration in academic libraries and patrons' ever-changing needs suggest the need for the academic libraries to adopt the most relevant and effective model. Back in 2005, Allen (2005: 291) deemed the hybrid model as the most innovative in the 21st century. The key elements of a hybrid model encompass the combination of traditional and modern ways of providing services. However, Allen (2005: 291) asserted that "two elements of a hybrid service model in the academic library are: flexible organizational structures and staff possessing hybrid skills, facilitated by a shared culture." Similarly, Jaguszewski and

Williams (2013: 7) found an emerging adoption of a “hybrid model that combines elements of the roles of liaisons and functional specialist or experts.” While the hybrid model is recommended in the earliest literature (Allen 2005; Jaguszewski and Williams 2013), but the continued development of ICTs in academic libraries predict the shift from earlier models towards the ‘digital librarian (Chanetsa 2014: 3).

A study undertaken by Hoodless and Pinfield (2018) in the United Kingdom found that some libraries are setting up a functional-based structure by adopting a model of restructuring that is based on functional teams, while other libraries were found to be still adopting subject-based approach within their models. In contrast, the current study found that the faculty-liaison is the model that is adopted by academic libraries in KwaZulu-Natal, South Africa. When the respondents of this study were asked to indicate the academic library model adopted by their respective libraries, 75.5% of them reported the faculty liaison model as the most relevant. The faculty liaison model is driven by the assumption that specialized knowledge in the form of subject expertise can help Subject Librarians meet the needs of faculty staff and students. In this model, Subject Librarians partner with the faculty staff to carry out teaching and learning. These findings are similar to that of Jaguszewski and Williams (2013: 7) on their report about transforming liaison roles in Washington DC. Jaguszewski and Williams (2013: 7) found that “most of the libraries (in Washington DC) embrace a liaison model in which Subject Librarians are assigned to academic departments, institutes, and research centers to effectively support teaching, learning, and research; identify opportunities for further development of tools and services; and connect students, staff, and faculty to deeper expertise when needed”.

Although the findings of this study were similar to the findings of the report by Jaguszewski and Williams (2013), they were however contrary to the study by Chanetsa (2014) undertaken within the Southern African Customs Union region, which discovered a “shift to the dual model of Subject Librarianship”.

Chanetsa (2014) revealed that “61 (50.4%) respondents worked under the dual model; and 41.3% of the respondents worked under a kind of crossbreed model, the hybrid model, which ‘grafted’ subject work onto a traditional library structure”.

5.4 Digital literacy instruction activities

The roles of Subject Librarians have been a constant feature of academic libraries around the world and their work is evolving rapidly with the advent of Information and Communications Technology. Most often, activities of Subject Librarians include a comprehensive information service, library collection development, and literacy skills' development among students. They have responsibilities for various disciplinary areas and work collaboratively with faculty staff for various purposes with some of them encompassing the implementation of integrated and embedded information research and learning skills and research data management programs. Their responsibilities also rest on leading change and to further library goals. Therefore, in this current study, respondents were requested to indicate if their job description was clear and whether it is inclusive of digital literacy instruction. A total of 45 of 49 respondents were in agreement that their job description was clear. However, 3 of 49 respondents were in disagreement that they have a clear job description, and one respondent was uncertain about whether they have a clear job description or not. Therefore, given the fact that 91.8% of respondents confirmed that they have a clear job description, this study then concludes that Subject Librarians in academic librarians in KZN have a clear job description.

Furthermore, this study also revealed that the job descriptions for Subject Librarians in traditional universities and universities of technology in KZN were inclusive of digital literacy instruction.

These findings support the argument by Jaguszewski and William (2013: 6) that Subject Librarians' time at a reference desk has been replaced by anticipating recurrent needs as a result of rapid technological developments. Zanin-Yost (2018: 161) further expands on this by mentioning that "the 'titles' Subject Librarian does not fully describe what services are offered to the patrons since they always do more than what is written in their job description."

Although the role of a Subject Librarian has seen a drastic change over time, the literature highlights five traditional activities associated with Subject Librarianship, which are: library orientation; information literacy instruction; faculty liaison; reference services and user education; and collection development (Agyen-Gyasi 2008; Zanin-Yost 2018; Jaguszewski and William 2013; and Attahir 2019; Madhusudhan and

Lamba 2021). Additionally, Madhusudhan and Lamba (2021: 95) also listed other traditional roles of a Subject Librarian which included among others:

- Performing cataloguing and classification of the resources.
- Providing good public relations inside and outside the library.
- Marketing and promotion.
- Production of guides, Web pages, etc.

Nevertheless, activities of Subject Librarians may differ from institution to institution; and the amount of time spent on each activity is dependent upon the emphasis placed on it by the particular institution (Madhusudhan and Lamba 2021: 91, Chanetsa 2014: 220).

In the context of this current study, participants were asked to indicate activities associated with digital literacy instruction that they perform. The study revealed that the activities that were most performed were: research support and consultations with students and staff; literature searches for all students; individual digital literacy training for students; online digital literacy training for students; and subject-specific digital literacy. As shown in Table 4.5 in the previous chapter, majority of the respondents spend over 10% of their time in the above-mentioned digital literacy activities.

5.4.1 Research support and consultations with students and staff

In this study, 19 (54.3%) respondents noted that they perform research support and consultations at least once a month; 16 (33%) of them pointed out that they carryout research support and consultations at least once a week and 9 (18.4%) carry out this activity at least once a day. These findings are similar to that of Chanetsa (2014) where respondents ranked research support as second important, noting that they spend more than 10% of their time on this activity.

One of the major responsibilities of a subject or liaison librarian is to provide research support and consultation to students and the faculty members that include developing collections to meet their needs and providing research consultations and other relevant services (Madhusudhan and Lamba 2021: 88). This responsibility also comprises developing easily accessible online materials (e.g., LibGuides) available to anyone at any time. A report about Transforming Liaison Roles in Research Libraries by Jaguszewski and William (2013) interviewed many libraries which discussed ways

to support a shifting range of needs related to research. Some of them noted an increased focus on supporting interdisciplinary research, assisting faculty who are branching out into new disciplines but are unfamiliar with key articles, core journals, and potential collaborators. Therefore, this implicates that research support and consultations is one of the core activities that Subject Librarians undertake most often.

5.4.2 Literature searches for all students

This activity can be explained as the use of ICTs and online discovery systems to help students to discover resources that would have been otherwise inaccessible.

In this current study, 27(55.3%) noted that they undertake this activity at least once a month; 15 (30.6%) mentioned that they perform literature searches at least once a week and 7(14.29%) perform this activity at least once a day.

Based to these findings, both the literature search for all students; and research support and consultation were ranked as the first most important and most undertaken activities.

In the study by Chanetsa (2014), respondents pointed out that “there would always be users, who lacked necessary information retrieval skills”, which then implies that this activity remain a Subject Librarian’s responsibility even from the time to come.

5.4.3 Digital literacy training for students

Digital literacy training for students includes individual digital literacy training, online digital literacy training; and subject-specific digital literacy training.

The study revealed a positive engagement of Subject Librarians in digital literacy training for students. It was discovered that a large number of respondents carried out digital literacy training once a month; once a week, and few of them undertook digital literacy instruction at least once a day.

5.4.4 Other digital literacy instruction activities

Other digital literacy instruction activities include general digital literacy instruction for students; advanced digital literacy training; classroom digital literacy training; digital literacy promotion; library orientation and induction of students.

Apart from the digital literacy activities that were carried out most often and ranked as most important, respondents further undertook other digital literacy instruction activities as mentioned above. However, above mentioned activities were not carried out most often as compared to the rest of the activities discussed. These activities were either carried-out by many respondents less than once a month or once a month with very few respondents mentioning that they carry-out these activities at least once a week.

The findings about digital literacy activities as discussed above imply that the role of a Subject Librarian is dynamic, broad, and intensive in nature. This notion is substantiated by Madhusudhan and Lamba (2021: 95) who argued that 'the emerging role of Subject Librarians need more thinking about the extent of their role and sustainability in the coming years by contemplating questions such as what are the new trends that Subject Librarians have to keep themselves abreast with?; what traditional activities should be discarded?; what new skills are to be learned by the Subject Librarians to keep the users engage?" (Madhusudhan and Lamba 2021: 95). These authors believe that contemplating such questions can enable Subject Librarians to keep up with the constantly changing digital environment and meet the expectations of their user community.

5.5 Subject Librarians' involvement in E-learning

E-learning is an important issue, and it has become a most dominant mode of teaching and learning in the institutions of higher learning around the globe.

The current study revealed that 37 (76%) of 49 respondents were involved in e-learning. The percentage of respondents who are involved in e-learning is pleasing and allows the study to draw positive conclusions regarding Subject Librarians' involvement in e-learning. Nevertheless, various researchers have argued about changes brought by e-learning in Subject Librarianship. For example: Khanchandani,

Kumar and Kumar (2015: 517) pointed out that E-learning environment has also provided various new opportunities among the library professionals. Library professionals can play a vital role in providing information to the needy ones and in spreading awareness regarding e-resources (Khanchandani, Kumar and Kumar 2015: 517). Additionally, Khanchandani, Kumar and Kumar (2015: 526) concluded that the library profession has also got affected in this information era; quoting that librarians cannot run away from the change, but they should acquire new skills and competencies to get along in the e-learning environment. Similarly, Pawar (2016: 24) argued that “e-learning is changing the role of information professionals and offering them new opportunities to capitalize on their expertise.” Kolhe (2018: 85) reported the need for librarians to utilize the changing technologies to provide the best access and services to the students. Pawar (2016:24) made an emphasis on the need for Subject Librarians to ensure their place in the virtual world of learning. As such, this can only suggest that it is important for all Subject Librarians to be involved in e-learning at their institutions.

Moreover, when respondents were asked to detail their involvement in e-learning, 35 (94.59%) of them associated their involvement with e-learning to using various Learning Management Systems to conduct their literacy classes. Among all other LMS used by respondents to participate in the e-learning, the most dominant were Microsoft Teams, Moodle and Blackboard. These findings were also supported by the qualitative findings of this study where it appeared that respondents use the very same Learning Management Systems to conduct their digital literacy instruction.

5.6 The Importance of ICTs in digital literacy instruction

As discussed in previous chapters, digital literacy means having the skills needed particularly to live, learn, and work in a society where communication and access to information is increasingly through digital technologies. It represents the ability to use information and communications technologies. Nowadays, digital literacy has an essential role in higher education and very important among students.

The quantitative findings of current study also deemed digital literacy instruction as a matter of importance. When respondents were asked to indicate their level of agreement that digital literacy is important among students; a total of 46 (93.9%) out

of 49 respondents were in agreement that digital literacy instruction is indeed important. These findings corroborate that of Shopova (2014) who established that improving digital literacy of students is an important condition. The development of the literacy level of students and their digital competence is crucial for improving the effectiveness and efficiency of the learning process as well as for the adaptation of students to the dynamically changing labour market (Shopova 2014:26).

Notwithstanding the evidence from the quantitative results that respondents of this study were very certain about the importance of digital literacy instruction; the qualitative results further extended to this notion by acknowledging the importance of ICTs in digital literacy instruction. Interviewees provided insightful explanations about the importance of ICTs in digital literacy. As a result, the qualitative findings identified many benefits of using ICTs in digital literacy instruction. The qualitative findings revealed that using ICTs in digital literacy is important as it allows an effective resource sharing; lesson planning and promote collaborative learning (See Table 4.27).

These findings are similar to that of Omosekejimi et al. (2018: 68) who revealed that the benefits of the use of ICT and digital literacy instruction include: faster lecturer-student communication; cooperative learning among students; helps to locate/find teaching materials; complementing classroom instructional materials; encourages individual learning; improves students' knowledge retention; saves time with the use of grading software and collaboration and knowledge sharing among lecturers.

Nonetheless, the current study argues that the use of ICTs in digital literacy instruction allow students to communicate, share and work collaboratively. Interviewees for this study were certain that the use of ICTs in digital literacy instruction can enhance learning.

> *"I think that using ICT can also allow students to communicate, share, and work collaboratively anywhere, anytime conveniently with less costs…" (Interviewee 3).*
>
> "*No doubt that digital technology can enhance learning through accessing information and improving communication, as well as providing self-directed and collaborative learning opportunities. ICT skills can also help develop capable, future-ready citizens. Students might be 'digital natives', comfortable with and*

immersed in technology, but they depend on us to learn through digital means" (Interviewee 4).

The use of ICTs in digital literacy instruction provides various benefits to students including "improved completion and student retention rates, fostered deeper learning and understanding of high order thinking processes, improved student interaction in online discussion forums" (Reddy, Sharma, and Chauhhary 2020: 79). On the other side, Omosekejimi et al. (2018: 69) concluded that the application of ICT and digital literacy instruction will have tremendous impact on higher education.

5.7 The Use of ICTs in digital literacy instruction

Information and communications technology has become very important, and it influences all aspects of our lives in the 21st century. Thus, in education, the use of ICTs allows for new ways of teaching and learning for students and teachers. The adoption and the use of ICTs digital literacy instruction is of utmost importance to access knowledge and keeps up with modern developments. It offers more opportunities for Subject Librarians and students to work better in a globalized digital age.

In the context of this current study, it was found that 48(98%) of 49 respondents use ICTs in their digital literacy instruction. The study further explored the extent to which Subject Librarians use ICTs in their digital literacy instruction. It was established that Subject Librarians use ICT to a very large extent. Out of 48 respondents who indicated that they use ICT in their digital literacy instruction, 26 (54%) of them use ICTs in most digital literacy instruction, whereas 18 (37.5%) use ICTs in all digital literacy sessions, while a minimum of 4 (8%) of respondents indicated that they use ICTs in few digital literacy instructions. Therefore, this study asserts that Subject Librarians have high confidence in the use of ICTs in digital literacy instruction.

5.671 Ways of using ICTs in digital literacy instruction

Having established the extent to which Subject Librarians use ICTs in their digital literacy instruction, it was necessary to expand on these findings by getting an in-depth explanation about the ways in which Subject Librarians use ICTs in digital literacy

instruction. As such, the qualitative approach was adopted to get rich explanations from respondents regarding ways in which they use ICTs in digital literacy. The qualitative findings suggest that ICTs can be used in various ways in digital literacy instruction. Though the idea of using ICTs in digital literacy instruction sounds interesting, but the manner to which ICTs are used for teaching and learning matters the most. “As universities adopt the e-learning approach, academic libraries are entitled to find ways to deliver their content in ways that the new generation of student prefers and on platforms where it interacts” (Mgquba and Underwood 2015: 39). Therefore, in this current study, respondents mentioned various teaching procedures as their ways of using ICTs. Among them was the use of personal computers, PowerPoint presentations and the internet. Respondents pointed out that they mainly use the mentioned ICT resources for information retrieval, lesson planning and projecting their lessons during sessions.

However, the similar case was established in a study by Suárez-Rodríguez *et al.* (2018) where ICTs were preferentially used to plan daily teaching practice.

The current study also noted multimodal learning as another way Subject Librarians use ICTs in digital literacy instruction. This study revealed that Subject Librarians use various Learning Management Systems to conduct their digital literacy instruction.

Nevertheless, the study established that ICTs are widely used for communication and dissemination of information. The study reveals various ways through which Subject Librarians communicate with their students for various reasons. Omosekejimi *et al. (2018: 59)* point out that use of ICTs calls for creativity, innovativeness hard work which can also be associated with digital literacy skills. Thus, in this study, creativity and innovation was noted where some respondents used ICTs in a manner that interest students and encourage them to be involved in the lesson and engage accordingly. For example, the use of Peer-deck and question Pro seemed to have made learning to be more interesting and effective.

5.7.2 ICT resources which are used the most in digital literacy

There are many ICT resources that can be used for digital literacy instruction, but even so, not all of them will be relevant for certain facilitator and certain lessons. The types of ICT resources used for digital literacy instruction may differ from institution to

institution. Thus, in this study, respondents mentioned vast number of ICT resources which they use for digital literacy instruction. While the study revealed many ICT resources used by Subject Librarians in their digital literacy instruction, the most dominant were Microsoft Teams (MS Teams); PowerPoint Presentation; Moodle and Blackboard, as discussed in the previous chapter.

Similarly, in a study by Mgquba and Underwood (2015: 42) Moodle was shown to be the preferred platform with 81% of respondents reporting that they used it the most for e-learning. On the other hand, Bhusal (2020: 23) revealed that “respondents also teach using power-point projector in their classrooms.” Bhusal (2020: 23) further established that the using ICT resources in education is very helpful for facilitators and students as well.

5.7.3 Challenges associated with digital literacy instruction and the use of ICTs by Subject Librarians

The rapid changes in technology are altering the traditional ways of undertaking literacy instruction in academic libraries. This rapid ICT transformation has brought many possibilities and advantages in academic library spaces. Although ICT is found to be useful in transforming education in various ways, but the literature suggests that “there are some impediments in adopting and integrating ICT in teaching and learning process” (Lawrence and Tar 2018: 83).

Many studies have reported various challenges in relation to literacy training. Many of these challenges were based to technology, funding, and time. “Technological challenges included slow internet connectivity, low bandwidth, and few computers and -all of which contributed to the hampering of literacy instruction activities” (Chanetsa 2014; Mansour 2017).

This study also revealed challenges experienced by Subject Librarians while carrying out their digital literacy instruction. The study established that Subject Librarians use ICTs mostly as online learning mechanisms, therefore, many notable challenges were mainly based to the online learning.

5.6.3.1 Students' digital literacy challenges

Challenges revealed from this study suggests that many university students may be digital natives, but not all of them possess necessary digital literacy skills, which in turn poses a number of challenges for Subject Librarians. These challenges are similar to the findings of Chanetsa (2014) who found a case where a "high number of students enrolled into universities every year had no or limited digital skills."

The quantitative findings of this current study found that challenges that were mostly experienced by Subject Librarians when carrying out their digital literacy were the lack of interest or poor attendance by students, and lack of computer literacy or differences in levels of computer literacy within a class. Accordingly, these findings were further explained in detail by the qualitative findings which suggested that student's inability to use ICTs is the reason for Subject Librarians to make limited use of ICTs in digital literacy instruction. The findings of the current study implies that students coming from disadvantaged backgrounds are normally the ones who lack knowledge and skills related to digital literacy and the use of computers. This was noted as a major challenge as it seemingly divides the class into a group of digital literate students and those who lack necessary digital skills. Therefore, such division calls for Subject Librarians to adopt teaching strategies which accommodate both groups of students. In such instances, the findings implies that students who are less skilled would be left behind, while those who possess basic ICT skills might become bored as a result of a teaching strategy adopted. As such, this challenge will eventually lead to lack of interest to attend digital literacy classes and poor attendance.

In view of this, the qualitative findings noted a concern from Subject Librarians where some students do not attend sessions and rely on the recording. Few respondents pointed out that some students do not take digital literacy classes seriously; therefore, they either do not attend sessions or do not pay attention.

Furthermore, the study also found that lack of concentration among students is also a challenge that Subject Librarians experience. An example was made with a case where sessions require the use of computers in the computer lab. It was raised that there will be students who use computers for other things like gaming, social networking other than focusing on the lesson being conducted.

5.6.3.2 Subject Librarians personal challenges

The findings of this study imply that if Subject Librarians lack relevant digital literacy skills, they will experience challenges in using ICTs for digital literacy instruction (Reddy and Sharma, Chaudhary 2020: 68). Subject Librarians' attitude towards digital literacy was viewed as one of the barriers to Subject Librarians' digital literacy instruction.

Nevertheless, a majority of respondents felt that they lacked relevant ICT knowledge and skills necessary for digital literacy instruction. In the context of the current study, ICT knowledge and skills refers to Subject Librarians' ability to utilize various technological resources in digital literacy instruction and entire teaching and learning process. While lack of ICT knowledge refers to the lack of broad knowledge and understanding of ICT, this is viewed as a barrier to the adoption and use of ICT in digital literacy instruction. These findings corroborate that of Chanetsa (2014) who found that Subject Librarians' information literacy challenges was their lack of skills related to instructional and using ICT resources. Similarly, another study by Lawrence and Tar (2018) found that barriers to ICT adoption and integration are: lack of ICT knowledge; lack of time; resistance to change; complexity of integrating ICT; lack of training; lack of technical support.

5.8 Skills of Subject Librarians

Digital literacy instruction demands technological competencies and adequate skills to successfully integrate ICTs in digital literacy instruction. The future of digital literacy in academic library is dependent upon Subject Librarians' professional skills which enable them to remain relevant in the ICT dominant era.

The reviewed literature insinuate that the transformation of digital technologies requires Subject Librarians to be skilled and competent to be able to carry out their digital literacy instruction and be able to address the challenges of the digital environment.

5.8.1 Ms Word, PowerPoint and Excel Skills

In this study, there was a significant agreement among respondents that Ms Word skills are important among Subject Librarians. The study by Ayoku and Okafor (2015) found that “more than half of the respondents (to a large or very large extent) can perform word processing tasks effectively.” Thus, in this study, majority of respondents rated their level of competence in Ms Word as very extreme. This suggest that Subject Librarians in academic librarians in KZN possess adequate knowledge of “how to save documents”, “difference between save and save as”, “saving documents in different version of word processor”, “setting margins and orientation”, “how to print document”, “how to password protect a document”, “how to use grammar and spelling tool and how to use thesaurus” (Ayoku and Okafor 2015: 507).

5.8.2 E- Mailing skills

E-mailing skills and abilities are critical for Subject Librarians because an E-mail is a formal and recognized medium of communication. Respondents were in strong agreement that e-mailing skills are of utmost importance among Subject Librarians. As such, they rated their E-mailing skills as highly competent. Therefore, to a large extent, Subject Librarians in academic libraries in KwaZulu-Natal are able to create and compose emails, forward and reply to emails, attach files, set up signatures or holiday/vacation notes, create folders, block an address, customize email, and tag a message.

5.8.3 Other skills held by Subject Librarians

These skills include: citing skills; blended and online learning; pedagogical classroom skills; knowledge of reference tools; MS Excel skills; knowledge of institutional repository; bibliographic skills; copyright and licensing, and metadata creation. While respondents were in agreement that the mentioned skills are of paramount importance among Subject Librarians, they also rated themselves as competent in these skills. These findings are also supported by Madhusudhan and Lamba (2021: 95) who emphasized the importance of Subject Librarians to possess skills and competencies in: knowledge of copyright, IPR, fair use, and other related topics.

Moreover, the majority of respondents from the study by Baro, Obaro and Aduba (2019) rated their knowledge of copyright laws in the digital environment to be highly competent. However, Subject Librarians "need to be able to provide a general level of knowledge about copyright, data management, the need for metadata and the ontologies available in their disciplines" (Jaguszewski and William 2013: 12). In this study, Subject Librarians' level of competency in copyright, data management and metadata were rated moderate other than competent or extremely competent.

5.8.4 Additional management; interpersonal & technical skills necessary for Subject Librarians

The study revealed the importance for Subject Librarians to possess various skills and knowledge related to management, interpersonal and technical skills. In the same vein, Raju (2017: 262) noted a case where senior librarians considered communication (written and oral) skills and interpersonal skills, respectively as being very important to academic librarians.

In this current study, all respondents were in agreement that it is essential for Subject librarians to possess the following management, interpersonal and technical skills: Communication and liaison skills; listening skills; critical thinking and analytical skills; writing skills; knowledge of international and local information sources; understanding of research work flows; research/information search and retrieval skills; information evaluation skills; knowledge of copyright, plagiarism, fair use concepts; licensing and negotiation skills; marketing and advocacy skills; management skills; leadership skills; decision making skills; team building; and problem solving. These findings support the sentiment by Attahir (2019: 113) who explained that skills in information retrieval, evaluation and management are essential for librarians. The similar sentiment is shared by Ayoku and Okafor (2015: 520) who also pointed out that Subject Librarians are expected to possess the above-mentioned interpersonal skills and technical skills. Madhusudhan and Lamba (2021: 95) on the other hand, articulated that it is very important for Subject Librarians to possess excellent communication and interpersonal skills; management skills; teaching skills; knowledge of copyright, IPR, fair use, and other related topics; knowledge of scholarly communication and research data services (Madhusudhan and Lamba 2021: 95).

Based on the findings of the current study and the literature reviewed, it appears that despite Subject Librarians increasing teaching responsibilities, for as much as they are not properly equipped in interpersonal skills, technical skills, and pedagogical skills; then they would be at risk of being unable to express and successfully portray their teacher identity to themselves and their respective institutions. As such, it is for this reason that this study places the highest degree of importance on the acquisition of the above-mentioned management, interpersonal and technical skills.

5.8.5 Level of digital literacy skills of Subject Librarians

Studies have been conducted to establish the level of digital literacy skills among Subject Librarians. For example, Baro, Obaro and Aduba (2019) assessed digital literacy skills and knowledge-based competencies among librarians working in university libraries in Africa. They found that the majority of respondents rated the level of their digital literacy skills possessed to be moderate; while, others rated their digital literacy skills to be excellent, and low. In Nigeria, Attahir (2019) conducted a study to determine if Nigerian librarians possess digital literacy skills. The study revealed that librarians in Nigeria possessed low digital literacy.

While these academic librarians have enthusiastically embraced the teaching roles thrust upon them, the qualitative findings of this study revealed low digital literacy skills among Subject Librarians and emphasizes the need for Subject Librarians to upgrade their ICT skills (See Table 4.29).

These findings are contrary to Mulat and Natarajan (2020) who discussed the contemporary digital literacy skills among library professionals in Jimma university libraries of Ethiopia. This discussion found that most of the librarians possess very high digital literacy skills.

5.9 Faculty-Librarian collaboration

Collaborations with faculty range from redesigning a course, imbedding information literacy skills, developing grading rubrics, and helping with grading. “Librarians at many institutions are now focusing on collaborating with faculty to develop thoughtful assignments and provide online instructional materials that are built into key courses

within a curriculum and provide scaffolding to help students develop library research skills over the course of their academic careers" (Jaguszewski and William 2013: 6).

The concept of collaboration can be clearly distinguished from cooperation and coordination as this process obtains a higher degree of commitment in sharing roles, resources and knowledge from involved entities who work together to achieve a common goal (Pham and Tanner 2014: 23). Collaboration and partnerships at all levels are critical to leveraging expertise and thereby developing and expanding new services, liaison roles, and library roles more generally (Jaguszewski and William 2013: 13).

By working with faculty staff, Subject Librarians will be able to share their expertise and knowledge; and support lecturers in embedding the necessary skills into the classroom. Therefore, this suggests that faculty and librarian collaboration is key in the quest for digital literacy.

The collaborative effort between Subject Librarians and academic staff strengthens the successful integration of ICTs in literacy instruction and have a positive effect on the implementation of digital literacy development programs.

This study found that 47 (95.9%) of 49 respondents collaborate with faculty in their digital literacy instruction. Moreover, the study revealed that very few respondents collaborate with faculty up to a very large extent (once a week). However, a majority of respondents reported a limited collaboration with faculty staff in their digital literacy instruction. Twenty-two respondents collaborate with faculty staff as least once a month and 20 respondents collaborate less than once a month. This study found that whenever collaboration between Subject Librarians and faculty staff took place, there was great success. These findings are similar to that of Hawes and Adamson (2016) who conducted a case study to exemplify successful faculty-librarian collaboration. The findings of their study established a successful collaboration between Subject Librarians and faculty staff. Collaterally, Igbo and Imo (2017: 13) highlighted the importance of collaboration between the "teaching faculty and librarians as a strategy for imparting information literacy in students, which invariably enhances teaching and learning, especially in a life-long context" (Igbo and Imo 2017: 13). In a study by Charles (2019), Subject Librarians and faculty staff perceived the idea of collaboration as a possible means of improving students overall learning. In the same vein, Igbo

and Imo (2017) revealed that “faculty and librarians view collaboration as a relevant strategy for improving students’ information literacy as well as their overall learning conditions, with sharing of ideas and expertise between professionals as the most beneficial effect of collaboration.”

Based on the literature reviewed, the findings of this study imply that successful implementation of digital literacy instruction requires an effective collaboration between faculty staff and Subject Librarians.

5.10 Alignment with Theoretical Framework

The ECU digital literacy framework was used to guide the study in the review of related literature, the development of survey and interview questions and data analysis. Therefore, this section discusses the findings of the study in terms of the 5 elements of ECU digital literacy Framework.

5.10.1 Digital technologies

The ECU Digital Literacy Framework implies that Subject Librarians should be provided with enough digital literacy training which is required to meet the digital needs of students. In this current study, it was revealed that Subject Librarians in academic libraries in KwaZulu-Natal do receive digital literacy training. However, the study established that there is still a need for more digital literacy training workshops for Subject Librarians. The current study implied that if Subject Libraries are well equipped and thoroughly trained with digital literacy skills, they will be in a good position to develop students’ digital literacy skills. Interviewees in the current study highlighted the lack of enough digital literacy skills as the challenge to successfully meet students’ digital learning needs. As a result, the current study placed the great deal of importance on Subject Librarians’ digital literacy skills development.

5.10.2 Information, academic, media & data literacy

As discussed in chapter two of this study, under the element of information, academic, media and data literacy; the ECU digital literacy Framework emphasises the importance of collaboration between librarians and various team players and stakeholders. Thus, in this element, the ECU digital literacy Framework also implies that Subject Librarians should provide access to information, academic and digital

literacy programs through the development of online resources and modules. In a similar way, the current study suggests that the successful development of digital literacy programs as suggested by ECU digital literacy framework, depends on the successful and effective collaboration between Subject Librarians, academic staff and relevant stakeholders. This current study investigated Subject Librarians' collaboration with Faculty staff to develop digital literacy programs. The findings revealed a successful collaboration between Subject Librarians and faculty staff. The current study implies that the collaboration of Subject Librarians with academic staff elevate the integration of ICTs in information literacy instruction and have a positive impact on the development of online resources and modules, and digital literacy programs as suggested by the ECU digital literacy Framework.

5.10.3 Digital citizenship & identity

According to the element of digital citizenship and identity, students must be educated about managing digital identities on multiple platforms. As previously discussed in this study, the element of digital citizenship and identity suggest the importance for libraries to continue to develop and update digital learning programs (Johnston 2020: 98). In this current study, it was established that Subject Librarians in traditional universities and universities of technology in KwaZulu-Natal utilizes various digital learning programs to educate students about the safe and responsible access and use of digital technologies.

5.10.4 Digital creation and communication

The ECU digital literacy Framework requires that students be provided with access to digital learning technologies which may include relevant technologies in their discipline. Furthermore, students must be educated and equipped with relevant digital literacy skills that will allow them to participate in the digital environment which for example include online discussions, webinars, social media, visual worlds. Thus, in this study, it was established that Subject Librarians utilize various ICT resources to develop students' digital literacy skills, as required by the ECU digital literacy Framework. The current study revealed that Subject Librarians use several learning management systems to allow students to engage in online discission forums which in turn equip students to be able to communicate with others for digital learning and social networking. In line with the element of digital creation and communication of the

ECU digital literacy Framework, the findings of the current study insinuate that Subject Librarians acknowledge the importance of teaching students “how to cope in the knowledge society and how to develop the necessary information and digital literacy skills to be productive members of society in a digital environment” (Ciccone and Hounslow (2019: 2).

5.10.5 Digital learning (professional & lifelong)

As previously discussed in Chapter 2 of this study, the element of digital learning suggests the need for and importance of promoting digital literacy as a “lifelong learning concept, and to equip students with digital literacy skills needed in the workplace.” In this current study, almost all Subject Librarians agreed that digital literacy is a paramount skill among students, and a requirement in the technologically changing society. The current study reflects Subject Librarians’ commitment to enable students to develop knowledge, skills, and attitudes to navigate the complexity and diversity present in the rapidly changing world, including the world of work. In line with ECU digital literacy Framework, the current study reflected that in the 21st century, digital literacy is a critical skill that is required in higher learning and beyond. To develop students’ digital literacy skills, this study found that Subject Librarians use Learning Management Systems and other ICT resources to conduct in-class and online digital literacy instruction. Where possible, Subject Librarians also collaborate with academic staff to prove the integration of ICTs in digital literacy instruction.

5.11 Summary

This chapter discussed and interpreted the findings of the study from both quantitative and qualitative phases. This chapter combined the results from both phases to fully answer the research questions and develop a more robust and meaningful picture of the research problem. The use of ICT in digital literacy instruction has been reported to result in many teaching and learning benefits even though it is quite demanding and challenging. This chapter discussed and interpreted both the quantitative and qualitative findings. The qualitative findings were very useful to explain the quantitative results in detail, giving an in-depth understanding of Subject Librarians use of ICTs in digital literacy instruction. The findings were rich and very clear and illustrated how the five elements of ECU digital literacy framework were incorporated into all aspects of

digital literacy instruction in academic libraries in KZN. The next chapter will draw conclusions by answering the research question, make recommendations and point to future research to strengthen the findings of this study

Chapter 6: Summary; conclusions and recommendations

6.1 Introduction

The previous chapter discussed and interpreted findings resulting from the online survey questionnaire and the remote interviews with Subject Librarians in academic libraries in KwaZulu-Natal. The qualitative data were further used to explain the quantitative findings of the study. This chapter will also draw conclusions from the research and further make recommendations based on the findings.

The objectives of this study were:

- To ascertain ways in which Subject Librarians use information and communication technologies for digital literacy instruction in academic libraries in KwaZulu-Natal.

- To find out if Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal.

6.2 Answering the research questions

In order to achieve the study's objectives, the following questions were generated:

- How are Subject Librarians using ICTs for digital literacy instruction in academic libraries in KwaZulu-Natal?
- Do Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal?

6.2.1 Ways in which Subject Librarians use ICTs for digital literacy instruction in academic libraries

The findings of the study confirmed evidence from the literature of rapid growth and on-going use of ICT in literacy instruction. Responses show a widespread involvement of Subject Librarians in e-learning thereby utilizing various ICT resources.

It was established that that Subject Librarians use ICTs for digital literacy instruction in various ways. The use of various Learning Management Systems was deemed as the most effective way through which Subject Librarians use ICTs for digital literacy instruction. It is

glaring from this study that majority of the respondents were of the opinion that ICTs will to a very large extent be a tool for effective digital literacy instruction.

The findings revealed that almost all the respondents are in agreement that computers, projectors, PowerPoint presentations, interactive white boards and various learning management systems are to a very large extent/large extent seen as best ways of using ICTs for digital literary instruction.

The findings of this study suggested that using ICTs in digital literacy instruction can elevate students' digital literacy skills. It was established that the use of ICTs in digital literacy instruction come with many benefits which include allowing students to communicate, share and work collaboratively.

6.2.2 Skills of Subject Librarians

Many Subject Librarians do have skills and knowledge to use ICTs for literacy instruction. However, they lack adequate skills such as: Library management system skills e.g., Millennium, ITS; Knowledge of SPSS/other statistical software packages; MS-Publisher skills; MS-Access skills; Web design skills all of which are very important to enable subject Librarians to render a comprehensive, high-quality service. The study revealed that Subject Librarians possessed quite a number of managerial and interpersonal skills. Even so, the findings further suggested that there is still a need for Subject Librarians to acquire more managerial skills.

While the revelation that Subject Librarians are very much equipped with necessary interpersonal and managerial skills was a pleasing one, the study revealed a lack of ICT skills required to successfully execute digital literacy instruction.

The lack of adequate ICT skills among the Subject Librarians has been an on-going problem without a resolution. Many studies have revealed this challenge and recommended measures to be adopted to promote Subject Librarians' skills development. For example, Ayoku and Okafor (2015) found that "many of the respondents do not know about database management and are not skilled in Web design or familiar with Web design applications." These researchers recommended that "it is necessary for the government and stakeholders involved in the management of university libraries to provide funds for ICT training and for ICT infrastructure acquisition in libraries so that librarians can acquire the necessary skills" (Ayoku and Okafor 2015: 521).

6.2.2.1 Interpersonal skills

Respondents felt that the following interpersonal skills are the most essential for Subject Librarians: communication and liaison skills; listening skills; critical thinking and analytical skills; writing skills; knowledge of international and local information sources; understanding of research work flows; research/information search and retrieval skills; information evaluation skills; knowledge of copyright, plagiarism, fair use concepts; licensing and negotiation skills; marketing and advocacy skills; management skills; leadership skills; decision making skills; team building; and problem solving.

6.2.2.2 ICT Skills

The study revealed that many Subject Librarians only possessed strong ICT skills in the most used and common ICT resources like MS Teams, Moodle, Blackboard; MS Word; MS PowerPoint; email; referencing tools (Endnote). One respondent mentioned that he/she possess strong skills in using various software which also include the website design.

6.3 Conclusions of the research

This section presents conclusions drawn from the entire research.

6.3.1 Conclusion about the use of ICTs in digital literacy instruction

Based on the discussion about the use of ICTs in digital literacy instruction, the study draws the following conclusions:

- Subject Librarians in academic libraries in KZN universities are fully involved in digital literacy instruction. The ICTs are increasingly used for digital literacy instruction in various ways. The utilization of ICT in digital literacy instruction has rendered a significant contribution in bringing about improvements in the quality of education. Subject Librarians use various innovative ICT resources in their digital literacy instruction that includes the use of Pear-deck; questions pro; YouTube and Kahoot among others.

- The use of innovative ICTs for digital literacy instruction would impact positively on both students and Subject Librarians. ICT skills for both Subject Librarians and students would be increased including the moral for digital literacy instruction. The

use of innovative ICTs in digital literacy instruction promotes and encourages collaborative teaching and learning environment.

- Subject Librarians use a vast number of ICT resources in their digital literacy instruction, most of which include Microsoft Teams (MS Teams); Moodle; Blackboard, PowerPoint Presentation; personal computers; the internet and various database search.

- The study further concludes that the inadequate use of ICTs would affect the successful undertaking of digital literacy instruction.

6.3.2 Conclusions about the importance of ICTs in digital literacy instruction

The importance of ICTs in digital literacy instruction cannot be overemphasized. Therefore, based to the reviewed literature and the discussions of the study, the following conclusions regarding the importance of ICTs in digital literacy instruction are drawn:

The Subject Librarians in academic libraries in KwaZulu-Natal agree and acknowledge the importance of ICTs in digital literacy instruction.

The information and communications technologies are important and crucial for improving the effectiveness and efficiency of the learning process as well as for the adaptation of students to the technologically changing environment.

The importance of ICTs in digital literacy instruction also lies in its ability to promote effective resource sharing, lesson planning and collaborative learning.

6.3.3 Conclusion about Skills of Subject Librarians

As a customer service industry, academic libraries are mostly about talking to people, conduction user education and literacy instruction. Subject Librarians need to be expert negotiator and liaisons. As such, this study concludes by placing a high degree of importance on the management and interpersonal skills among Subject Librarians. Good communication (oral and written) skills; interpersonal skills; and general skills are judged as essential and very important among Subject Librarians.

The study concludes that Subject Librarians have strong skills in Microsoft Office in suite (MS Word, MS PowerPoint, and MS Excel); and emailing.

The study further concludes that Subject Librarians are competent and possess immense skills and knowledge in the following areas: blended and online learning; citing skills; pedagogical classroom skills; knowledge of reference tools; knowledge of institutional repository; bibliographic skills.

In terms of digital literacy skills relevant for digital literacy instruction, the study revealed that Subject Librarians' digital skills are mainly related to the use of the most common ICT resources like MS Teams; Moodle; Blackboard; MS word; PowerPoint; and MS Excel. There is only a few number of Subject Librarians who possess skills to use other innovative ICT resources like question pro; Pear-deck; Kahoot and other innovative ICT tools relevant for digital literacy instruction. Therefore, the study concludes that Subject Librarians possess low innovative digital literacy skills relevant for digital literacy instruction.

6.3.4 Conclusions about the challenges to using ICTs in digital literacy instruction

The idea of using ICTs for digital literacy instruction is pleasing and encouraging, however, there are also difficulties that come with the integration of ICTs in digital literacy instruction. Based on the discussions about challenges associated with the use of ICTs in digital literacy instruction, the study draws the following conclusions:

The digital divide is one of the biggest barriers to the use of ICTs in digital literacy instruction by Subject Librarians. For online digital literacy sessions, the issue of network connection infrastructure among students was a most notable challenge.

The lack of concentration; interest or poor attendance by students; and lack of computer literacy or differences in levels of computer literacy among students are also notable barriers to the use of ICTs for digital literacy instruction by Subject Librarians.

Most importantly, this study concludes that another challenge encountered by Subject Librarian in the use of ICTs in digital literacy instruction is their lack of relevant skills and knowledge necessary for digital literacy instruction. The basic understanding is that if Subject Librarians are not ICT skilled and knowledgeable, they would not be able to successfully use ICTs for digital literacy instruction.

6.4 Recommendations

Subject Librarians are deemed as pioneers of digital literacy instruction in academic libraries. However, the effective execution of digital literacy instruction relies on the successful use of information and communications technology. On the other hand, the said successful use of ICTs in digital literacy instruction required adequate ICT skills. Therefore, discovering ways through which Subject Librarians use ICT in digital literacy instruction; and determining the level of ICT skills they possess and those that they need for digital literacy instruction was a major objective for this study.

6.4.1 Recommendations about the use of ICTs in digital literacy

Academic libraries are now operating in a technologically driven environment which calls for Subject Librarians to have more than just a basic understanding of the latest or common ICT resources. Subject Librarians should demonstrate creativity and innovation when developing resources for digital literacy instruction. Therefore, the study recommends that Subject Librarians should be encouraged to explore viable innovative ICT tools to create an engaging and interactive experience in their digital literacy instruction.

6.4.2 Skills of Subject Librarians

Considering the fact that many first-year students are not digitally literate, therefore Subject Librarians need to be creative in the way they carry out their digital literacy instruction. As such, the study recommends that Subject Librarians should have a theoretical understanding of curriculum development and pedagogy to create appropriate curriculum.

Furthermore, the study recommends that Subject Librarians should take risks and be proactive. As such, the study suggests that Subject Librarians should be brave and take it upon themselves to seek ICT knowledge and acquire more ICT skills relevant for digital literacy instruction. This means even taking ICT short courses.

6.4.3 Subject Librarians' training and development

In order for Subject Librarians to be able to contribute immensely in students' digital literacy skills' development, they need to be empowered with all necessary digital literacy skills to achieve such mission. This can be accomplished through comprehensive training

workshops and related programs. The current study concluded that Subject Librarians are among the most important information disseminators, knowledge organizers and service providers in university libraries. Thus, they should be provided with the “necessary skills and competencies to help them achieve their library work” (Mansour 2017: 182). Therefore, professional development is necessary for Subject Librarians to be able to effectively use ICT in digital literacy instruction to improve students’ ICT skills.

As such, this study recommends that the university library management in academic libraries in KZN should organize routine training programs for Subject Librarians on the use of innovative ICT tools for digital literacy instruction. This will enable Subject Librarians to acquire relevant skills and further prepare them to use ICTs effectively in their digital literacy instruction.

6.4.4 Additional Recommendations

The majority of students enrolled for their first year at a university level usually lack knowledge of using computers. Many studies from the literature pointed out that many newcomers struggle with just basic ICT skills, with King (2007: 60) mentioning a case where some students would pay other students to type their assignments as a result of lack of typing abilities. For this reason, one respondent in this study recommended that universities should create an “ICT Commons” with an idea that is similar to research commons, which will specialize in providing basic training to students on how to use computers. This could be inclusive of teaching students almost everything about a computer.

Considering the fact that students come from different backgrounds, as previously noted in this study, therefore the study recommends the increasing use of zero data rated ICT resources in digital literacy instruction so as to accommodate students from all backgrounds.

Regarding Subject Librarians’ collaboration with faculty-staff for digital literacy instruction, this study revealed very limited Faculty-Librarian collaboration. Developing students’ digital literacy skills cannot be achieved by Subject Librarians alone; effective faculty-librarian collaborations are important. Zanin-Yost (2018: 161) concluded that “Subject librarians should not base their collaborations according to their titles, but rather focus on the scope of their mission within their institution.”

The current study asserted that the successful implementation of digital literacy instruction requires an effective collaboration between faculty staff and Subject Librarians. Therefore, the study recommends that regular faculty-librarian collaborations must take place to create environments where digital literacy instruction is successfully implemented.

6.4.5 Recommendations for future research

- The current study was limited to Subject Librarians; investigating the manner they use ICTs in digital literacy instruction and the skills they possess for digital literacy instruction. A similar study would be beneficial to investigate the perceptions of students regarding digital literacy instruction.
- Further, it is recommended that the same study be carried out in other South African provinces and other countries as well, to have an in-depth understanding of digital literacy instruction nationally and globally.
- The current study has drawn conclusions on the use of ICTs for digital literacy instruction in academic libraries in KZN. Therefore, it is recommended that further research be undertaken to examine the impact of the use of ICTs on the performance of Subject Librarians.

6.5 Conclusion

The study integrated the quantitative and qualitative phases during the discussion and interpretation of the findings of the study. As previously indicated, the research problem and questions implied the need to adopt the mixed methods approach. In the discussion and interpretation chapter, the study combined the results from both phases of the study to fully answer the research questions and get an in-depth understanding of the research problem. The integration process allowed for findings from the second qualitative phase to further clarify and explain the statistical results from the first quantitative phase. The researcher believes that the data gathered was useful in answering the research questions and attaining the objectives of the study.

The study augmented the discussion by citing related literature. Thus, combining the quantitative and qualitative findings helped to explain the results of the statistical tests, which underscored the elaborating purpose for a mixed-methods sequential explanatory design. Based on the analysis and discussion, the study concludes that the majority of Subject Librarians rated themselves as competent in most of the interpersonal skills.

Furthermore, majority of respondents held strong ICT knowledge and skills related to the use of the common ICT resources. Subject Librarians are lacking innovative ICT skills. With reference to the literature, the current study implied that ICT skills are of utmost importance in the 21st century. As such, it is important for Subject Librarians to be highly competent and possess extensive knowledge and skills of ICTs, to be effective and relevant in the digital era.

References

Adam-Turner, N. 2017. Digital literacy adoption with academic technology: namely digital information literacy to enhance student learning outcomes. PhD., Old Dominion University. Available: https://digitalcommons.odu.edu/efl_etds/39 (Accessed 07/04/2020).

Adam-Turner, N. 2016. Digital literacy adoption with academic technology namely digital information literacy to enhance student learning outcomes? In: Chamblee, G and Langub, L. Eds. *Proceedings of Society for Information Technology and Teacher Education International Conference*. Savannah, GA, United States: Association for the Advancement of Computing in Education (AACE): 1666-1672. Available: https://www.learntechlib.org/primary/p/171914/. (Accessed 2022/02/15)

Adams-Becker, S., Pasquini, L. A. and Zentner, A. 2017. Digital literacy impact study: an NMC horizon project strategic brief. *The New Media Consortium*, 3(5). Available: https://www.learntechlib.org/p/182080/ (Accessed 20/11/2020)

Adeleke, A. A. 2016. Digitization capacity and skills of academic librarians in Nigeria. Available: http://wiredspace.wits.ac.za/handle/10539/20526 (Accessed 04/12/2020)

Adeoye, A. A. and Adeoye, B. J. 2017. Digital Literacy Skills of Undergraduate Students in Nigeria Universities. *Library Philosophy and Practice*. Available: https://digitalcommons.unl.edu/libphilprac/1665 (Accessed 04/12/2020)

Agyen-Gyasi, K. 2008. The need for subject librarians in Ghanaian academic libraries. *The Electronic Journal of academic and special librarianship (E-JASL)*, 9(3): 95. Available: http://southernlibrarianship.icaap.org/content/v09n03/agyen-gyasa_k01.html (Accessed 04/12/2020)

Aharony, N., Julien, H. and Nadel-Kritz, N. 2020. Survey of information literacy instructional practices in academic libraries. *Journal of Librarianship and Information*

Science, 52 (4): 964-971. Available: https://doi.org/10.1177%2F0961000619891762 (Accessed 20/11/2021)

Allen, L. 2005. Hybrid librarians in the 21st century library: a collaborative service-staffing model. In: Proceedings of *ACRL Twelfth National Conference, Minneapolis, Minnesota*. Available: https://www.ala.org/acrl/sites/ala.org.acrl/files/content/conferences/pdf/allen05.pdf (Accessed 07/04/2020)

Alvarez, C., Salavati, S., Nussbaum, M. and Milrad, M. 2013. Collboard: Fostering new media literacies in the classroom through collaborative problem solving supported by digital pens and interactive whiteboards. *Computers & Education*, 63: 368-379. Available: http://dx.doi.org/10.1016/j.compedu.2012.12.019 (Accessed 15/09/2021)

Attahir, I. S. 2019. Digital literacy: Survival skill for librarians in the Digital Era. Information Impact: *Journal of Information and Knowledge Management*, 9(5): 107. Available: https://doi.org/10.4314/iijikm.v9i4.10 (Accessed 20/12/2020)

Ayoku, O. A. and Okafor, V. N. 2015. ICT skills acquisition and competencies of librarians: implications for digital and electronic environment in Nigerian universities libraries. *The Electronic Library*, 33(3): 502-523. Available: https://doi.org/10.1108/EL-08-2013-0155 (Accessed 10/09/2020)

Babbie, E.R. 2016. *The practice of social research*. Belmont, CA: Wadsworth Cengage Learning.

Babbie, E. and Mouton, J. 2001. *The practice of social research*. Cape Town: Oxford University Press.

Baro, E.E., Obaro, O.G. and Aduba, E.D. 2019. An assessment of digital literacy skills and knowledge-based competencies among librarians working in university libraries in

Africa. *Digital Library Perspectives*, 35 (3/4): 172-192. Available: https://doi.org/10.1108/DLP-04-2019-0013 (Accessed 15/04/2021)

Baro, E. E. and Godfrey, V. Z. 2015. Web 2.0, Library 2.0, Librarian 2.0 and the challenges for librarians in Africa: a review of current literature. *International Journal of Information Technology and Library Science* 4(1): 1–16. Available: https://www.ripublication.com/ijitls/ijitlsv4n1_01.pdf (Accessed 15/04/2021)

Bartol, T., Dolničar, D., Podgornik, B. B., Rodič, B. and Zoranović, T. 2018. a comparative study of information literacy skill performance of students in agricultural sciences. *The Journal of Academic Librarianship*, 44 (3): 374-382. Available: https://doi.org/10.1016/j.acalib.2018.03.004 (Accessed 20/05/2021)

Beard, L and Land, A. 2012. Staying relevant in the Google age: implementing vertical search at the University of Manchester- a technological and cultural perspective. *Liber-quarterly***,** 21(2): 238-248. Available: https://doi.org/10.18352/lq.8022 (Accessed: 13/04/2021)

Bhongade, D. and Sarode, Y. M. 2018. Prospect of E-learning in Indian higher education: trends and issues. *International Journal of Current Engineering and Scientific Research*, 5 (5): 180-186. Available: lbsangsagcc.org/pdf/International_conference_2018_journal.pdf#page=190 (Accessed 15/12/2020)

Bhusal, D. R. 2020. Nepalese teachers' perceptions on integrating technology in English language teaching. *English Language Teaching and Research*, 2 (2): 19-25. Available: https://www.academia.edu/45022442/English_Language_Teaching_and_Research_Nepalese_Teachers_Perceptions_on_Integrating_Technology_in_English_Language_Teaching (Accessed 08/12/2021)

Blummer, B. and Kenton, J.M. 2015. Academic librarians' use of web 2.0 tools and new media to promote students' information literacy skills, *Journal of Education Research*, 9(2): 151-175. Available: EBSCOhost (Accessed: 15/01/2021)

Brace, I. 2018. *Questionnaire design: how to plan, structure and write survey material for effective market research*. Kogan Page.

Braun, V. and Clarke, V. 2012. *Thematic analysis*. In: APA handbook of research methods in psychology, Vol 2: Research designs: quantitative, qualitative, neuropsychological, and biological. Washington, DC, US: American Psychological Association, 57-71.

Bright, K. M. 2018. Examining the role of liaison librarians as research collaboration partners: A mixed-methods multiple-case study. PhD Thesis, University of Denver, Denver. Available: https://www.proquest.com/openview/f96de24819fdc19fc9744327765e05ea/1?pq-origsite=gscholar&cbl=18750&diss=y (Accessed 09/07/2021)

Brink, H. and Andresen, L. 2010. Danish libraries in WorldCat – and ordering facilities to ten Danish libraries. *Interlending & Document Supply*, 38(3): 147-151. Available: https://doi.org/10.1108/02641611011072332 (Accessed 20/08/2020)

Chanetsa, B. 2014. The changing roles, responsibilities and skills of Subject and Learning Support Librarians in universities in the Southern African Customs Union (SACU) region: guidelines for the establishment of a new service. DLitt et Phil, University of South Africa.

Charles, C. J. 2019. Faculty–librarian collaboration: information literacy integration in second year English writing and composition. Ed.D., Concordia University (Oregon). Available: https://digitalcommons.csp.edu/cup_commons_grad_edd/346 (Accessed: 15/01/2021)

Chartered Institute of Library and Information Professionals (CILIP). 2020. Information literacy: the skills. CILIP. Available:

http://www.cilip.org.uk/professionalguidance/informationliteracy/definition/skills.htm (Accessed 07/08/2021)

Chetty, K., Qigui, L., Gcora, N., Josie, J., Wenwei, L. and Fang, C. 2018. Bridging the digital divide: measuring digital literacy. *Economics: The Open-Access, Open-Assessment E-Journal*, 12 (2018-23): 1-20. Available: https://doi.org/10.5018/economics-ejournal.ja.2018-23 (Accessed 07/06/2020)

Church-Duran, J. 2017. Distinctive roles: engagement, innovation, and the liaison model. *Portal: Libraries and the Academy*, 17 (2): 257-271. Available: https://muse.jhu.edu/article/653203 (Accessed 18/12/2020)

Ciccone, A. and Hounslow, L. 2019. Re-envisioning the role of academic librarians for the digital learning environment: the case of UniSA Online. *Journal of University Teaching & Learning Practice*, 16 (1). Available: https://ro.uow.edu.au/jutlp/vol16/iss1/11 (Accessed 20/01/2021)

Cohen, L., Manion, L. and Morrison, K. 2016. *Research methods in education.* 5th ed. London: Routledge.

Creswell, J. W. and Clark, V. L. P. 2017. *Designing and conducting mixed methods research*. 3rd ed. Los Angeles: USAGE.

Creswell, J. W. A., Creswell, J. D. 2018. *Research design: qualitative, quantitative & mixed methods approaches.* 5th ed. United States: Sage Publications.

Creswell, J. W. 2014. *Research Design: Qualitative, Quantitative, and Mixed Methods approaches*. 4th ed. Thousand Oaks, CA: SAGE Publications.

Department of Higher Education and Training. 2021. Dictionary of Terms and Concepts for Post-School Education and Training (Policy document). Available: http://www.dhet.gov.za/SitePages/HRDPlanningNew.aspx (Accessed 20/11/2021)

Dewan, S., and Sarkar, U. 2017. *From education to employability: Preparing South Asian youth for the world of work*. Just-Jobs Network Inc. and UNICEF South Asia, Washington D.C.

Edith Cowan University. 2019. Digital Literacy Framework. Available: https://www.ecu.edu.au/__data/assets/pdf_file/0006/833145/Digital-Literacy-Framework.pdf. (Accessed: 21 July 2020)

Edmonds, W. A. and Kennedy, T. D. 2016. *An applied guide to research designs: quantitative, qualitative, and mixed methods*. 2nd ed. London, United Kingdom: Sage Publications.

Emiri, O. T. 2015. Digital literacy skills among librarians in university libraries in the 21st century in Edo and Delta states, Nigeria. *International Journal of Library and Information Services (IJLIS)*, 6 (1): 159-153. Available: https://www.igi-global.com/article/digital-literacy-skills-among-librarians-in-university-libraries-in-the-21st-century-in-edo-and-delta-states-nigeria/181686 (Accessed: 20/11/2020)

Eurostat. 2015. Being young in Europe today - digital world. Available: http://ec.europa.eu/eurostat/statisticsexplained/index.php/Being_young_in_Europe_today_digital_world. (Accessed: 20/11/2020)

Farrell, R. and Badke, W. 2015. Situating information literacy in the disciplines: A practical and systematic approach for academic librarians. *Reference Services Review*,

43 (2): 319-340. Available: https://doi.org/10.1108/RSR-11-2014-0052 (Accessed: 08/11/2020)

Feldman, L. 2016. Subject Librarians in the Changing Academic Library. *E-JASL 1999-2009*, 1(10). Available: https://digitalcommons.unl.edu/ejasljournal/71 (Accessed: 06/09/2020)

Fernández-Ramos, A. 2019. Online information literacy instruction in Mexican university libraries: The librarians' point of view. *The Journal of Academic Librarianship*, 45 (3): 242-251. Available: https://doi.org/10.1016/j.acalib.2019.03.008 (Accessed: 10/11/2020)

Fernández-Gutiérrez, M., Gimenez, G. and Calero, J. 2020. Is the use of ICT in education leading to higher student outcomes? Analysis from the Spanish Autonomous Communities. *Computers & Education*, 157: 103969. Available: https://doi.org/10.1016/j.compedu.2020.103969 (Accessed: 15/10/2020)

Fraillon, J., Ainley, J., Schulz, W., Duckworth, D. and Friedman, T. 2019. *IEA* international computer and information literacy study 2018 assessment framework. Switzerland: Springer Nature. Available: https://doi.org/10.1007/978-3-030-19389-8 (Accessed: 06/ 12/2020)

Ganaie, S. A. 2013. Role of university libraries in promoting the Digital literacy: the Indian perspective. London, United Kingdom: Digital Information Research Ltd.

Ghavifekr, S. and Rosdy, W.A.W. 2015. Teaching and learning with technology: effectiveness of ICT integration in schools. *International Journal of Research in Education and Science (IJRES)*, 1(2): 175-191. Available: https://eric.ed.gov/?id=EJ1105224 (Accessed: 20/02/2021)

Gilster, P. 1997. *Digital literacy*. New York: Wiley Computer Publishers.

Grant, C., and Osanloo, A. 2014. Understanding, selecting, and integrating a theoretical framework in dissertation research: creating the blueprint for your “house.” *Administrative Issues Journal: Connecting to Education, Practice, and Research*, 4(2): 12–26. Available: https://aij.scholasticahq.com/article/7.pdf (Accessed: 20/082020)

Gross, M. 2011. Imposed information seeking in public libraries and school libraries: a common behaviour. *Information Research*, 6(2). Available: http://InformationR.net/ir/6-2/paper100.html (Accessed: 04/12/2020)

Gross, M. and Latham, D. 2012.What’s skill got to do with it? Information literacy skills and self-views of ability among first-year college students*. Journal of the American Society for Information Science and Technology,* 63(3):574‑583. Available: https://doi.org/10.1002/asi.21681 (Accessed: 16/10/2020)

Hadimani, M. B. and Rajgoli, I. U. 2009. Assessing information literacy competence among the undergraduate students of college of Agriculture, Raichur: a case study. *Journal of Library & Information Technology*, 30(2): 70-73. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1026.6538&rep=rep1&type=pdf (Accessed: 10/11/2020)

Hallam, G., Thomas, A. and Beach, B.2018. Creating a connected future through information and digital literacy: strategic directions at the University of Queensland Library. *Journal of the Australian Library and Information Association*, 67(1): 42-54. Available: https://doi.org/10.1080/24750158.2018.1426365 (Accessed 20/01/2021)

Hamad, F., Al-Fadel, M. and Fakhouri, H. 2020. The effect of librarians’ digital skills on technology acceptance in academic libraries in Jordan. *Journal of Librarianship and Information Science*. Available: https://doi.org/10.1177%2F0961000620966644 (Accessed: 20/02/2021).

Hamilton, A. 2015. The importance of digital literacy in the knowledge era. PHD thesis: Deakin University.

Hanson, W. E., J. W. Creswell, V. L. Plano Clark, K. P. Petska, and J. D. Creswell. 2005. Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology,* 52 (2): 224–35. Available: https://doi.org/10.1037/0022-0167.52.2.224 (Accessed: 15/07/2020)

Hawes, S. L. and Adamson, M. J. 2016. Flipping out over online library instruction: a case study in faculty-librarian collaboration. *Journal of Library & Information Services in Distance Learning*, 10 (3-4): 254-267. Available: https://doi.org/10.1080/1533290X.2016.1219202 (Accessed: 10/11/2020).

Hesse-Biber, S. 2016. Qualitative or mixed methods research inquiry approaches: some loose guidelines for publishing in sex roles. *Sex Roles*, 74 (1): 6-9. Available: https://link.springer.com/content/pdf/10.1007/s11199-015-0568-8.pdf (Accessed: 20/11/2020).

Heitin, L. 2016. Digital Literacy: An evolving definition, *education week,* 36(12): 5-6.

Hoodless, C. and Pinfield, S. 2018. Subject vs. functional: Should subject librarians be replaced by functional specialists in academic libraries? *Journal of Librarianship and Information Science*, 50 (4): 345-360. Available: https://journals.sagepub.com/doi/pdf/10.1177/0961000616653647 (Accessed: 09/12/2020).

Igbo, H. U. and Imo, N. T. 2017. Collaborative teaching as a strategy for imparting information literacy in students: faculty-librarian perceptions. *Library Philosophy and Practice*: 155-177. Available: http://digitalcommons.unl.edu/libphilprac/1548 (Accessed: 20/11/2020).

Igwenagu, C. 2016. *Fundamentals of research methodology and data collection*. LAP Lambert Academic Publishing.

Jabeen, M., Yun, L., Rafiq, M., Jabeen, M. and Tahir, M. A. 2016. Information literacy in academic and research libraries of Beijing, China: Practices, methods and problems. *Information Development*, 32 (3): 579-591. Available: https://doi.org/10.1177%2F0266666914562845 (Accessed: 08/11/2020)

Jaguszewski, J. and Williams, K. 2013. *New roles for new times: Transforming liaison roles in research libraries*. Washington: Association of Research Libraries. Available: http://www.arl.org/component/content/article/6/2893 (Accessed: 09/12/2020).

Johnston, N. 2020. The shift towards digital literacy in Australian University Libraries: developing a digital literacy framework. *Journal of the Australian Library and Information Association*, 69(1): 93-101. Available: https://doi.org/10.1080/24750158.2020.1712638 (Accessed: 14/01/2021)

Johnson-Grau, G., Archambault, S. G., Acosta, E. S. and McLean, L. 2016. Patience, persistence, and process: embedding a campus-wide information literacy program across the curriculum. *The Journal of Academic Librarianship*, 42 (6): 750-756. Available: https://doi.org/10.1016/j.acalib.2016.10.013 (Accessed: 14/01/2021)

Julien, H., Gross, M. and Latham, D. 2018. Survey of information literacy instructional practices in US academic libraries. *College & research libraries*, 79 (2): 179. Available: https://crl.acrl.org/index.php/crl/article/view/16606 (Accessed: 22/11/2020)

Junisbai, B., Lowe, M. S. and Tagge, N. 2016. A pragmatic and flexible approach to information literacy: findings from a three-year study of faculty-librarian collaboration. *The Journal of Academic Librarianship*, 42 (5): 604-611. Available: https://doi.org/10.1016/j.acalib.2016.07.001 (Accessed: 17/12/2020)

Kajee, L. and Balfour, R. 2011. Students' access to digital literacy at a South African university: privilege and marginalization, Southern African Linguistics and Applied Language Studies, 29:2, 187-196. Available: https://doi.org/10.2989/16073614.2011.633365 (Accessed: 04/12/2020)

Kamau, G. and Adika, F. 2018. Collaboration between the faculty and librarians to improve students' information literacy skills at Strathmore University. *Regional Journal of Information and Knowledge Management*, 3 (2): 1-19. Available: https://www.rjikm.org/vol3-2-article1.html (Accessed: 10/05/2021)

Kapur, R. 2019. Use of ICT in improving quality of education. Available: https://www.researchgate.net/publication/333446961_Use_of_ICT_in_Improving_Quality_of_Education. (Accessed: 17/12/ 2020)

Kelly, B. 2019. Uncovering digital literacy and supporting the implicit: a case study of library-faculty collaboration. *Proceedings of the IATUL Conferences*. Available: https://docs.lib.purdue.edu/iatul/2019/bp/1 (Accessed: 15/12/2020)

Khaldi, K. 2017. Quantitative, qualitative or mixed research: which research paradigm to use? *Journal of Educational and Social Research*, 7 (2): 15. Available: http://www.richtmann.org/journal/index.php/jesr/article/view/9915 (Accessed: 17/08/2020)

Khan, A. 2020. Digital information literacy skills of Pakistani librarians: exploring supply-demand mismatches, adoption strategies and acquisition barriers. *Digital Library Perspectives*, 36 (2): 167-189. Available: https://doi.org/10.1108/DLP-01-2020-0003 (Accessed: 07/12/2021)

Khan, S. A. and Bhatti, R. 2017. Digital competencies for developing and managing digital libraries: An investigation from university librarians in Pakistan. *The Electronic Library*, 35(3): 573-597. Available: https://doi.org/10.1108/EL-06-2016-0133 (Accessed: 08/12/2021).

Khan, S. A. and Waheed, A. 2015. *Digital literacy practices for library users at Government College University Libraries*. Lahore: University Libraries.

Khanchandani, V., Kumar, M. and Kumar, R. 2015. E-learning initiatives in India and libraries. In: Proceedings of *International Conference on Grey to Green*. 517-527.

Kimani, H. 2014. Information literacy skills among incoming first-year undergraduate students at the Catholic University of Eastern Africa in Kenya. University of South Africa, South Africa. Available: https://hdl.handle.net/10520/EJC184882 (Accessed: 16/10/2020)

King, L. 2007. Information literacy of incoming undergraduate arts students at the university of the Western Cape: assessment of competencies and proficiencies. PhD dissertation, University of the Western Cape. Available: http://etd.uwc.ac.za/. (Accessed 04/12/2020)

Klomsri, T. and Teddre, M. 2016. Poor information literacy skills and practices as barriers to academic performance: a mixed methods study of the University of Dar es Salaam. *American library Association*. Reference and user services quarterly, 55(4): 293- 305. Available: https://www.jstor.org/stable/10.2307/refuseserq.55.4.293 (Accessed: 13/02/2021).

Kolhe, P. S. 2018. E-learning and changing roles of academic libraries. *International Journal of Current Engineering and Scientific Research (IJCESR)*, 5 (5): 85-89. Available: http://www.lbsangsagcc.org/pdf/International_conference_2018_journal.pdf#page=95 (Accessed: 10/11/2020)

Krish, C., Liu, Q., Gcora, N. Li Wenwei, J. J. and Fang, C. 2018. Bridging the digital divide: measuring digital literacy, Economics: The Open-Access, Open-Assessment E-

Journal, 12(23): 1-20. Available: http://dx.doi.org/10.5018/economics-ejournal.ja.2018-23 (Accessed: 09/11/2020)

Kumar, R. 2019. *Research methodology: a step-by-step guide for beginners*. Sage Publications Limited.

Kumar, R. 2018. *Research methodology: A step-by-step guide for beginners*. 5th ed. London: Sage. Available: http://digitallab.wldu.edu.et/bitstream/123456789/3713/1/Ranjit%20Kumar%20-%20Research%20Methodology_%20A%20Step-by-Step%20Guide%20for%20Beginners-SAGE%20Publications%20Ltd%20%282010%29.pdf (Accessed 04/12/2020)

Lan, N. T. and Tuamsuk, K. 2018. Factors influencing the collaboration between faculty and librarian at the universities: a Literature Review. *TLA Research Journal*, 11 (2): 78-90. Available: https://so06.tci-thaijo.org/index.php/tla_research/issue/view/12332/TLA%20RES%20J%2011%282%29.PDF (Accessed: 20/12/2020).

Law, N., Woo, D., de la Torre, J. and Wong, G. 2018. A global framework of reference on digital literacy skills for indicator 4.4. 2. *UNESCO Institute for Statistics.* Available: http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf (Accessed: 13/12/2020)

Lawrence, J. E. and Tar, U. A. 2018. Factors that influence teachers' adoption and integration of ICT in teaching/learning process. *Educational Media International*, 55 (1): 79-105. Available: https://doi.org/10.1080/09523987.2018.1439712 (Accessed: 10/02/2021)

Leaning, M. 2019. An approach to digital literacy through the integration of media and Information literacy. *Media and Communication*, 7 (2): 4-13. Available: https://doi.org/10.17645/mac.v7i2.1931 (Accessed: 16/10/2020)

Leedy, P. D., and Ormrod, J. E. 2015. Practical research: planning and design. 11th ed. Boston: Pearson. Available: https://doi.org/10.37074/jalt.2018.1.2.15 (Accessed: 07/06/2020)

Li, L., Worch, E., Zhou, Y. and Aguiton, R. 2015. How and why digital generation teachers use technology in the classroom: An explanatory sequential mixed methods study. *International Journal for the Scholarship of Teaching and Learning*, 9 (2): 2. Available: https://doi.org/10.20429/ijsotl.2015.090209 (Accessed 04/12/2020)

List, A. 2019. Defining digital literacy development: an examination of pre-service teachers' beliefs. *Computers & Education*, 138: 146-158. Available: https://doi.org/10.1016/j.compedu.2019.03.009 (Accessed: 20/09/2020)

Littlejohn, A., Beetham, H. and McGill, L. 2012. Learning at the digital frontier: a review of digital literacies in theory and practice. *Journal of Computer Assisted Learning*, 28 (6): 547-556. Available: https://doi.org/10.1111/j.1365-2729.2011.00474.x (Accessed: 10/07/2020).

Lynch, M. 2017. What is Digital Literacy? Available: http://www.theedadvocate.org/what-is-digital-literacy/ (Accessed: 24/11/2020)

Machi, L. A. and McEvoy, B. T. 2016. *The literature review: six steps to success*. 3rd ed. United States of America: SAGE Publication Ltd.

Madhusudhan, M. and Lamba, M. 2021. The changing roles of librarians: managing emerging technologies in Libraries. In: Singh, S. K. and Sarma, K. eds. *Quality Library Services in New Era*. Guwahati: EBH Publishers. 88- 96.

Manovich, L. 2017. *Theory of soft culture*. Nizhniy Novgorod: Krasnaya lastochka Publishers.

Mansour, E. 2017. A survey of digital information literacy (DIL) among academic library and information professionals. *Digital Library Perspectives*, 33 (2): 166-188. Available: https://doi.org/10.1108/DLP-07-2016-0022 (Accessed 04/12/2020)

Maphosa, C. and Bhebhe, S. 2019. Digital literacy: a must for open distance and e-learning (ODEL) students. *European Journal of Education Studies*. Available: https://www.oapub.org/edu/index.php/ejes/article/view/2274 (Accessed: 24/11/2020)

Martin J. V. 1996. Subject specialization in British university libraries: a second survey. *Journal of Librarianship and Information Science*, 28(3): 159–169.

Martzoukou, K. and Elliott, J. 2016. The development of digital literacy and inclusion skills of public librarians. *Communications In information Literacy*, 10 (1): 99- 115. Available: https://doi.org/10.15760/comminfolit.2016.10.1.17 (Accessed: 13/11/2020)

Matatiele, R. A. 2020. Strategies for converting traditional academic library spaces to research commons: a South African perspective. M A. University of South Africa. Available: https://uir.unisa.ac.za/handle/10500/27236 (Accessed 04/12/2020)

Mgquba, S. K. and Underwood, P. G. 2015. Enhancing information research and learning skills through e-learning: the case of Monash University Library. *South African Journal of Libraries and Information Science*, 81 (2): 39-45. Available: https://hdl.handle.net/10520/EJC189327 (Accessed: 24/11/2020)

Mishra, C. 2019. Faculty perceptions of digital information literacy (DIL) at an Indian university: an exploratory study. *New Review of Academic Librarianship*, 25 (1): 76-94. Available: https://doi.org/10.1080/13614533.2018.1517102 (Accessed: 16/10/2020)

Mohammadyari, S. and Singh, H. 2015. Understanding the effect of e-learning on individual performance: The role of digital literacy. *Computers & Education*, 82: 11-25. Available: https://doi.org/10.1016/j.compedu.2014.10.025 (Accessed: 14/12/2020)

Mourer, M. 2017. A subject librarian's pedagogical path in the digital humanities. *College & Undergraduate Libraries*, 24:2-4. Available: https://doi.org/10.1080/10691316.2017.1336506 (Accessed: 10/11/2020)

Mulat, T. and Natarajan, M. 2020. Digital literacy skills among library professionals in jimma university libraries. *Library Philosophy and Practice (e-journal)*: 4629. Available: https://digitalcommons.unl.edu/libphilprac/4629 (Accessed: 16/10/2020)

Murray, M.C., and Pérez, J. 2014. Unraveling the digital literacy paradox: How higher education fails at the fourth literacy. *Issues in Informing Science and Information Technology*, 11: 85-100. Available: http://iisit.org/Vol11/IISITv11p085-100Murray0507.pdf (Accessed: 08/10/2020)

Musangi, P. S. 2015. Library 2.0 and the changing landscape of information services in academic libraries in Kenya. *International Journal of Library and Information Science* 7(10): 183–187. Available: https://DOI:10.5897/IJLIS2014.0492. (Accessed: 02/11/2020)

Naik, M. M. 2014. Importance of information literacy. International Journal of Digital Library Services, 4(3). Available: www.ijodls.in (Accessed 14/12/2020)

Nguyen, L. T. and Tuamsuk, K. 2020a. Roles of the faculty and librarian in the collaborative relationships at Vietnamese Universities: a qualitative methodology. *Journal of Information Science Theory and Practice*, 8 (1): 33-44. Available: https://repository.kisti.re.kr/handle/10580/15491 (Accessed: 20/01/2021)

Nguyen, T. L. and Tuamsuk, K. 2020b. Faculty–librarian administrative structure and collaborative activities supporting teaching and research at Vietnamese universities: A

qualitative study. *IFLA Journal*, 47(2). Available: https://doi.org/10.1177%2F0340035220944945 (Accessed: 16/01/2021)

Nguyen, T. L. and Tuamsuk, K. 2020c. Factors influencing the faculty-librarian collaboration at the Vietnamese universities. *The Journal of Academic Librarianship*, 46 (2). Available: https://doi.org/10.1016/j.acalib.2020.102130 (Accessed: 16/01/2021)

Odede, I. R. and Jiyane, G. 2019. Exploring dimensional constructs of digital literacy skills for higher education. *Library Philosophy and Practice (e-journal).* Available: https://digitalcommons.unl.edu/libphilprac/2806 (Accessed: 04/12/2020)

Odu, A. O. and Omosigho, N. A. 2017. Digital literacy and the implication on Nigerian digital library. *International Journal of Library and Information Science Studies*, 3 (2): 13-19. Available: http://www.eajournals.org/wp-content/uploads/Digital-Literacy-and-the-Implication-on-Nigerian-Digital-Library.pdf (Accessed: 04/12/2020)

Omosekejimi, A. F., Brume-Ezewu, S., Brume-Ezewu, E. G., Nwobu, B. K. and Nweke, A. C. 2018. ICT and digital literacy skills: a mechanism for efficient teaching in Nigerian colleges of education. *Information Impact: Journal of Information and Knowledge Management*, 9 (3): 57-71. Available: https://www.ajol.info/index.php/iijikm/article/view/182026 (Accessed: 10/10/2020)

Pandey, P. and Pandey, M.M. 2015. *Research* methodology: tools and techniques. City University of Hong Kong. Bridge Center. Available: http://euacademic.org/BookUpload/9.pdf (Accessed: 05/11/2020)

Pangrazio, L. 2016. Reconceptualizing critical digital literacy. *Discourse: Studies in the Cultural Politics of Education*, 37(2): 163-174. Available: https://doi.org/10.1080/01596306.2014.942836 (Accessed: 16/10/2020)

Pautz, M. C. and Gauder, H. 2017. Undergraduate research needs: faculty-librarian collaboration to improve information literacy in policy papers. *Journal of Public Affairs Education*, 23 (4): 1017-1030. Available: https://doi.org/10.1080/15236803.2017.12002302 (Accessed: 16/12/2020)

Park, H., Kim, H. S. and Park, H. W. 2020. A scientometric study of digital literacy, ICT literacy, information literacy, and media literacy. *Journal of Data and Information Science*, 6 (2): 116-138. Available: https://doi.org/10.2478/jdis-2021-0001 (Accessed: 22/01/2021)

Pawar, A. A. 2016. E-literacy and E-learning. *Knowledge Librarian: An International Peer Reviewed Bilingual E-Journal of Library and Information Science*, 3 (5). Available: http://www.klibjlis.com/ (Accessed: 16/12/2020)

Petermanec, Z. and Sebjan, B. 2017. Evaluation components of information literacy in undergraduate students in Slovenia: An experimental study. *Library & Information Science Research*, 39 (1): 69-75. http://dx.doi.org/10.1016/j.lisr.2017.01.009 (Accessed: 16/09/2020)

Pham, T. H. 2017. Collaboration between academics and library staff: A comparative study of two universities in Australia and Vietnam. PhD, Monash University. Available: https://doi.org/10.4225/03/58b78ec80049f (Accessed: 03/12/2020)

Pham, H. and Tanner, K. 2014. Collaboration between academics and librarians: a literature review and framework for analysis. *Library Review*, Vol. 63: 15-45. Available: https://doi.org/10.1108/LR-06-2013-0064 (Accessed: 03/12/2020)

Pillai, V. 2020. Exploring the impact of library instruction on the Human Sciences Research Council staff, in support of achieving their research and academic goals. M LIS, University of Cape Town. Available: http://hdl.handle.net/11427/32974 (Accessed: 10/09/2020)

Polkinghorne, S. and Julien, H. 2019. Survey of information literacy instructional practices in Canadian academic libraries. *Canadian Journal of Information and Library Science*, 42 (1/2): 69‑93. Available: https://doi.org/10.1177%2F0961000619891762 (Accessed: 10/09/2020)

Rafi, M., JianMing, Z. and Ahmad, K. 2019. Technology integration for students' information and digital literacy education in academic libraries. *Information Discovery and Delivery*, 47 (4): 203-217. Available: https://doi.org/10.1108/IDD-07-2019-0049 (Accessed: 13/01/2021)

Raju, J. 2017. To teach or not to teach? The question of the academic librarian's pedagogical competencies in the digital age. *South African Journal of Higher Education*, 31 (2): 251-269.

Ratheeswari, K. 2018. Information Communication Technology in Education. *Journal of Applied and Advanced Research*, 3: 45-47. Available: http://dx.doi.org/10.21839/jaar.2018.v3iS1.169 (Accessed 04/12/2020)

Reddy, P., Sharma, B. and Chaudhary, K. 2020. Digital literacy: a review of literature. *International Journal of Technoethics (IJT)*, 11(2): 65-94. Available: https://www.igi-global.com/article/digital-literacy/258971 (Accessed: 18/04/2021)

Rolke, W. and Gongora, C. G. 2021. A chi-square goodness-of-fit test for continuous distributions against a known alternative. *Computational Statistics*, 36 (3): 1885-1900. Available: https://link.springer.com/article/10.1007/s00180-020-00997-x (Accessed: 10/01/2022)

Salleh, M. I. M., Halim, A. F. A., Yaacob, R. A. R., and Yusoff, Z. 2011. Measuring the effect of information literacy on the undergraduates' academic performance in higher education. *International Proceedings of Economics Development and Research*, 5(2), 506–510.

Samie, M. A. 2005. *Using information and communications technology (ICT) in illiteracy eradication in Egypt (Reality and Aspirations)*. Cairo: UNESCO

Sandhu, G. 2018. The role of academic libraries in the digital transformation of the universities. In: Proceedings of *2018 5th International Symposium on Emerging Trends and Technologies in Libraries and Information Services (ETTLIS). Noida. India, 21-23 Feb 2018. India: IEEE*, 292-296. Available: https://doi.org/10.1109/ETTLIS.2018.8485258 (Accessed: 16/12/2020)

Savina, A. G., Malyavkina, L. I., Zimina, L. V., Muzalevskaya, A. A., Sergeeva, I. I. and Smagina, I. V. 2019. Reconceptualization of the concept of digital literacy as a theoretical and methodological background for its study. *Espacios*, 40 (10): 29. Available: http://revistaespacios.com/a19v40n10/a19v40n10p29.pdf (Accessed 04/12/2020)

Saxena, N. 2017. The role and impact of ICT in improving the quality of education: an overview. *International Journal of Engineering Sciences & Research Technology*, 6 (3): 501-503. Available: https://doi.org/10.5281/zenodo.439205 (Accessed: 14/01/2021)

Schoonenboom, J. and Johnson, R. 2017. How to construct a mixed methods research design. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 69. Available: https://doi.org/10.1007/s11577-017-0454-1 (Accessed: 10/07/2020)

Scripps-Hoekstra, L. and Hamilton, E. R. 2016. Back to the future: prospects for education faculty and librarian collaboration thirty years later. *Education Libraries*, 39 (1): 1. Available: https://doi.org/10.26443/el.v39i1.10 (Accessed: 07/11/2020)

Sekaran, U. and Bougie, R. 2016. *Research methods for business.* 7 ed. United Kingdom: John Wiley & Sons.

Shannon, S. K. 2017. A mixed methods exploratory study of digital literacies in higher education. EdD Educational technology. Boise State University. Available:

http://scholarworks.boisestate.edu/cgi/viewcontent.cgi?article=2430&context=td (Accessed: 23/08/2020)

Shao, X. and Purpur, G. 2016. Effects of information literacy skills on student writing and course performance. *The Journal of Academic Librarianship*, 42 (6): 670-678. Available: https://doi.org/10.1016/j.acalib.2016.08.006 (Accessed: 13/07/2020)

Sharikov, A. 2016. Digital literacy: a four-component model. *Zhurnal Issledovanii Sotsialnoi Politiki= the Journal of Social Policy Studies*, 14 (1): 87-98. Available: https://www.proquest.com/scholarly-journals/digital-literacy-four-component-model/docview/1791580053/se-2?accountid=10612 (Accessed: 05/09/2020)

Shongwe, M. S. 2015. The information technology influence on LIS job descriptions in South Africa. *Information Technology for Development* 21(2): 196–204. Available: https://doi.org/10.1080/02681102.2013.874315 (Accessed: 16/10/2020)

Shopova, T. 2014. Digital literacy of students and its improvement at the university. *Journal on Efficiency and Responsibility in Education and Science*, 7 (2): 26-32. Available: https://doi.org/10.7160/eriesj.2014.070201 (Accessed: 14/01/2021)

Siddiq, F., Hatlevik, O. E., Olsen, R. V., Throndsen, I. and Scherer, R. 2016. Taking a future perspective by learning from the past – a systematic review of assessment instruments that aim to measure primary and secondary school students' ICT literacy. *Educational Research Review*, 19: 58-84. Available: https://doi.org/10.1016/j.edurev.2016.05.002 (Accessed 04/12/2020)

Singh, N. U., Roy, A., Tripathi, A., Test, C.S., Test, B., Test, O.S. K.S., Run, W.W., Kruskal-Wallis, H., Cochran's, Q. and Kendall's, W. 2013. Non Parametric Tests: Hands on SPSS. *ICAR Research Complex for NEH Region, Umiam, Meghalaya*. Available: http://kiran.nic.in/pdf/Social_Science/e-learning/Non_Parametrict_Test.pdf (Accessed: 25/11/2021)

Sparks, J.R., Katz, I.R. and Beile, P.M. 2016. Assessing digital information literacy in higher education: a review of existing frameworks and assessments with recommendations for next-generation assessment. *ETS Research Report Series*, 2016 (2): 1-33. Available: https://doi.org/10.1002/ets2.12118 (Accessed: 16/10/2020)

Stone, S., Quirke, M. and Lowe, M. S. 2018. Opportunities for faculty - librarian collaboration in an expanded dentistry curriculum. *Health Information & Libraries Journal*, 35 (2): 170-176. Available: https://doi.org/10.1111/hir.12211 (Accessed: 22/11/2020)

Suárez-Rodríguez, J., Almerich, G., Orellana, N. and Díaz-García, I. 2018. A basic model of integration of ICT by teachers: competence and use. *Educational Technology Research and Development*, 66 (5): 1165-1187. Available: https://doi.org/10.1007/s11423-018-9591-0 (Accessed: 26/03/2021)

Sullivan, B. T. and Porter, K. L. 2016. From one-shot sessions to embedded librarian: Lessons learned over seven years of successful faculty-librarian collaboration. *2016*, 77 (1): 4. Available: https://crln.acrl.org/index.php/crlnews/article/view/9431/10650 (Accessed: 02/11/2020)

Tekale, R. 2018. Digital literacy. *The South Asian Academic Research Chronicle*, 6(9), 152-157. Available: https://www.academia.edu/download/58564167/20._Digital_Literacy_Dr.R.B.Tekale.pdf (Accessed: 10/08/2020)

Tennessee State University. 2020. Definition of Faculty (Policy document). Available: https://policies.tbr.edu/policies/definition-faculty (Accessed 20/11/2021)

Thanuskodi, S. 2019. Information literacy skills among Library and Information Science Professionals in India. *Library Philosophy and Practice*: 1-24. Available:

https://www.proquest.com/scholarly-journals/information-literacy-skills-among-library-science/docview/2173481796/se-2?accountid=10612 (Accessed: 05/08/2020)

Tiemo, P. A. 2019. Digital technology training among library personnel for effective management of online resources and services in Federal University*. International Journal of Applied Technologies in Library and Information Management,* 5: 82–93. Availabble: https://jatlim.org/volumes/Volume%205/Pereware.pdf (Accessed: 14/01/2021)

Ting, Y.-L. 2015. Tapping into students' digital literacy and designing negotiated learning to promote learner autonomy. *The Internet and Higher Education*, 26: 25-32. Available: https://doi.org/10.1016/j.iheduc.2015.04.004 (Accessed: 05/08/2020)

Tolstova, O. S. 2019. Information and communication technologies in education of Russia and China. *Reviewers: Dadyan Eduard Grigorievich, Cand. tech. Sci., Associate Professor*. Retrieved from: Google Scholar (Accessed: 10/11/2020)

Ukwoma, S. C., Iwundu, N. E. and Iwundu, I. E. 2016. Digital literacy skills possessed by students of UNN, implications for effective learning and performance. *New Library World*, 117 (11/12): 702-720. Available: https://doi.org/10.1108/NLW-08-2016-0061 (Accessed: 07/08/2020)

UNESCO. 2018. Digital skills critical for jobs and social inclusion. Available: https://en.unesco.org/news/digital-skills-critical-jobs-and-social-inclusion (Accessed: 20/11/2020)

UNESCO. 2016. Institute for Lifelong Learning. *European Journal of Education*, 65(3):55–670

Van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M. and de Haan, J. 2020. Determinants of 21st-Century Skills and 21st-Century Digital Skills for Workers: A Systematic Literature Review. *SAGE Open*, 10 (1): Available:

https://journals.sagepub.com/doi/abs/10.1177/2158244019900176 (Accessed: 16/10/2020)

Young, J. A. 2018. Equipping Future Non-profit Professionals with digital literacies for the 21st Century. *Journal of non-profit education and leadership*, 8 (1): 4-15. Available: https://doi.org/10.18666/JNEL-2018-V8-I1-8309 (Accessed 04/12/2020)

Yu, T., Chen, C.-c., Khoo, C., Butdisuwan, S., Ma, L., Sacchanand, C. and Tuamsuk, K. 2019. Faculty-librarian collaborative culture in the universities of Hong Kong, Singapore, Taiwan, and Thailand: A comparative study. *Malaysian Journal of Library & Information Science*, (1): 97-121. Available: https://doi.org/10.22452/mjlis.vol24no1.6 (Accessed 10/12/2020)

Zanin-Yost, A. 2018. Academic collaborations: linking the role of the liaison/embedded librarian to teaching and learning. *College & Undergraduate Libraries*, 25(2): 150-163. Available: https://doi.org/10.1080/10691316.2018.1455548 (Accessed: 14/01/2021)

APPENDIX A- ONLINE QUESTIONNAIRE

DIGITAL LITERACY IN ACADEMIC LIBRARIES IN KWAZULU-NATAL

Dear participant

I am conducting this survey as part of the requirement for the Masters of Management Sciences Degree in Library and Information Science at the Durban University of Technology. I request your assistance in my study by taking a few minutes to complete this survey. My research seeks to examine the extent to which Subject Librarians in academic libraries make use of Information and Communication Technologies (ICT) in digital literacy instruction.

I am distributing this survey to all Subject Librarians in traditional universities and universities of technology in KwaZulu- Natal. In line with the DUT Policy on Research Ethics, participation in this survey is voluntary. Please be assured that if you choose to participate, your responses will be treated confidentially, and that the findings of the study will be presented without identifying the respondents. The collected personal information will be used only for facilitation of second phase data collection.

I look forward to your assistance and thank you in advance for your time.

1. Please indicate your current employer

2. How long have you worked in an academic library?

- Less than one year
- 1- <5 years
- 5- <10 years
- 10-15 years
- More than 15 years

3. How long have you worked as a Subject Librarian?

- Less than one year
- 1 - <5 years

- 5 - <10 years
- 10 -15 years
- More than 15 years

4. In your opinion; which academic library model best describes Subject Librarians at your university?

FACULTY-LIAISON MODEL: Subject Librarians partner with faculty to carry out resource-based teaching and learning, thus encouraging students to acquire the skills and expertise necessary to transform them into independent learners and/or researchers.

SUBJECT CENTERED MODEL: Subject Librarians team up with senior and support staff from various grades. They are based in and responsible for subject collection/s, and they carry out functions like collection development, cataloguing, classification, user education and faculty liaison on a subject basis.

DUAL MODEL: Subject Librarians carry out some duties or responsibilities on a subject basis, for example, faculty liaison, book selection, reference, and information services; while other staff carry out the balance of library functions on a centralized basis.

HYBRID MODEL: The library combines traditional and modern sources, formats, services and skills. Subject Librarians provide subject-based services and carry out other library functions.

MATRIX MANAGEMENT MODEL: Subject Librarians provide their services and expertise on an ad hoc or informal basis, across subject areas, instead of focusing on one fixed subject area to the exclusion of all others.

DIGITAL MODEL: The Digital Librarian, Cybrarian or specialist information professional provides some or all of the following Subject Librarian services solely through a digital environment: multimedia information search and retrieval, data/knowledge mining, user education, reference services.

5. Indicate your level of agreement that, as a Subject/Information Librarian you do have a clear job description

- Strongly disagree
- Disagree

- Neutral
- Agree
- Strongly agree

5.1. Does your job description include digital literacy?

- Yes
- No

6. How often do you spend time on the following?

	Never	More than once a month	At least once a month	At least once a week	At least once a day
6.1 General digital literacy instruction for students					
6.2 Subject –specific digital literacy instruction for students					
6.3 Research support/consultations with staff/students					
6.4 Literature searches for all students					
6.5 Library orientation/induction of students					
6.6 Individual digital literacy training (students)					
6.7 Classroom digital literacy training (students)					
6.8 Advanced digital literacy training (students)					
6.9 Online digital literacy training (students)					
6.10 Digital literacy promotion (students)					

7. Are you involved in e-learning at your university?

- Yes
- No

7.1 If you are involved in any way, please briefly explain how:

_____

_____

_____

8. Indicate your level of agreement that digital literacy among students is important

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

9. Do you use ITCs in digital literacy instruction?

- Yes
- No

9.1 If YES to question 9, how often do you apply ICT's in digital literacy instruction?

- In all digital literacy classes
- In most digital literacy classes
- In a few digital literacy classes

10. Do you experience any challenges when carrying out digital literacy instruction?

- Yes
- No

10.1 If responded YES to question 10, which of the following challenges do you face when carrying out digital literacy instruction?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10.1.1 Lack of interest and/or poor attendance by students	○	○	○	○	○
10.1.2 Lack of computer literacy or differences in levels of computer literacy within a class	○	○	○	○	○
10.1.3 Lack of availability of students for classes	○	○	○	○	○
10.1.4 Lack of or limited facilities and venues	○	○	○	○	○
10.1.5 Large sizes of some classes which could be overwhelming	○	○	○	○	○
10.1.6 Lack of lecturer support	○	○	○	○	○
10.1.7 Lack of digital literacy assignments/subject-specific digital literacy classes which were more relevant/useful	○	○	○	○	○

11. Indicate your level of agreement that Subject/Information Librarians should possess the following technical skills:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11.1 Pedagogical classroom skills	○	○	○	○	○
11.2 Citing skills (using a specific style e.g. Harvard or APA)	○	○	○	○	○
11.3 Copyright & licensing skills	○	○	○	○	○

11.4 Knowledge of reference tools, e.g. Endnote	○	○	○	○	○
11.5 Blended and online learning skills	○	○	○	○	○
11.6 Web design skills	○	○	○	○	○
11.7 Ms Word skills	○	○	○	○	○
11.8 MS-PowerPoint skills	○	○	○	○	○
11.9 MS-Excel skills	○	○	○	○	○
11.10 MS-Publisher skills	○	○	○	○	○
11.11. MS-Access skills	○	○	○	○	○
11.12 Library management system skills	○	○	○	○	○
11.13 Knowledge of SPSS/other statistical software packages	○	○	○	○	○
11.14. E-mailing skills	○	○	○	○	○
11.15 Knowledge of Institutional repository tools e.g. DSpace	○	○	○	○	○
11.16. Metadata skills	○	○	○	○	○
11.15 Bibliographic (cataloguing and classification) skills	○	○	○	○	○

12 Rate your level of competence in the following skills:

	Not at all competent	Less competent	Average	Competent	Extremely competent
12.1 Pedagogical classroom skills	○	○	○	○	○
12.2 Citing skills (using a specific style e.g. Harvard or APA)	○	○	○	○	○
12.3 Copyright & licensing skills	○	○	○	○	○

12.4 Knowledge of reference tools, e.g. Endnote	○	○	○	○	○
12.5 Blended and online learning skills	○	○	○	○	○
12.6 Web design skills	○	○	○	○	○
12.7 Ms Word skills	○	○	○	○	○
12.8 MS-PowerPoint skills	○	○	○	○	○
12.9 MS-Excel skills	○	○	○	○	○
12.10 MS-Publisher skills	○	○	○	○	○
12.11 MS-Access skills	○	○	○	○	○
12.12 Library management system skills	○	○	○	○	○
12.13 Knowledge of SPSS/other statistical software packages	○	○	○	○	○
12.14 E-mailing skills	○	○	○	○	○
12.15 Knowledge of Institutional repository tools e.g. DSpace	○	○	○	○	○
12.16 Metadata skills	○	○	○	○	○
12.17 Bibliographic (cataloguing and classification) skills	○	○	○	○	○

13 Indicate your level of agreement that it is necessary for Subject/Information Librarians to possess the following additional skills:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13.1 Communication and liaison skills	○	○	○	○	○
13.2 Listening skills	○	○	○	○	○
13.3 Critical thinking and analytical skills	○	○	○	○	○
13.4 Writing skills	○	○	○	○	○
13.5 Knowledge of international data/information sources	○	○	○	○	○

13.6 Knowledge of local data/information sources	○	○	○	○	○
13.7 Understanding of academic/research work flows	○	○	○	○	○
13.8 Research/information search and retrieval skills	○	○	○	○	○
13.9 Information evaluation skills	○	○	○	○	○
13.10 Knowledge of copyright, plagiarism, fair use concepts	○	○	○	○	○
13.11 Licensing & negotiation skills (for database acquisition)	○	○	○	○	○
13.12 Marketing and advocacy skills	○	○	○	○	○
13.13 Management skills	○	○	○	○	○
13.14 Leadership skills	○	○	○	○	○
13.15 Decision-making skills	○	○	○	○	○
13.16 Team building skills	○	○	○	○	○
13.17 Problem solving skills	○	○	○	○	○

14 Do you collaborate with faculty academics in digital literacy instruction?

- ○ Yes
- ○ No

14.1 If you selected YES to question 15, how often do you collaborate with faculty academics in digital literacy instruction?

- ○ Never
- ○ Less than once a month
- ○ At least once a month
- ○ At least once a week
- ○ At least once a day

14.2 Rate how successful your collaboration generally is?

Not at all successful 1	2	3	4	Extremely successful 5
○	○	○	○	○

15 Indicate your level of agreement that faculty academics should teach digital literacy skills

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ○ Strongly agree

16 Kindly provide your additional comments, suggestions or concerns with regards to digital literacy, if any

_____

_____

_____

_____

THANK YOU FOR TAKING YOUR TIME TO COMPLETE THIS SURVEY.

Name: Amahle Khumalo
E-mail: amahlehkhumalo@gmail.com
Contact number: 0820524965

https://www.cognitoforms.com/DurbanUniversityOfTechnology3/AMAHLEKHUMALO

APPENDIX B- INTERVIEW SCHEDULE

Dear participant

Thank you for agreeing to be interviewed for this study. The study which is part of my dissertation research, explores the extent to which digital literacy instruction is conducted in academic libraries. The questions in this interview will focus mainly on the use of ICT in digital literacy instruction. I am hoping that the interview will provide a richer and indepth information on the use of ICT in digital literacy instruction and help to develop a clearer picture and understanding of digital literacy practice in academic libraries. You may choose not to answer a particular question if you feel uncomfortable about answering.

1. Has the use of ICT been helpful to your digital literacy classes?
2. In what ways do you use Information and Communication Technology (ICT) in your digital literacy instruction?
3. What Information and Communication Technology resources do you mostly use in your digital literacy instruction?
4. What has been your experience with the use of ICT for digital literacy instruction?
5. What is the importance of using ICT in literacy instructions?
6. Are there any advantages or barriers to using ICT in digital literacy classes?
7. How do you think the use of ICT in digital literacy instruction can enhance student learning outcome?
8. Do you have any additional comments with regards to the use of ICT in digital literacy instruction?

THANK YOU FOR YOUR TIME AND PARTICIPATION IN THIS STUDY

APPENDIX C – IREC ETHICAL CLEARANCE

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate2nd Floor, Berwyn Court

Gate 1, Steve Biko Campus Durban University of Technology

P O Box 1334, Durban, South Africa, 4001Tel: 031 373 2375

Email: lavishad@dut.ac.za

http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

8 June 2021

Mr A Khumalo

P O Box 67

Swart Mfolozi
Vryheid

3115

Dear Mr Khumalo

Digital literacy instruction in academic libraries in KwaZulu-Natal

Ethics Clearance Number: IREC 003/21

The Institutional Research Ethics Committee acknowledges receipt of your notification regardingthe piloting of your data collection tool.

Kindly ensure that participants used for the pilot study are not part of the main study.In

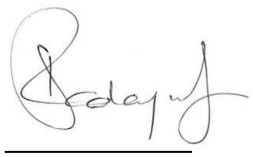
addition, the IREC acknowledges receipt of your gatekeeper permission letter.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed withdata collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which mayalter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely



Dr K Padayachy
Deputy Chairperson: IREC

APPENDIX D- ETHICS CERTIFICATE

TRREE

Zertifikat Certificado
Certificat Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Amahle Khumalo

a complété avec succès - has successfully completed

Research Ethics Evaluation

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2020/12/02
CID : aH0lsOEVmG

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

FMH Continuing Education Program (5 Credits)
Programme de Formation continue (5 Crédits)

Foederatio Pharmaceutica Helvetiae FPH Programmes de formation continue
Continuing Education Programms
Programmes de formation continue

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20170310]

APPENDIX E- GATE KEEPER'S LETTER

12/04/2021

Durban University of Technology

41 M L Sultan Rd

Greyville

Berea

4001

Request for Permission to Conduct Research

To: Whom it may concern

My name is Amahle Khumalo, a MMLIS student at the Durban University of Technology. The research I wish to conduct for my Masters Dissertation involves the digital literacy instruction in academic libraries in KwaZulu- Natal.

I am hereby seeking your consent to undertake an initial explanatory survey with Subject Librarians to identify the application/use of ICT in digital literacy instruction by subject librarians in KZN. Interviews with selected Subject Librarians may also need to be conducted at a later stage.

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC). The results of the survey will be stored on a secure server and access will be restricted to the researcher and supervisors.

If you require any further information, please do not hesitate to contact me: 082 052 4965 or amahlehkhumalo@gmail.com. Thank you for your time and consideration in this matter.

Yours sincerely,

Amahle Khumalo
Durban University of Technology

Appendix F- LETTER OF INFORMATION AND CONSENT

LETTER OF INFORMATION

Title of the Research Study: Digital literacy instruction in academic libraries in KwaZulu-Natal

Principal Investigator/s/researcher: Mr Amahle Khumalo, BTLIS

Co-Investigator/s/supervisor/s: Dr M. Rajkoomar, PhDLIS

Ms A. Rajagopaul, MTECH.LIS

Brief Introduction and Purpose of the Study:

Dear Participant

I am a Masters student at the Durban University of Technology doing my research as a requirement for the Masters of Management Degree in Library and Information Science.

I would like to invite you to participate in my research about digital literacy in academic libraries. Research is a systematic or enquiry for generalized new knowledge. Digital literacy is widely considered to be an essential survival skill for life in the Information Age. Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Academic libraries have a significant role in the preparation of dynamic future leaders by offering effective and efficient services so that users can learn the process of how to enter methods of higher research-oriented studies gradually. Subject Librarians play a critical role in teaching students digital literacy in the classroom to enable them to fit into current operations in today's world. In view of this, the purpose of this study is to examine the extent to which subject librarians in academic libraries use information and communication technologies in digital literacy instruction. You can ask as many questions as you wish pertaining to this study.

Outline of the Procedures: The aim of this study is to explore the extent to which digital literacy instruction is conducted in academic libraries. Its objectives are to ascertain ways in which Subject Librarians use information and communication technologies for digital literacy instruction in academic libraries in KwaZulu-Natal; and to find out if Subject Librarians possess digital literacy skills necessary for digital literacy instruction in academic libraries in KwaZulu-Natal.

You will be required to fully complete the questionnaire as honestly as possible as this will enable the analysis to be efficient and accurate based on the responses. The questionnaire is web based and it will take about 10 minutes of your time. However, as a result of this study's methodology, data will be collected in two phases: the first quantitative phase by means of questionnaires which will be followed by the qualitative phase by means of interviews. Interviews will only be scheduled for respondents who use ICT's in their digital literacy instructions. These interviews will be telephonically or online via MS Teams, Zoom or Skype based to your convenience. The responses to the questionnaires will be analyzed using *Microsoft excel* and interviews will be analyzed using thematic analysis. You were selected as a participant by means of a census as you were part of 58 subject librarians in KZN universities.

The study will collect data from subject librarians and or librarians responsible for literacy trainings, excluding librarians in other library departments or sections (circulation, acquisitions, cataloguing, etc.). This is due to the fact that Subject Librarians provide reference and research services in their specialty field. They provide important and valuable literacy training students. For the first quantitative data collection, all subject librarians will be invited to participate in the study. However, participants will be excluded from the study if they decline to participate. Moreover, for the second qualitative phase, all respondents who participated in the first phase of data collection will be invited to participate in the second phase of data collection as a result of the exploratory mixed methods design. However, participants will be excluded from the second phases of data collection if they did not submit the survey, or they decline to participate.

Risks or Discomforts to the Participant: There are no known or anticipated risks or discomfort to you as a participant in this study.

Explain to the participant the reasons he/she may be withdraw from the Study: There are no foreseeable reasons to why the participants may withdraw from the study; however, you may decide to withdraw from this study at any time without any negative or adverse consequences by advising the researcher that you no longer wish to participate.

Benefits: It is envisaged that this study will: provide a platform for subject librarians to recommend the type of digital skills training they need; provide feedback and recommendations to academic library management about what is done correctly or what should be added in terms of digital literacy instruction; and will make a significant contribution to literature regarding digital literacy. The benefits to the researcher will be research publications in accredited journals, conference papers and a qualification of Master of Management Sciences in Library and Information Studies.

Remuneration: There are no financial incentives or remuneration for the participants of this study.

Costs of the Study: As a participant, you will not be liable for any costs for this study, nor will you receive any monetary compensation or any other remuneration.

Confidentiality: All information you provide is completely confidential. Your name will not appear in my thesis or report resulting from this study; however, with your permission, anonymous quotations may be used. Only my supervisors and I will have access to the data you provide. The personal identification details you will provide in the questionnaire will only be used to facilitate the second phase of data collection.

Results: The results of this study will be published; however, they will also be made available to the participants upon request.

Research-related Injury: There are no known or anticipated injuries related to this study. However, should it happen that by any chance the research-related injury or adverse reaction occur, the participants (s) of this study will be compensated with the aid of the DUT research indemnity cover.

Storage of all electronic and hard copies including tape recordings: Data for this study (questionnaires and Audio recording) will be kept in a password-protected computer and stored in a password encrypted folder. Only the researcher and the supervisor will have access to the data. The data will be retained for a period of five (5) years. Thereafter, the data will be disposed by erasing all its content from the personal computer.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher on: 0820524965, my supervisor: 031 373 6776/5446 or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

CONSENT

Full Title of the Study: Digital literacy instruction in academic libraries in KwaZulu-Natal

Names of Researcher/s: Amahle Khumalo

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher,_____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____Digital literacy instruction in academic libraries in KwaZulu-Natal,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

APPENDIX G –

APPROVAL LETTERS

Directorate for Research and Postgraduate Support
Durban University of Technology
Tromso Annexe, Steve Biko Campus
P.O. Box 1334, Durban 4000
Tel.: 031-3732576/7
Fax: 031-3732946

13 April 2021
Mr Amahle Khumalo
c/o Department of Information Systems
Faculty of Accounting and Informatics
Durban University of Technology

Dear Mr Khumalo

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers. I am pleased to inform you that the Institutional Research and Innovation Committee (IRIC) has granted **Gatekeeper Permission** for you to conduct your research "Digital literacy instruction in academic libraries in KwaZulu-Natal" at the Durban University of Technology. **Kindly note that this letter must be issued to the IREC for approval before you commence data collection.**

The DUT may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

We would be grateful if a summary of your key research findings would be submitted to the IRIC on completion of your studies.

Kindest regards.
Yours sincerely

DR LINDA ZIKHONA LINGANISO
DIRECTOR: RESEARCH AND POSTGRADUATE SUPPORT DIRECTORATE

UNIVERSITY OF ZULULAND

University of Zululand, Private Bag X1001, KwaDlangezwa, 3886
W: www.unizulu.ac.za

T: +27 35 902 6779/6615 F: +27 35 902 6355 E: JiliN@unizulu.ac.za

Office of the Deputy Vice–Chancellor: Research and Innovation

17 May 2021

Mr A Khumalo
Faculty of Accounting and informatics
Department of Information Systems
Durban University of Technology
Email Address: amahlehkhumalo@gmail.com

Dear: Mr A Khumalo

RE: PERMISSION TO COLLECT DATA ON A RESEARCH STUDY TITLED: "DIGITAL LITERACY INSTRUCTION IN ACADEMIC LIBRARIES IN KWAZULU-NATAL"

The University of Zululand's Research Ethics Committee (UZREC) hereby grants approval for you to conduct part of your research at UNIZULU, as per the methodologies stated in your research proposal and in terms of the data collection instruments that you have submitted.

We note also that Durban University of Technology (DUT) has issued an ethical clearance certificate and, having read the documentation, we accept the submission in good faith.

You may use this letter as authorization when you approach the relevant persons. Please note that the permission is based on the documentation that you have submitted. Should you revise your research instruments, or use additional instruments, you must submit all the changes to the University of Zululand Research Ethics Committee (UZREC).

The UZREC wishes you well in conducting your research.

Yours Sincerely,

18/05/2021

Professor Nontokozo Mashiya
Chairperson: University Research Ethics Committee
Acting Deputy Vice-Chancellor: Research & Innovation

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

18 May 2021

Mr Amahle Khumalo
Durban University of Technology
Email: amahlehkhumalo@gmail.com

Dear Mr Khumalo

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN) towards your postgraduate studies, provided Ethical clearance has been obtained. We note the title of your research project is:

"Digital literacy instruction in academic libraries in KwaZulu-Natal."

It is noted that you will be constituting your sample by handing out questionnaires and/or conducting interviews with staff members at UKZN (Taking in account the regulations imposed during the lockdown ie restrictions on gatherings, travel, social distancing etc. ZOOM, Skype or telephone surveys recommended).

Please ensure that the following appears on your notice/questionnaire:

- Ethical clearance number;
- Research title and details of the research, the researcher and the supervisor;
- Consent form is attached to the notice/questionnaire and to be signed by user before he/she fills in questionnaire;
- gatekeepers approval by the Registrar.

You are not authorized to contact staff and students using the 'Microsoft Outlook' address book. Identity numbers and email addresses of individuals are not a matter of public record and are protected according to Section 14 of the South African Constitution, as well as the PAIA and POPI Act. For the release of such information over to yourself for research purposes, the University of KwaZulu-Natal will need express consent from the relevant data subjects. Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

DR KE CLELAND
REGISTRAR

UNISA university of south africa

UNISA RESEARCH ETHICS REVIEW COMMITTEE

24 May 2021

Dear Mr. Amahle Khumalo

Decision: Ethics Approval from 24 May 2021 to 23 May 2022

NHREC Registration # : (if applicable)

ERC Reference # : 2021_URERC_013 ER

Name : Mr. Amahle Khumalo

Student #: 21544087

Staff #: N/A

Researcher(s): Mr. Amahle Khumalo
Durban University of Technology
amahlehkhumalo@gmail.com; 0820524965

Supervisor (s): Dr M Raikoomar; mogier@dut.ac.za

Digital Literacy instruction in academic libraries in KwaZulu-Natal

Qualification: Master's Degree

Thank you for the application for research ethics clearance by the UNISA Research Ethics Review Committee for the above-mentioned research.

The **low-risk application** was reviewed in compliance with the UNISA Policy on Research Ethics and the UNISA Standard Operating Procedure on Research Ethics Risk Assessment on 17 May 2021. **The application is approved**. The decision will be tabled at the nextCommittee meeting on 22 July 2021 for ratification.

The proposed research may now commence with the provisions that:

1. If DUT requires that a journal article needs to be submitted from the dissertation forthe qualification to be awarded, section 1.6.1 in Form1 should also be ticked and thepurpose for which the data will be used must be included in the consent forms. Section 6.7 divulges that results will be disseminated in journal articles and conferences. There is no indication that the results of your study will be shared with the participants.
2. The project receives approval from the Research Permission Committee of Unisa

prior to the commencement of fieldwork activities.

3. Access to the Unisa student and employees for the dissemination of the online survey should be negotiated through the gatekeeping assistance of the Unisa ICT department.
4. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
5. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the URERC.
6. The researcher(s) will conduct the study according to the methods and proceduresset out in the approved application.
7. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing accompanied by a progress report.
8. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
9. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
10. No field work activities may continue after the expiry date (**23 May 2022**). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

For consideration:

There are inconsistencies with regards to the audio and/or video recording of interviews

(section 2.3; section 2.6). Please ensure that these sections align in Form1.

Note:

11. *The reference number **2021_URERC_013** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee*

Decision template- approval template

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

Kind regards

Dr Retha Visagie – Deputy Chairperson
Email: visagrg@unisa.ac.za, Tel: (012) 429-2478

–

Prof Lessing Labuschagne – Chairperson Email: llabus@unisa.ac.za, Tel: (012) 429-6368

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

MUT
MANGOSUTHU
UNIVERSITY OF TECHNOLOGY

Research Directorate

UMLAZI KWAZULU-NATAL

PO Box 12363 Jacobs 4026 Durban Tel: 031 907 7450

23 June 2021 REF:

RDO/05/2021

Mr Amahle Khumalo
Durban University of Technology

Dear Mr Khumalo

PROTOCOL: Digital literacy instruction in academic libraries in KwaZu1u-Natal

The MUT Research Ethics Committee considered your application at their meeting held on 17 June 2021. It is my pleasure to inform you that permission to conduct the research project above was granted.

The approval is valid for two years from 17 June 2021. Any changes to the project must immediately be brought to the attention of the MUT Research Ethics Committee.

Your acceptance of this approval denotes your compliance with South African National Research Ethics guidelines (2004) and the MUT Research Ethics Policy, Procedures and Guidelines

Good luck with your research.

Yours sincerely,
Dr A Mienie
Director: Research

APPENDIX H- RESEARCH PATH TABLE

Research Path Table	Literature review- Research proposal	Developing data collection instruments and pilot testing	Pilot Testing	Ethics clearance and Gate Keeper Approval letters	Quantitative data collection and analysis	Qualitative data collection and analysis	Integration of qualitative and quantitative results; Summary of the main findings	Writing of first draft of Theses	Second draft and editing	Submission for examination
July 2020- December 2020										
January 2021 - February 2021										
February 2021- March 2021										
April 2021- Jun 2021										
July 2021- September 2021										
October 2021- November 2021										
December 2021- January 2022										
February 2022 - March 2022										
April 2022 - May 2022										
Jun 2022										

APPENDIX I- TURNITIN REPORT

Turnitin Originality Report

Processed on: 25-May-2022 14:28 SAST
ID: 1843216149
Word Count: 48560
Submitted: 2

Digital Literacy Instruction in Academic Libraries in KwaZulu-Natal By Amahle Khumalo

Similarity Index	Similarity by Source
15%	Internet Sources: 12% Publications: 9% Student Papers: 5%

1% match ()
Chanetsa, Bernadette. "The changing roles, responsibilities and skills of subject and learning support librarians in universities in the Southern African Customs Union Region: guidelines for the establishment of a new service", 2014

1% match (publications)
Chanetsa, B., and P. Ngulube. "The changing roles, responsibilities and skills of subject and learning support librarians in the Southern African Customs Union region", Journal of Librarianship and Information Science, 2014.

1% match (Internet from 31-Dec-2021)
https://mobt3ath.com/uplode/books/book-60611.pdf

< 1% match ()
Neerputh, Shirlene.. "Developing guidelines for performance appraisal of subject librarians in KwaZulu-Natal academic libraries", 2004

< 1% match ()
Jaguszewski, Janice, Williams, Karen. "New Roles for New Times: Transforming Liaison Roles in Research Libraries", Association of Research Libraries, 2013

< 1% match ()
Kimani, Hannah Njeri. "Information literacy skills among incoming first-year undergraduate students at the Catholic University of Eastern Africa in Kenya", 2014

< 1% match ()
Katende, Jonathan. "Modes of market entry strategies : a South African retail company's perspective on doing business in Nigeria", 2015

< 1% match ()
Odede, Israel Oghenerukevwe.. "Information literacy self-efficacy in the use of electronic information resources by library and information science postgraduate students in South South Nigeria.", 2018

< 1% match ()
Faber, Hilda Anna. "2-D AND 3-D DESIGN AT A UNIVERSITY OF TECHNOLOGY: A RETROSPECTIVE OUTCOME", Bloemfontein: Central University of Technology, Free State

< 1% match ()
Dzandza, Patience Emefa. "Use and management of information systems in academic libraries in Ghana", 'University of the Western Cape Library Service', 2019

< 1% match ()
Bakare, Oluwabunmi Dorcas.. "The use of social media technologies (SMTs) in the provision of library and information services in academic libraries of South-West, Nigeria.", 2018

< 1% match ()
Tsegahun Manyazewal Musse. "An analysis of the implementation of business process reengineering health care reform initiative in Ethiopia", 2015

< 1% match (Internet from 08-Apr-2019)
http://uir.unisa.ac.za/bitstream/handle/10500/24930/dissertation_dube_s.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 30-Nov-2021)
https://uir.unisa.ac.za/bitstream/handle/10500/27251/dissertation_izo_lo.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 02-May-2021)
http://uir.unisa.ac.za/bitstream/handle/10500/27236/dissertation_matatiele_ra.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 12-Aug-2019)
http://uir.unisa.ac.za/bitstream/handle/10500/25642/thesis_nigusso_ft.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 09-Oct-2019)
http://uir.unisa.ac.za/bitstream/handle/10500/25815/dissertation_matyila_pml.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 16-Dec-2021)
https://uir.unisa.ac.za/bitstream/handle/10500/28056/dissertation_maphosa_c.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 15-Oct-2021)
https://uir.unisa.ac.za/bitstream/handle/10500/26473/thesis_nkalane_pk.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 16-Oct-2021)
https://uir.unisa.ac.za/bitstream/handle/10500/27992/dissertation_hlengwa_cl.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 03-Jan-2022)
https://mobt3ath.com/uplode/books/book-83990.pdf

< 1% match (Internet from 27-Oct-2019)
https://www.tandfonline.com/doi/full/10.1080/09523987.2018.1439712

APPENDIX J- LANGUAGE CLEARANCE CERTIFICATE

25 Maple Crescent
Circle Park
KLOOF
3610

Phone 031 – 7075912
0823757722
Fax 031 - 7110458
E-mail:
dr1govender@telkomsa.net
sathsgovender4@gmail.com

Dr Saths Govender

19 MAY 2022

TO WHOM IT MAY CONCERN

LANGUAGE CLEARANCE CERTIFICATE

This serves to inform that I have read the final version of the dissertation titled:

Digital Literacy Instruction in Academic Libraries in KwaZulu-Natal by AMAHLE KHUMALO, student no. 21544087.

To the best of my knowledge, all the proposed amendments have been effected and the work is free of spelling and grammatical errors. I am of the view that the quality of language used meets generally accepted academic standards.

Yours faithfully

DR S. GOVENDER

B Paed. (Arts), B.A. (Hons), B Ed.

Cambridge Certificate for English Medium Teachers

MPA, D. Admin.