Durban University of Technology

The provision of access to electronic information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era

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DECLARATION

I, **Nonhlanhla Princess Ntloko**, hereby declare that this study represents the original work by the author and has not been submitted in any form at another university. Where use is made of the work of others, it has been duly acknowledged in the text and included in the list of references.

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Signature: Date: 18 August 2024

DEDICATION

I dedicate this research to my mother (Sindiswa Stella Ntloko), my husband (Lwazi Carllo Sonqishe), and my son (Christopher Thami Jnr Ntloko).

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ABSTRACT

This study investigated the provision of staff digital access to information in Kwazulu-Natal Department of Health (KZN DOH) libraries. The current state of access to information was determined, challenges encountered were identified, systems and technologies used for the provision of access to information were assessed, the level of digital skills for staff members in accessing digital information was examined, and strategies for optimising the utilization of electronic information resources were discovered. National Health Digital Strategy of South Africa (2019 – 2024) emphasis on leveraging technology for better health outcomes aligns seamlessly with the health libraries' mission to provide timely and accurate health information. The goal is to create a seamless digital environment where health professionals, students, and researchers can easily access and utilise various health information resources.

Digitisation in libraries is part of technological advancements of the twenty-first century that help to manage information securely and enable efficient retrieval and timeous dissemination. This study adopted interpretivist research paradigm. Qualitative research methodology was used for this study, with phenomenology as the research design. The target population for this study were student nurses, nurses, doctors, lecturers, and librarians from the thirteen (13) hospitals and nursing campus libraries in KwaZulu Natal. Non-probability, judgement, or purposive sampling was adopted, and according to Pathak (2015), it is the best sampling method for a phenomenological study. The sampling frame for this study consisted of student doctors, doctors, student nurses, librarians, lecturers, and other health staff. The study utilised a sample of 73 available and accessible participants across ten hospitals and nursing colleges with digital library resources.

Data collection from the recruited participants included interviews, focus group discussions and document analysis. Semi-structured interviews were also conducted to gather participants' background data and information on library usage. Focus group discussions were utilised to generate discussion among the diverse participants, including student nurses, lecturers, nurses, and doctors. Phenomenological reduction was used for dimension reduction during data analysis. From the librarians' perspective, budgetary technological constraints and the need

for improved digital literacy among patrons are significant concerns. In response, librarians have implemented various strategies, including enhancing digital access, providing training, and introducing innovative solutions.

Conversely, patrons express satisfaction with the library staff but desire improved network reliability, access to online resources, extended library hours, and further digital literacy training. As the document analysis highlights, the legislative and strategic frameworks provide a roadmap for libraries to align their services with national health objectives and embrace digital transformation. The study recommended enhancing digital infrastructure, improving digital literacy, and adopting innovative technologies to effectively transition to digital information access. The study recommends reducing the digital gap and increasing digital awareness through investment in digital skills among patrons and providing digital tools.

Keywords: Digitization, digital information era, digital information literacy, evidence-based medical practice, health libraries, information access, medical libraries

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LIST OF ABBREVIATIONS AND ACRONYMS

AI	Artificial Intelligence
CAS	Current Awareness Services
eHealth	Electronic Health
EHR	Electronic Health Records
IALCH	Inkosi Albert Luthuli Central Hospital
ICT	Information and Communication Technology
IFL	The International Federation of Library
ILLS	Inter-Lending Library Services
KZN DOH	Kwazulu Natal Department of Health
mHealth	Mobile Health
NDHS SA	National Digital Health Strategy for South Africa
PAIA	Promotion of Access to Information Act
SDI	Selective Dissemination of Information
IT	Information Technology
SIF	Social Informatics Framework
TAM	Technology Acceptance Model
PPP	Public Private Partnerships

CHAPTER 1

1.1. Introduction and Background of the Study

Chigbundu (2023) stipulates that digitisation adoption in libraries cuts across different library routines and services, including but not limited to current awareness services, library registration, cataloguing, reference services, document delivery services, and library resource acquisition. Some libraries still rely heavily on print resources and have little interest in providing access to digital documents. Some available print resources, such as academic projects, backend newspapers, fragile documents, and old library resources, have become poorly kept and deteriorated due to insufficient space to accommodate them. Some of these resources are also not sought after because of a lack of awareness of their existence (Chigbundu, 2023). This problem reduces the efficiency and efficacy of libraries in serving as a centre for learning. Therefore, library authorities must devise ways of preserving these resources and enhancing their accessibility to their users to achieve what is known as digitisation.

Digital technologies enable data-driven healthcare service delivery, introducing digital health monitoring, eHealth and big data-based health information systems, and artificial intelligence in healthcare management, information access, and healthcare service delivery (Jablonski et al., 2021). These cutting-edge technologies have diminished the geographical obstacles that formerly constrained healthcare services, traditionally hampered by geography, distance, and time. For example, digital health or digital healthcare enables real-time patient health monitoring, remote consultations, and healthcare services from the comfort of one's home (Al-Shorbaji and Al-Shorbaji, 2021).

In addition, digital healthcare platforms enable the collection of health data at the individual level, which can be utilised for healthcare planning and research purposes. Digital technologies have revolutionised the delivery of healthcare services by expanding their reach and improving their effectiveness (Hermes et al., 2020). Similarly, digital technology provides healthcare libraries new opportunities to expand their services and enhance operational efficiency (Lyman, 2017). Consequently, the availability and utilisation of information have undergone a complete overhaul due to the widespread presence of digital libraries,

databases, and repositories within the healthcare community. According to Wallis et al. (2019), digital technologies enable users to instantaneously access a substantial amount of material, bypassing the limitations of physical and time constraints seen in traditional libraries.

1.2 Contextualisation of the Study

This study is directed at investigating the provision of access to electronic information in Kwazulu Natal Department of Health (KZN DOH) libraries. KZN DOH has health libraries based in hospital and nursing college campuses. The libraries are used by staff, including student nurses, nurses, doctors, lecturers, support staff, and other health professionals. The main library that supplies these libraries with information resources is at Pietermaritzburg's head office. Some of these libraries have continued to use hybrid information systems combining manual and electronic records for collecting, developing, cataloguing, classifying, and sharing information resources through the World-share database.

The Inkosi Albert Luthuli Central Hospital (IALCH) is one of the biggest hospitals in the KZN DOH and a referral hospital that deals with complicated health cases. The IALCH is a Public Private Partnership (PPP) with various companies providing services; for example, health professionals and administration staff are government employees, and Janitors, the Information Technology department, and security staff are under private companies. The IALCH is a paperless hospital, meaning the entire patient admission and discharge process is made online, and communication, human resource services, and technical services are mainly online. Therefore, staff members are expected to be digitally literate and familiar with technologies for handling information.

During the researcher’s stint of employment at IALCH from 2016, it has been observed that there has been a reduction of print journals and print textbook subscriptions and purchases, an addition for subscriptions of e-journals, e-books, online databases, and a move to WorldShare database for Inter-Lending Library Services (ILLS). It was necessary to obtain a broader understanding of these developments and their effect on health information access among library patrons and how these findings and lessons can provide a framework for digital information access across health libraries in KwaZulu Natal to enhance information sharing and exchange.

1.3 Problem Statement

The provision of staff access to electronic information in KwaZulu Natal Department of Health libraries is vital for staff to satisfy their information needs and for health libraries to add value to the department (Jinabhai et al., 2021). The digital formats of accessing information align with the digital transformation era, which helps preserve, conserve, and disseminate information when required and even from remote locations, such as from the respective departments and away from work (Jinabhai et al., 2021). Health professionals' daily duties and research depend on access to authentic information, and digitisation organizes such information with ease of access, proper management, and dissemination of information (van Velthoven et al., 2019). When information is poorly organised, it results in difficulty accessing it and probably loss of information records when there is no proper access to relevant information.

This can lead to inefficiencies in the provision of services (Alvarenga, 2020). While working as a medical librarian for the KZN Department of Health, the researcher observed a general reluctance toward transitioning to digital information usage and handling by library patrons. Several benefits have been identified in studies from digital information access, which include increased accessibility, cost-effectiveness, search and discovery, multimedia support, remote learning and support, space efficiency, preservation and conversation, collaboration and networking, data analytics and environmental impact (Banks, 2017; Masenya and Ngulube, 2020; Ashikuzzaman, 2023). However, these and other studies have also observed the need for technical and personal resources and the provision of specific services and platforms for these benefits to accrue to library users.

This study, therefore, was directed at investigating these factors about the library patrons and the library environment that can facilitate the proliferation of these benefits and improve information access and utilisation. In addition to the need to understand the perspectives of patrons and the library environments that promote or inhibit digital transition in access to and use of digital information, several gaps have also been observed in existing research. The three research gaps most pertinent to this present study include accessibility and equity (focusing on the digital divide, health literacy, and cultural considerations), practical implementation and impact (focusing on technology-user disconnect and cost-effectiveness), and policy and governance, which focuses on interoperability and standardisation.

Concerning accessibility and equity, several studies have pointed to a digital divide and digital literacy (Dixon et al., 2014; Nguyen et al., 2017; Rushambwa, 2021; Rushambwa and Ndhlovu, 2023). These and other studies have highlighted that while the internet and other similar digital technologies have expanded information access, unequal access to technology, internet coactivity, digital skills, and literacy continue to marginalize vulnerable populations. While this has been observed in settings of computer productivity and work (Rushambwa and Ndhlovu, 2023) and private information access (Dixon et al., 2014; Nguyen et al., 2017), the role of digital libraries or integration of digital technology tools in libraries remains an area of limited study.

An empirical study on the digital divide in South Africa found that men were likely to be more digitally literate when compared to females in South Africa (Mkhize and Rushambwa, 2022). While these quantitative analyses may be informative concerning the distribution of the digital divide, qualitative analyses can provide explanations and perspectives into the underlying reason and contributing factors. The present study, taking a qualitative analytical approach, seeks to provide perspectives on digital transition among library patrons. In the digital transformation survey and socioeconomic change, the authors argued that since most technologies are incorporated in African societies and not developed based on local contexts, some technologies may lack practical implementation and impact (Rushambwa and Ndhlovu, 2023).

The digitalisation of library information may suffer from this scarcely researched phenomenon termed technology user disconnects, where designers often lack contextual and meaningful user input, leading to tools being made available with usability issues. Furthermore, the non-inclusion of user input may lead to a lack of evidence-based implementation to achieve optimal integration of digital tools into healthcare research and workflows. Hence, there is a general apathy towards using such provisions. Finally, digital technologies are emerging technologies (Ndemo and Weiss, 2017; Kaplan and Haenlein, 2019; Verhoef et al., 2021) and are transforming societies and thus have not reached integration and absorption into general usage. The intersection between emerging technologies and user adoption in library usage and digital information remains an active research area. The present study contributes towards understanding how issues such as the digital divide, technology disconnect, and the

general profile of emerging technologies influence digital transition among library patrons in KZN libraries.

1.4 Aim of the study

The aim of the study was motivated by the primary need to describe and interpret the expiriences of patrons and librarians in Kwazulu Natal Department of Health libraries as the basis for understanding the factors influencing the provision of access to electronic information.

1.4.1. Research Objectives

i. Determine the state of electronic information provision by library staff members in Kwazulu Natal Department of Health libraries.

ii. Identify challenges encountered by Kwazulu Natal Health staff members in electronic information provision.

iii. Establish the systems or technologies used to provide access to electronic information.

iv. Determine the role of library staff in facilitating access to electronic information.

v. Recommend a strategy for optimising the use of electronic information services in Kwazulu natal Department of Health libraries.

1.4.2. Research Questions

i. What is the current state of Kwazulu Natal Health staff members' access to electronic information?

ii. What are the challenges KZN Health staff members encounter in accessing electronic information using digital technologies?

iii. What systems or technologies are used to provide access to electronic information?

iv. What is the role of library staff in facilitating access to electronic information?

v. What strategy can be recommended to optimise the use of electronic information services in KZN Health libraries?

1.5 Significance of the Study

Traditionally, libraries have served the role of information archives for learning and research. The present study argues the continued role of libraries as places for digital change and transition due to them being centres for collaboration, information exchange, idea sharing, and learning and development. In this study, the sample comprises individuals at different stages of learning and development, such as student nurses, nurses, doctors, and lecturers, presenting a concerted and diverse range of individuals who can provide insight into the advances and reception of digital information models and systems. Libraries will continue to be information and ideas exchange centres as digital transformation, and its impact on information access becomes mainstream.

The need to understand how those who utilise library services and those who administer those services and the environment within which that can best occur remains an important area of investigation that this study addresses. Herring (2012) stipulates that several points have been highlighted in research that strengthen the role of libraries and the significance of the present study. Libraries are safe spaces compared to online communities such as internet sites, with challenges such as fake news, cyberbullying, and trolling, which can make people reluctant to engage in information exchange. On the other hand, libraries continue to be spaces where collaboration, idea-sharing, and constructive engagement can occur (Herring, 2012). As such, it is important to understand how libraries can continue to fulfil this role by creating conducive environments for their patrons.

Libraries can efficiently digitize influential primary sources, thus making versions of essential works available online. This digitisation can provide library access to people who do not have the resources to travel there. Librarians, therefore, continue to play an essential role by utilising emerging technologies to further timeless provision and better access to information (Jones, 2017; Chigbundu, 2023). This necessitates understanding librarians' perspectives on their changing and evolving roles in information provision and access in the digital transformation era, which the present study investigates. Bombarded with large volumes of information, librarians provide the essential service of sorting the real news from the fake, thus helping patrons to engage with objective, accurate, and engaging information that meets the needs of the patrons, thus helping in shaping collaboration and information access (Smith, 2019).

Librarians play a crucial role in influencing and enhancing the availability of scholarly content on the Internet. The open access movement facilitates the online availability of scholarly articles, vital for disseminating publically financed medical research outcomes. Such information tends not to be known, and through information provision, education and engagement, librarians can play a role in improving information access (Herring, 2012; Chigbundu, 2023). Thus, this study investigates library access to digital information and the possible engagement between patrons and librarians. This is essential in understanding how librarians fulfil this role and the scope for improvement.

1.6. Scope and Limitations

The study was based on 13 health libraries in hospitals and nursing college campuses, consisting of KZN DOH libraries. Patrons range from nursing students, student doctors, nurses, doctors, lecturers, and other health staff members in KZN DOH. Out of the 13 health libraries, patrons from 9 participated, and 11 librarians represented 11 libraries. The limitations of this study are the findings might not be universally applicable to other regions or types of libraries; the reliance on qualitative methods, specifically interviews, focus groups, and document analysis, for data collection as these methods provided in-depth insights, they might also have introduced biases; technological limitations as rapid advancements in digital technologies and online resources could mean that some of the findings become quickly outdated.

1.7. Research Methodology

The study utilised the interpretivism paradigm, a commonly employed approach in qualitative research. This paradigm assumes that reality is socially constructed, meaning no singular, observable reality exists. Instead, there are multiple interpretations or realities of a given event. Researchers do not simply discover knowledge but actively construct it (Merriam and Tisdell, 2015). The nature of the inquiry informs the choice of qualitative research methods in this study, the need for dialogue and discourse with research participants to find explanations and understand the social world of information access, collaboration and exchange, and perspectives on change and continuity relative to information access.

According to scholars, qualitative research methods allow researchers to interact and have a dialogue with research participants to understand the social and/or lived world they are

attached to from their experience and the meanings they attach to the symbols they interact with in their experiences (Wahyuni, 2012; Shelembe, 2021). Phenomenology design was used as it is a method within the interpretivist research paradigm and emphasizes the importance of personal perspective in interpreting and analysing qualitative data (Phathak, 2017). Non-probability purposive sampling was applied as, according to Taherdoost (2016), purposive sampling is often associated with qualitative research, and a clear rationale is needed for the inclusion of some cases rather than others.

The researcher relies on their expertise to select the most suitable participants for the systematic inquiry and prevent irrelevant responses (Pathak, 2017). The data collection methods were interviews, focus group discussions, and document analysis. Creswell (2014) highlighted that qualitative researchers commonly collect several types of data, including interviews, observations, documents, and audio-visual material, instead of depending just on one kind of data. The utilisation of numerous sources of data and information in qualitative research inquiry, known as triangulation, enhances the precision and relevance of the findings (Creswell, 2014).

1.8. Ethical Considerations

Ethical considerations, which consider parameters in this study for ethical research practice guidelines and criteria, are discussed in detail in chapter three. They are presented with transparency, a letter of information sent to participants before interviews and focus group discussions, privacy (names of participants not required), and consent signed by participants. Confidentiality of information supplied by research participants will be kept securely for five years, and then that information will be destroyed.

1.9. Knowledge Dissemination

This study focused on providing developments in providing access to electronic information in KZN DOH libraries in the digital transformation era. As a means of enhancing the body of knowledge in Library and Information Studies, the findings from this study will be compiled into a thesis accessible to all academics via the Durban University of Technology Repository. Knowledge dissemination has been obtained by publishing research findings in a book chapter published by IGI Global Publishers in February 2024. The following are the specifics of the research output:

Ntloko, N.P. and Masenya, M.T. (2024). Enhancing Access to Electronic Information through Digital Transformation in Kwa-Zulu Natal Department of Health Libraries in South Africa. In Holland, B. and Sinha, K. (eds). *Multidisciplinary Approach to Information Technology in Library and Information Science*. Hershey, Pennsylvania: IGI-Global, pp.114-131.

Available at: https://www.igi-global.com/book/multidisciplinary-approach-information-technology-library/334129

1.10. Definition of Key Concepts and Terms

Health libraries are special libraries as they specialise in and cater to the fields of health and medicine to support health staff with information needed for further studies, research, and their daily duties. These libraries are also referred to as departmental libraries in KZN DOH, and literature often refers to them as health, medical, and health science libraries; hence, these terms are used interchangeably in this study.

Digital transformation for the healthcare industry is about how the organisation uses technologies, people, and processes to deliver more sustainable value to patients, healthcare professionals, and medical organisations.

Digitisation is the conversion of text, picture, or sound into a digital form that can be processed by a computer or other digital devices (Verhoef et al., 2021).

Digital literacy is accessing, managing, understanding, and integrating digital technology tools and appropriately communicating, evaluating, and creating information through such technologies (Breakstone et al., 2018).

Information literacy uses digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information to function in a knowledge society (Breakstone et al., 2018).

Health literacy is the degree to which individuals can obtain, process, and understand basic health information and services needed to make appropriate health decisions (Berkman et al., 2010).

Evidence-based medical practice is the conscientious, explicit, judicious, and reasonable use of current best evidence in making decisions about the care of individual patients (Badrick, 2013).

E-health and M-health – eHealth is (Electronic Health Records), and m-Health is (medical and public health practice supported by mobile phones and wireless devices).

Web 2.0 technologies refer to websites and applications that rely on content created by users for the benefit of other users. Web 2.0 is distinguished by increased user engagement and cooperation, widespread network connectivity, and improved communication channels.

Library patrons are people to whom you can check out resources. They can independently search for resources, place holds, and leave reviews and recommendations. Staff, faculty, and students automatically have patron privileges in your library.

1.11. Structure of the Thesis

The structure of the thesis is as follows:

Chapter 1: Introduction

This chapter briefly covers the study's structure, including the introduction and background, contextualization, problem statement, aim of the study, objectives and research questions, significance of the study, literature review, methodology, and ethical considerations.

Chapter 2: Literature Review

This chapter reviews the literature on library provision and access to electronic information. It reviews the literature concerning the study's objectives and gives thorough information on the subject investigated.

Chapter 3: Research Methodology

This chapter provides how a qualitative study was conducted regarding the research paradigm, approach, sampling methods, data collection, and data analysis.

Chapter 4: Presentation of findings

This chapter focused on presenting findings, data analysis, and interpretation of data using qualitative research methodology.

Chapter 5: Discussion and interpretation of findings

This chapter discussed and interpreted the findings gathered following the study's objectives or research questions.

Chapter 6: Conclusions and Recommendations

This chapter summarizes the study findings and recommends future research on traditional medicinal knowledge preservation techniques.

1.12. Chapter Summary

This chapter covered the background of the study, which elaborates on the issues of digital information access in KZN DOH libraries, the importance of health libraries in aligning with technological advances of handling information as stipulated by parent bodies, National Department of Health, IFLA, National Health Digital Strategy in South Africa. The problem statement was discussed, mentioning problems that arise when information is not correctly handled in health libraries. Research objectives and questions were described, including the state of access to information by staff members, challenges encountered by KZN Health staff members in accessing information digitally, the systems or technologies used for the provision of access to information, the role of library staff in facilitating access to electronic information and the strategy for optimising the use of digital information services in KZN DOH libraries.

The significance of the study was discussed, stipulating that the need for increased access to electronic information is urgent in KZN DOH health libraries, where the digital gap is significant. The scope and limitations of the study were mentioned as the study applies to KZN DOH libraries. The issue of literature review guided by a theoretical framework and to be discussed in detail in chapter two was mentioned. A description of the research methodology process mentioning that interpretivism, qualitative, phenomenology, non-probability purposive sampling, interviews, focus group discussions, and document analysis used to collect data and obtain data triangulation, ethical considerations also used including letter of information, consent form, privacy of participants' identity and information they provided considered.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter examines the relevant theoretical and empirical literature to establish a conceptual framework that will help address the study questions formulated in Chapter One. The literature reviewed focused on the following research objectives: assessing the current state of electronic information provision by library staff members in KZN Health libraries, identifying the challenges faced by KZN Health staff members in providing electronic information, determining the systems or technologies used to grant access to electronic information, understanding the role of library staff in facilitating access to electronic information and proposing a strategy to enhance the utilisation of electronic information services in KZN Department of Health libraries.

A literature study determines the existing theories, their interconnections, and the extent to which these theories have been explored and to formulate new hypotheses for future testing (Ngulube, 2015). A literature review is a concise overview of previous research on a particular topic of interest. A literature review extensively examines existing literature on a specific subject. Cooper (2015) defines a literature review as examining existing literature on a particular topic to identify areas of consensus, disagreement, and gaps in the literature that require further exploration. Creswell (2014) defines a literature review as the systematic examination, analysis, assessment, and synthesis of academic resources about a specific subject.

Creswell (2014) emphasises the significance of reading, assessing, evaluating, and summarising literature to discover central themes, patterns, and research gaps. According to Neupane (2020), a literature review comprises several essential elements, including an introduction, a thorough examination of existing theoretical and empirical literature, the implications derived from the review, and a theoretical and/or conceptual framework. The implication is that all studies must establish clear pathways for effective implementation. Granting staff members the ability to get electronic information from the libraries of the KwaZulu Natal Department of Health is of utmost importance during digital transformation.

This measure guarantees that healthcare professionals and other personnel possess the necessary information to deliver exceptional patient care.

Given the growing utilisation of digital technology in healthcare, library professionals must be able to promptly and effectively offer access to the most recent research and information. The objective of the literature review for this study was to analyse the existing knowledge on the availability of information for staff in KZN DOH libraries during the digital transformation era. The study examined the difficulties and advantages of digital technology and determined the most effective methods for ensuring access to knowledge in the digital era. This study offers an extensive examination of the current research on the subject, providing valuable insight for future research and practical applications.

2.1.1 The Purpose of the Literature Review

A literature review facilitates researchers in acquiring a comprehensive understanding of existing knowledge and research on a particular issue, identifying literature deficiencies, and directing research questions and hypotheses. A literature review serves the purpose of emphasising the significance and worth of a study by offering a contextual background for the research. A literature review identifies and summarises previous research's essential discoveries and outcomes on a particular subject (Creswell, 2014). Identifying the key research topics, methodology, and findings of past studies, as well as any developed patterns or trends, is part of this process. A literature review may assist in discovering what is currently known about a subject and what areas need future investigation by summarising the essential results of prior research. A literature review might also help you find gaps in the literature and aid in contextualising the study.

It involves determining the topic's historical and theoretical context and the current status of study in the subject. A literature review may assist researchers in comprehending the relevance and value of their work and how it fits into the greater body of research on the issue by offering context. Cooper (2015) also adds that a literature review helps to construct the study's theoretical foundation. It identified the primary theories, models, and frameworks utilised to examine the issue and any significant ideas or phrases fundamental to the research. A literature review, by defining the theoretical framework, may assist researchers in

developing a clear and consistent approach to their study and understanding how their research fits into the broader body of research on the issue.

A literature review may uncover possible sources of bias or limits in earlier research, which can influence the present study's design and approach, ensuring the study is rigorous and impartial. The purpose of the literature review for this study was to gain more knowledge about the subject, which is about the provision of access to electronic information in health libraries and serves as a guide for relevance. Literature shows what the other researchers say about the subject and what they have covered, and it helps shape the current study's structure, scope, and direction (Ngulube, 2015). Research questions were formulated through a literature review. Significant findings from previous research, methodologies, patterns, trends, and gaps were discovered, which helped me learn which methods to apply to the current study.

2.1.2 Conducting Literature Review

A systematic strategy was used to discover, assess, and synthesise relevant materials relating to the issue of access to information in health libraries, as well as the problems and technology involved with it. The following procedures were used to perform the literature review:

- Formulation of a research question: The research question was developed to help guide the literature evaluation process. The inquiry focuses on the present condition of information access in health libraries, the problems encountered, and the methods and technology employed to provide access.

- Database and search term selection: Key databases were chosen to search for relevant academic publications and research papers. PubMed, Unisa Theses and Dissertations, DUT online library, Google Scholar, and Library and Information Science Abstracts (LISA) databases were used. The study question was used to identify search phrases, which included keywords like "health libraries," "access to information," "digital technologies," "challenges," and "systems."

- Initial search and screening: An initial search was done in the specified databases using the identified search phrases. The search results were evaluated based on titles and

abstracts to find possibly relevant papers. At this point, irrelevant or duplicate articles were removed.

- Inclusion and exclusion criteria: To pick the most relevant articles for the literature review, inclusion and exclusion criteria were devised. The criterion included the article's relevance to the study issue, its publication date (limited to the last ten years), and the availability of full-text access.

- Full-text evaluation: The chosen articles' full-texts were assessed to determine their appropriateness for inclusion in the literature review. The publications were evaluated critically for their contribution to the research issue and the quality of their methodology and results.

- Data extraction and synthesis: Data extraction included extracting pertinent material from the chosen publications, such as essential themes, primary conclusions, and any relevant quotations or figures. The gathered data was organised and synthesised to find common themes, patterns, and trends within the literature.

- Data analysis and interpretation: The synthesised data were analysed and evaluated to derive relevant findings and identify gaps or topics for additional research. The investigation focuses on determining the existing level of information access, the problems encountered, and the methods and technologies employed in health libraries.

- Literature review organisation and writing: The results of the literature study were organised into parts based on the selected topics. The literature study was organised logically and coherently, providing an overview of the current situation, difficulties, and technology linked to information access in health libraries.

- Review and revision: The literature review's original draft was reviewed and improved for clarity, coherence, and correctness. Feedback and ideas from peers or experts in the subject were solicited to guarantee the quality and rigour of the evaluation.

- Cites and referring: Appropriate citations and referencing were employed to credit the sources of the material used in the literature study. Throughout the review, the Harvard citation and referencing convention was used consistently.

The literature review was done methodically following the abovementioned stages to acquire relevant and credible material from academic sources. The method guaranteed that the evaluation was complete, up-to-date, and appropriate to the research issue. It laid the groundwork for discussing information access in health libraries, the accompanying difficulties, and the technology used to solve them.

2.1.3 Map of Literature Review

A literature review map is a visual representation of the existing literature on a particular subject, where the key findings of previous research are organised and displayed (Booth, 2016). It aids researchers in understanding the existing knowledge about a subject, pinpointing areas where literature is lacking, and developing research questions and hypotheses. A literature review map visualises the existing literature on a specific issue, where the key findings of previous studies are organised and displayed (Cooper and Schindler, 2014). It aids researchers in understanding the existing knowledge about a topic, recognising patterns and trends in the literature, and developing research questions and hypotheses.

A literature review map is a graphical representation of existing research on a particular topic. It structures and summarises the ideas presented in the literature review and helps shape the development of research questions and hypotheses. It assists scholars in comprehending current information on a subject and identifying patterns and trends in the literature (Grant and Booth, 2009; Cooper, 2015).

2.1.4. Conception of the Literature Review Mapping

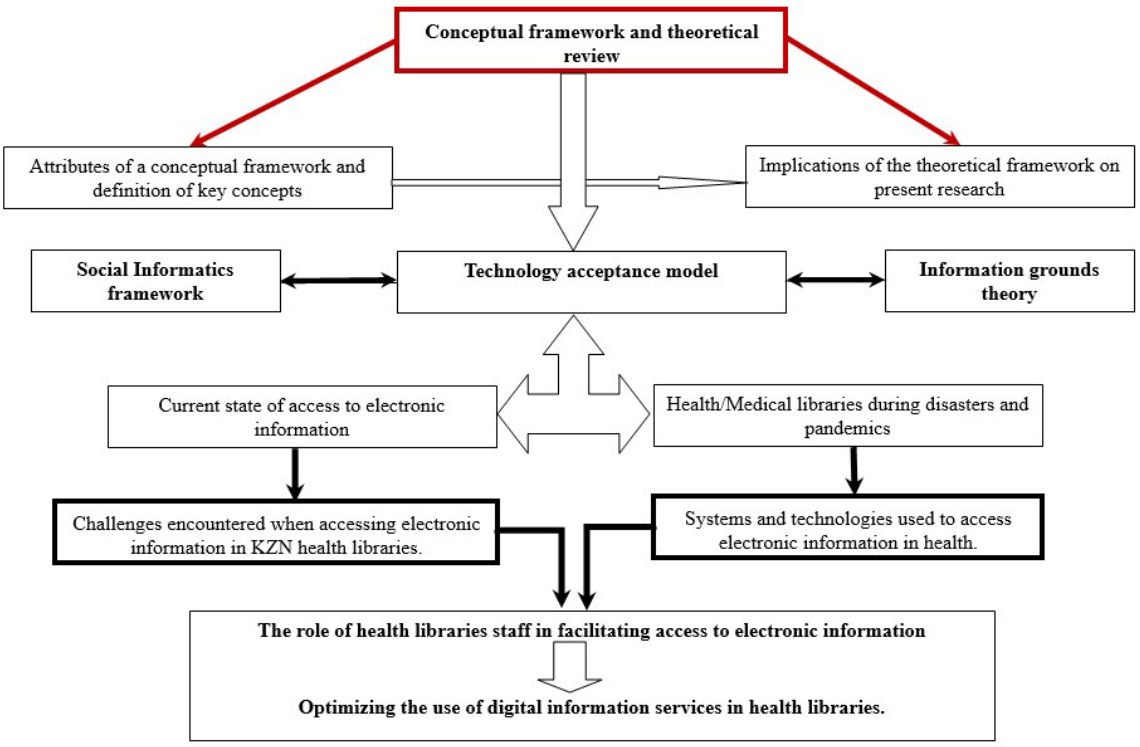

Figure 2.1: Literature Review Mapping

2.2. Conceptual and Theoretical Framework

Utilising a theory or a collection of related concepts from that theory to elucidate an occurrence or provide insight into a specific phenomenon or research issue. Conceptual frameworks are ideas and principles that help create consistency in research. They are not as well developed as theories (Ngulube et al., 2015: 48). A conceptual framework is a visual or written representation that outlines the primary elements to be examined, the crucial components, constructions, or variables, and the assumed connections between them. Conceptual frameworks can vary in complexity, ranging from basic to intricate. They can be influenced by theories focused on describing phenomena or establishing cause-and-effect relationships (Miles and Huberman, 1994:18 cited in Ngulube, 2015). A researcher's selection of a theoretical framework serves as the fundamental structure for their research endeavour.

According to Ngulube et al. (2015), a theoretical framework is a systematic arrangement that identifies and characterises the key components, variables, or concepts that organise a body of knowledge. The theoretical framework is a comprehensive structure of concepts, assumptions, beliefs, and theories that guide and shape the research process (Ngulube, 2015). Mensah et al. (2020) explained that the theoretical framework is derived from the relevant theoretical literature that a researcher examines in relation to their study issue. Neupane (2020) contends that each research is guided by a particular theory, providing a clear direction for the research process. This study utilised a theoretical framework. This study selected it because it is grounded in the discoveries of other researchers who have studied the same topic. Previous researchers' theories and findings in providing electronic information access to health library staff have greatly influenced this study. They have assisted in formulating the research questions, guiding the focus of the study, and acknowledging previous work done on the subject. Additionally, they have provided insight into the methodologies used and ensured the study's rigour, validity, and avoidance of bias

2.2.1. The Relevance of Theoretical Framework to this Study

Kivunja (2018) contended that the theoretical framework consolidates the ideas of influential figures in the research field about the planned study or theses and how these theories would be applied to comprehend data. The theoretical framework encompasses the viewpoints of prominent researchers regarding the research topic and the problem under investigation. It may also include recommendations for resolving and interpreting the data findings. Integrating research findings into a theoretical framework enhances academic rigour and proficiency in advanced research. In the present study, three frameworks, the social informatics framework, the technology adoption model, and the informatics ground theory, are integrated to shape the thinking in the inquiry of electronic information access at KZN Health libraries. The various themes around which discussions in the literature review coalesce must be considered from the perspective of these three frameworks.

The social informatics frameworks offer insight into understanding library access to electronic information by focusing on the social context of information provision and access, the user-centred approach, the importance of social capital, equity and inclusion, and power dynamics (Kling, 2007; Fusco et al., 2010). The social informatics framework's focus on the social

context emphasises the social and cultural factors that shape information access and use patterns. This implies that improving access to information must consider issues such as social norms, values, and power dynamics, which transcend technology and influence how people interact with electronic information in libraries (Fusco et al., 2010). User-centredness implies that library users' needs, experiences, and practices shape their information access patterns. This further indicates the need to engage with users actively, understand their information-seeking behaviours, and design library services that cater to specific requirements. Finally, the equity and inclusion principle underscores the need to address issues of equity and inclusion in access to electronic information. This implies that factors such as race, gender, socioeconomic status, and disability affect access and that strategies should be developed to ensure everyone can benefit from library resources (Fusco et al., 2010).

The technology acceptance model (TAM) offers insight into understanding implications for providing and accessing electronic information in libraries by focusing on four aspects: understanding user perceptions, identifying barriers to adoption, tailoring resources and services, and predicting adoption rates (Alharbi and Drew, 2014; Al-Emran et al., 2018). In understanding user perceptions, the TAM helps to analyse the perceptions of the perceived usefulness and ease of use regarding accessing electronic information. Libraries can thus be tailored to implement this information to improve usability (Alharbi and Drew, 2014). In identifying barriers to adoption, the TAM implies identifying user concerns and roadblocks hindering the adoption of electronic resources. Libraries can be enabled to address these concerns with better user interfaces, tutorials, and targeted communication. Finally, adopting users with different adoption levels empowers libraries to tailor resources and services. This might imply offering varied access methods such as desktop and mobile applications, personalised search assistance, and training programmes for different skill levels (Al-Emran et al., 2018).

Finally, the informatics ground theory emphasises developing theories or approaches to information management that are grounded in specific data and contexts (Wulf et al., 2018; Scott et al., 2019). Informatics covers a wide range of fields, including health informatics, library informatics, and social informatics; its implications in access to electronic information

include understanding users' needs and behaviours, designing and providing electronic resources, and evaluating and improving access to information (Kling, 2007; Wulf et al., 2018; Scott et al., 2019). The focus of the three theoretical approaches focuses on the need for interaction and engagement between librarians and users in developing a concerted approach to improving the adoption of digital tools and accessing electronic information at libraries.

2.3. Social Informatics Framework

The digital transformation era has brought forth a wide array of technical developments. However, comprehending the incorporation of technology into human society extends beyond mere assessment of the technology in isolation. Social Informatics is an academic discipline that examines the intricate interplay between individuals, technology, and the social environments in which they are situated (Kling, 2007). The underlying principle of this operation is that technology does not exist in isolation. However, it is intricately connected to and impacted by the socio-cultural and organisational context within which it functions. The reciprocal interaction between technology and society is fundamental in Social Informatics (Fusco et al., 2010).

The influence of technology on social practices, social norms, and organisational behaviours is reciprocal since these practices and behaviours may also impact the design, development, and use of technology (Sawyer and Rosenbaum, 2000). Moreover, the field of Social Informatics argues that the outcomes resulting from the design and use of technology cannot always be accurately anticipated. According to Lamb et al. (2000), a desired outcome can have unintended consequences that might have a more significant influence than the initial objectives. Inflexible hierarchical frameworks inside an organisation might impede the general adoption of certain digital technologies by restricting their accessibility to a specific subset of individuals (Kling, 2007; Oliveira and Welch, 2013).

Researchers may use the framework of Social Informatics to examine the presence of policies that either impose limitations or promote the utilisation of specific platforms. The process of determining the adoption of digital tools and identifying relevant stakeholders participating in this decision-making process is of interest. According to Lamb and Sawyer (2005), when a digital tool becomes integral to an organisation's workflow, it is probable that it will have a

more substantial influence on the information-seeking behaviours of the personnel and their overall job efficiency. The variability in staff members' utilisation of digital tools may be attributed to several aspects, such as their technological proficiency, the perceived usefulness of the tool, and their prior experiences, including both good and negative encounters (Lamb and Kling, 2003).

The information-seeking behaviour involves a multifaceted interaction, including the individual's requirements, the accessible resources, and the surrounding context. Implementing a novel digital instrument may profoundly impact these behaviours as personnel adapt their approaches to capitalise on their newfound resources (Star and Ruhleder, 1996). The ever-growing health information landscape necessitates efficient and equitable access for healthcare professionals and the public. Health libraries play a vital role in this ecosystem, and understanding their functionalities requires a robust framework. Social informatics, focusing on the interplay between technology, information, and social structures, offers a valuable lens to examine the provision and access to health information in these settings (Fusco et al., 2010).

Social informatics acknowledges that information is not merely data but a construct shaped by social context. It recognises the librarian's role as an information intermediary, navigating the complex world of databases, regulations, and user needs (Lamb and Sawyer, 2003). This lens shows how librarians curate and organise information, ensuring its relevance and accessibility for diverse user groups. This includes tailoring resources to the specific needs of medical students, researchers, and the general public, all with varying levels of digital literacy. Social informatics also highlights the importance of technology in information access. It allows us to analyse how libraries leverage digital platforms and electronic databases to expand access beyond physical library walls.

The analysis above can expose challenges like limited internet connectivity or user-unfriendly interfaces that hinder access for patrons in remote areas or those with limited technological skills (Marcinkowski, 2016). Furthermore, social informatics underscores the social dynamics within health libraries and encourages examining how policies and regulations influence information access. Social informatics helps us analyse how libraries navigate these regulations while ensuring efficient information provision. Finally, a social informatics

approach encourages studying the user side of the equation. It allows us to understand how diverse user demographics and information needs impact access (Fichman et al., 2022). For example, student nurses often have different requirements compared to experienced doctors.

By analysing user behaviour, libraries can develop targeted training programs on navigating digital databases or searching for specific health information. Social informatics, as such, provides a comprehensive framework for understanding the provision and access to health information in health libraries. It goes beyond the physical resources, acknowledging the crucial role of librarians, technology, regulations, and user demographics in shaping this dynamic ecosystem. By employing this framework, we can work towards creating a healthcare information landscape that is accessible, equitable, and empowers individuals to make informed health decisions.

2.3.1. The Relevance of Social Informatics Framework to this Study

Within the realm of health libraries, namely those affiliated with the KwaZulu Natal Department of Health, the Social Information Filtering (SIF) as a component of the social informatics framework serves as a comprehensive lens for examining the ramifications of digital information dissemination (Peng et al., 2017; Wulf et al., 2018). By providing insight into processes of using information about social connections to personalise and prioritise information overload, it helps discover relevant content in the vast digital landscape. Digital technologies may either be facilitated or hindered in their adoption by the fundamental policies and practices of KZN DOH. Gaining an awareness of how technology is integrated into the everyday routines of staff members may provide valuable information.

The Social Informatics Framework, which places significant importance on the interdependent connection between technology and society (Fusco et al., 2010), is an excellent guide for comprehending the intricacies of technology uptake within health libraries, particularly in KZN DOH. Librarians can use the framework to develop a thorough grasp of the ramifications of digital transformation in many contexts by considering the technology and the numerous social and organisational factors that interact with it (Fusco et al., 2010).

2.3.2. Technology Acceptance Model (TAM)

The advent of the digital era brought forth a wide array of tools and technology that considerably altered the operating landscape of several sectors. Nevertheless, like any innovation, the effectiveness of these technologies frequently depends on the degree of acceptance they receive from their intended users (Al-Emran et al., 2018). The Technology Acceptance Model (TAM) is a prominent theoretical paradigm in information technology. The framework offers a thorough understanding of the aspects that impact the acceptance of technology, focusing specifically on two main elements: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989). The Technology Acceptance Model (TAM) suggests that individuals are more inclined to adopt a technology if they perceive it as helpful for improving their work performance (Al-Emran et al., 2018). Davis (1989) suggests that Perceived Usefulness might be defined as the degree to which an individual believes that utilising a specific technology will enhance their job performance (Davis, 1989: 320). Despite its potential transformative benefits, technology acceptance may be limited if it is perceived as challenging to control or understand (Al-Emran et al., 2018). The second essential feature of the Technology Acceptance Model (TAM), Perceived Ease of Use, holds equal significance.

Davis (1989) provides additional details by explaining that the concept can be defined as "the degree to which an individual perceives the utilisation of a particular system to be free from effort." It is crucial to recognise that these perspectives are not static and that many external factors influence them. External factors, such as training, system features, and user demographics, might potentially affect the perceived usefulness (PU) and perceived ease of use (PEOU) of a system (Venkatesh and Davis, 2000). Moreover, the amount of research on the Technology Acceptance Model (TAM) has experienced substantial growth over time. Venkatesh and Bala (2008) have expanded the model by including other aspects, such as social effects and enabling circumstances. This upgraded version is commonly known as TAM3. The genuine value of TAM lies in its usefulness and pertinence. The Technology Acceptance Model (TAM) posits that the complete capabilities of modern technologies can only be actualized when they are adopted and put into practice by employees (Alharbi and Drew, 2014).

The Technology Acceptance Model (TAM) application goes beyond the initial technology adoption stage. Healthcare institutions can improve the efficiency of their digital initiatives by understanding the underlying motivations of their staff members (Marangunić and Granić, 2015). Having this knowledge enables them to align their strategies more closely with user requirements, leading to higher and sustained utilisation. Nevertheless, it is important to acknowledge that the initial adoption of a particular technology or practice does not guarantee its continued use in the long run (Marangunić and Granić, 2015). Regular evaluations based on the Technology Acceptance Model (TAM) can ensure the continued importance of digital products and make iterative improvements based on user feedback (Marangunić and Granić, 2015).

15). Regular evaluations based on the Technology Acceptance Model (TAM) can ensure the continued importance of digital products and make iterative improvements based on user feedback (Marangunić and Granić, 2015).

2.3.3. The Relevance of Technology Acceptance Model (TAM) to this Study

The medical practice in KZN DOH produces many health records, procedures, and discussions on practice, protocol, and legislation/policy, among other topics. These can be handled more effectively by digitising and adopting digital technology (Scott et al., 2019). Implementing these technologies in a healthcare setting can potentially enhance operational efficiency and elevate the standard of patient care. An example to explore is the health department professionals confronted with navigating the intricate assortment of digital platforms and technologies that have become increasingly common in the modern healthcare setting. The Technology Acceptance Model (TAM) can be employed to understand the attitudes and beliefs of health department professionals. Commence by evaluating the viewpoints of KZN DOH personnel regarding the digital technologies at their disposal.

Surveys and interviews are highly valuable tools in this particular setting. Questions such as "To what degree do you believe this digital platform helps you with your job responsibilities?" or "How confident are you in your ability to use this software effectively?" could yield valuable information regarding Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as suggested by Davis (1989). While technology can provide consultations between doctors and patients regardless of geographical limitations, its extensive implementation is not guaranteed. Medical practitioners may be reluctant to adopt the system if they perceive it as

cumbersome or are not convinced of its diagnostic efficiency (Venkatesh and Davis, 2000). The department might take proactive measures by thoroughly understanding these impressions beforehand. The system could be improved by implementing more design improvements to enhance its intuitiveness. Alternatively, offering physicians training sessions could enhance their acquaintance with the system's functionalities.

2.3.4. Information Grounds Theory

The discourse around information retrieval has undergone significant transformation since the advent of the digital age (Shaw and Stahl, 2011). Historically, individuals have sought knowledge inside organised settings, such as libraries and archives. However, with the increasing diversity of human connections, there has been a corresponding expansion in the channels through which information is exchanged (Vehovar et al., 2022). The Information Grounds Theory was presented by Fisher et al. (2004) as a means to elucidate these phenomena. The researchers noted that individuals often get information unintentionally inside commonplace environments, referred to as *grounds*. This hypothesis demonstrates that the most influential knowledge is frequently encountered serendipitously rather than actively pursued.

The 'information grounds' concept refers to locations where individuals gather primarily for objectives unrelated to acquiring information (Fisher et al., 2004). The examples mentioned above include many social settings, such as a café serving as a meeting place for friends, a park facilitating recreational activities for families, or an internet forum providing a platform for hobbyists to engage in discussions. These environments, characterised by extensive social contact, unintentionally serve as breeding grounds for the spread of knowledge. The concept of *serendipitous discovery* has significant importance within the theoretical framework. Although individuals may have many motivations for visiting these 'grounds' that are not necessarily related to information-seeking, they often depart with unexpected insights and knowledge.

One intriguing aspect of the Information Grounds Theory is its emphasis on the significance of *informants*. These persons are situated in the physical environment and inadvertently provide information (Savolainen, 2009; Narayan et al., 2013). Al-Aufi (2015) argues that individuals who are not official experts or exceptionally versed in the issue may play a crucial

role in exchanging information. Moreover, while designing such platforms, it is crucial to prioritise the comprehension of user behaviour. According to Fisher et al. (2005), ‘information encountering’ is often influenced by the users' habits, behaviours, and engagement patterns.

By examining these patterns, it is possible to build digital platforms that maximises the likelihood of serendipitous discovery, augmenting the overall user experience. The Information Grounds Theory encourages us to expand our perspective beyond formal and deliberate information-seeking methods. In the current age of digital change, there is a growing convergence between formal and informal channels of information-seeking. Consequently, the ability to identify and effectively use 'information grounds' has significant importance. In the context of the health department, where accurate information has important implications for life and death situations, the development of intuitive and user-friendly digital platforms that emulate these physical environments has the potential to bring about a transformative shift in the manner in which staff members get and disseminate knowledge (Fisher et al., 2004; Savolainen, 2009).

2.3.5. The Relevance of Information Grounds Theory to this Study

Within the setting of the KZN DOH, the healthcare sector is characterised by a wide range of platforms, technologies, and resources within the digital transformation framework, which presents both difficulties and possibilities in retrieving information. The rising occurrence of the KZN health department staff encountering 'digital grounds' and fortuitously discovering important information poses a challenge to conventional information distribution frameworks. This highlights the need to comprehend these digital ecosystems. To apply the Information Grounds Theory within this context, it is essential first to ascertain the digital platforms or spaces that serve as the aforementioned 'grounds'. Where do health department staff employees allocate their online activities? Do they have any preferred internet platforms, chat groups, or forums that they often visit?

A widely used digital healthcare platform or application may facilitate professional duties and informal conversations among colleagues, hence fostering an atmosphere conducive to fortuitous information exploration (Narayan et al., 2013). It is crucial to comprehend the dynamics of these digital platforms. Who are the individuals referred to as 'informants' inside these contexts? Within an online medical forum, it is possible to encounter many individuals

who provide valuable insights. These contributors may include experienced physicians who share anecdotal experiences or nurses who discuss novel approaches to patient care. Although these individuals may not explicitly aim to teach others, their contributions may substantially impact the community's knowledge base (Talip et al., 2016).

However, its genuine worth resides in implementing the Information Grounds Theory in the digital world. Libraries and information centres within the health department could use the principles of this theory to develop digital platforms that replicate the functionalities and characteristics of physical spaces. Consider envisioning a digital library site that offers organised databases and resources and facilitates a platform for healthcare professionals to engage in discussions, debates, and knowledge exchange. These platforms can potentially leverage serendipitous discovery, providing users with the information they are searching for and unexpected findings that might be worth it.

2.4 The State of Access of Electronic Information in KZN DOH Libraries

Indrak and Pokorná (2021: 154) contended that the progressive replacement of traditional library services with a digital infrastructure is unattainable and undesirable due to obstacles. Unless restricted by copyright law, there are no local limitations on accessing the papers, save for digitised ones that are not publicly accessible. E-resources offer digital content not constrained by geographical boundaries or other hindrances typically encountered when dealing with physical papers. There is a high likelihood that the number of users utilising digital services will increase, resulting in overall library usage (Pokorna et al., 2020). Despite the abundance of e-resources accessible online, health librarians must continue actively promoting, raising awareness, and providing training to staff members to ensure the effective utilisation of the information resources available in the online library.

The KZN Department of Health (KZN DOH) has an electronic library (e-library) that staff members can access over the intranet. The e-library facilitates the Department of Health's objective to establish a durable, well-coordinated, unified, and all-encompassing healthcare system at every level. This is achieved by adopting the primary healthcare approach through the district health system and providing online resources that fulfil the health community's informational, educational, and research requirements. The primary objective of the e-library

in KZN DOH is to deliver exceptional online library services to KZN Provincial Health Institutions by offering electronic databases and other resources that enhance patient care.

The e-library consists of e-journals, e-books, e-reports, government parliamentary and legislative information in health discipline, journal articles, nursing resources, provincial and national government gazettes, articles of interest, thesis, and dissertations. E-resources like e-books and e-journals contain more up-to-date information in demand for the latest research and current issues. Health libraries require access to such resources so staff members can be well-informed and continue their research using evidence-based information.

2.4.1 The Function of Digital Transformation in Improving Accessibility to Electronic Information in Health Libraries

Healthcare libraries are essential in managing the healthcare industry's complex and constantly changing aspects. Their support is irreplaceable in patient care, nursing education, and research. These libraries serve as intermediaries, connecting healthcare practitioners to the extensive realm of medical knowledge and advancements through the provision of resources and services such as literature searching, critical evaluation training, and evidence-based practice help (Wallis et al., 2019; Jablonski et al., 2021). The typical functions of healthcare libraries, as integrated into their duties, encompass providing users with electronic information access, teaching users, and assisting with research (Molokisi, 2019).

The digital transition has revolutionised the healthcare information management environment while maintaining the importance of these professions. As a result of this transition and the always-evolving needs of library users, healthcare libraries now have opportunities to enhance and expand the services they offer, ultimately resulting in improved quality of care for patients (Herring, 2012). D*igital transformation* denotes incorporating digital technology into every facet of an organisation, resulting in substantial changes to its operations and the value it delivers to its customers (Sebastian et al., 2020). Within healthcare libraries, digital transformation is the application of digital technology to enhance the provision of library services, enhance resource accessibility, boost user engagement, and facilitate decision-making and learning processes (Molokisi, 2019).

Health libraries offer various technologies, including e-libraries, e-resources (e-books and e-

journals), mobile applications, social networking platforms, and other online services (Shaw and Stahl, 2011). E-libraries and e-resources have rapidly become vital components of healthcare library collections, primarily due to their ability to bypass the physical constraints inherent in traditional libraries and resources. These applications have entirely transformed how library users access and interact with library materials and services. They facilitate users to access library resources remotely, enhancing the portability and ease of library services (Althubaiti et al., 2022). Moreover, these applications offer libraries interactive and personalised services to their users, like immediate chat support, tailored reading recommendations, and notifications when new materials are accessible (Althubaiti et al., 2022).

Chamberlain et al. (2021) observed that mobile applications can be integrated with additional digital resources and platforms, such as e-books and e-journals, to offer a smooth and uninterrupted user experience. One additional benefit offered by the digital transformation in healthcare libraries, other than providing materials and services, is the engagement of patrons. Amidst the prevalence of technology in today's society, where social media platforms have become essential to everyday life, libraries can utilise these platforms to enhance their engagement with consumers (Herring, 2012). Libraries can interact with consumers, share knowledge and information, solicit criticism, and promote their services using social media platforms like Facebook, Twitter, and LinkedIn (Masizana and Salubi, 2022). Healthcare libraries can enhance their services by incorporating advanced digital technologies such as artificial intelligence and data analytics. This integration enables them to offer predictive searches, personalised content suggestions, and real-time data analysis.

By leveraging these sophisticated services, healthcare libraries can significantly improve the effectiveness and efficiency of decision-making and research processes. Similarly, digital technology can be utilised in educational pursuits to offer individuals immersive, engaging, and personalised learning experiences (Smadi et al., 2021). Digital transformation provides healthcare libraries numerous opportunities to improve access to electronic material and expand their current range of services. Through digital technology, healthcare libraries like KZN DOH libraries may enhance the accessibility and quality of their available resources.

Additionally, they can provide personalised and interactive services, increase user engagement, and facilitate decision-making and learning processes.

Nevertheless, these opportunities need deliberate strategising, financial investment, and a corporate culture that fosters innovation and is dedicated to ongoing growth. This also involves a shift in mindset and a distinct approach to providing services alongside the adoption of innovative technologies. The issue of digital transformation for hospital libraries lies in striking the right balance between embracing new innovative technologies and preserving the personal touch that sets apart their services (Gupta and Katarya, 2020).

The constant progress in information technology and evolving user preferences are consistently impacting how individuals search for and acquire comprehensible health information, communicate with healthcare practitioners, and participate in initiatives to promote health (Nkosi et al., 2011). These characteristics have also been noticed in several KZN DOH libraries, and targeted initiatives must be implemented to address them.

2.5. Challenges Encountered by KZN Health Staff Members in Electronic Information Provision

While digital transformation in healthcare libraries offers significant potential benefits, it also presents numerous challenges that must be addressed. Healthcare libraries, namely KZN DOH, have innumerable obstacles hindering their digitalisation advancement (Zungu, 2018; Mthembu et al., 2019). The challenges encompass a deficiency in the requisite skills and training of library personnel, financial limitations, inadequate infrastructure, concerns regarding the quality assurance of digital materials, limited availability of internet access, and insufficiency in the skills and training of both library users and staff (Mthembu et al., 2019). The issues present a complex and multifaceted predicament that requires a comprehensive, collaborative, and synchronised endeavour from all parties involved, such as legislators, library and hospital administrators, and staff members (Zungu,2018).

Zungu (2018) asserts that acquisition, implementation, and upkeep of digital technology require substantial financial resources. These encompass the initial expenses associated with acquiring the necessary software and hardware, the expenses related to integrating and

modifying the system, the costs of training staff, and the continuous expenses of software licences, system upgrades, and maintenance. Furthermore, the cost of digital technologies frequently exceeds the financial resources provided to hospital libraries, rendering it unfeasible for these institutions to fund the technology for digital transformation. This predicament becomes more acute in scenarios characterised by scarce resources, such as hospitals, as additional pressing healthcare needs compete for little cash (Mthembu et al., 2019).

According to Mthembu et al. (2019), integrating digital technologies requires a reliable and robust infrastructure. This infrastructure consists of hardware (such as computers, servers, and networking equipment), software (such as operating systems, databases, and applications), and network infrastructure (such as internet connectivity and bandwidth). However, some healthcare libraries, especially those in settings with constrained resources, such as KZN DOH, do not possess the necessary infrastructure to manage digital technology. The absence of infrastructure hinders the introduction and acceptance of digital technologies, affecting their effectiveness and reliability.

Zungu (2018) asserted that maintaining materials that meet the rigorous standards of the healthcare business is a laborious and time-consuming procedure that requires specialised expertise and skills. The accessibility and reliability of internet connectivity are two key aspects that greatly influence the effectiveness of digital technology. If the internet connection is unstable, library customers cannot access online resources or use online services. As stated by Mthembu et al. (2019), slow internet connections can impede the operation of digital technologies and frustrate users, thereby diminishing the benefits of digital transformation. This problem is especially pronounced in isolated or rural areas, where the internet infrastructure is frequently inadequate or nonexistent.

A further impediment to the effective implementation of digital transformation is the insufficient proficiency and training of the library staff. Zungu (2018) has observed that incorporating digital technology necessitates acquiring new skills and capabilities. These encompass technical proficiencies (such as software and hardware administration and data analysis), digital literacy proficiencies (such as browsing online resources and assessing digital

materials), and interpersonal skills (such as problem-solving, adaptation, and communication). However, a significant number of library staff members lack these skills primarily due to a lack of training and development opportunities (Baro et al., 2019). Hence, this skills gap poses a greater challenge in efficiently incorporating and utilising digital technologies and hinders library staff from effectively aiding patrons in utilising these technologies. Healthcare library administration and other stakeholders could develop additional measures to address the barriers to accessing electronic information (Raju, 2014; Baro et al., 2019; Sibiya and Ngulube, 2023).

Sinha and Ugwulebo (2022) identified several barriers to accessing electronic information in KZN DOH libraries. These include limited digital health literacy skills, inadequate access to digital technologies, network issues in rural areas, restrictions in online databases, absence of remote access to online library facilities, time constraints for patrons, limited library opening hours, insufficient variety in library collections (such as textbooks, e-books, and e-journals), as well as infrastructure limitations, subscription renewals, and budgetary constraints. Nevertheless, it is essential to acknowledge that the issues encountered differ among different libraries, and not all health libraries encounter identical obstacles (Sinha and Ugwulebo, 2022).

In a study by Nkosi et al. (2011), the researchers investigated how post-basic nursing students access information and their attitudes towards using Information Technology in their practice. The study found that nurse academics and managers should recognise the significance of incorporating computer literacy into the nursing curriculum. This is necessary to equip students with the skills to function effectively in an increasingly technologically advanced healthcare environment. The study also identified the reasons that impede the implementation of digital transformation, categorised into five main areas (Nkosi et al., 2011):

- The nurses' deficiency in computer skills has resulted in their inability to capitalise on the progress in information technology.
- The absence of computer equipment, intranet, internet, and passwords limits access.
- Due to a scarcity of nurses, they are burdened with excessive workload, leaving them with inadequate time to utilise computers.

- Computers are prone to malfunctions, and there is a lack of support to address these issues.
- Financial limitations and the inability to integrate and embrace digital technologies.

Patients frequently encounter novel personal health concerns, novel interactions with the healthcare system, and novel obligations to comprehend environmental aspects that impact their health.

2.5.1. Health Staff Lack of Time for Visiting the Libraries

The opening hours in KZN DOH libraries are typically weekdays between eight in the morning and five in the evening, and they are closed after hours during the week and on the weekends. Health and medical staff usually have to make time to visit or access the libraries during their work hours, which limits the time for the library. Bougiokas et al. (2020) explain that health staff sometimes do not have enough time to sift through the information sources to the most relevant because of their nature of work, which is time-demanding, and sometimes because of digital literacy skills. It is advisable to seek the assistance of a health librarian or information specialist to stay current.

Furthermore, it is imperative to provide medical practitioners with support in choosing suitable tools to effectively sift through pertinent material for their research and patient-centred tasks, all while efficiently managing their time. Health librarians must establish dependable connections with clinical professionals to foster confidence and reliance. They can achieve this by promptly engaging with medical personnel and providing digital information services that deliver relevant information tailored to their need. Bougioukas et al. (2020) asserted that the need for clinicians (doctors), medical researchers, and students to stay updated with medical literature is more evident, necessitating acquiring information management skills. Web-based technology advancements have become a valuable tool for efficiently monitoring and developing relevant, high-quality medical material and expertise.

A recent study by Geda (2021) revealed a dearth of research on the information-seeking behaviour of dental professionals. It was found that ninety-one per cent of dental professionals do not utilise a practical electronic resource centre. Additionally, dentists have challenges regarding time constraints, lack of experience, and confidence when searching for

and retrieving evidence-based resources. Dental professionals prefer to acquire knowledge from seasoned experts and peers through in-person interactions rather than relying on the assistance of a librarian (Geda, 2021). In addition, family physicians are more inclined to rely on personal electronic resource collections as their primary source of knowledge rather than the electronic resource collections of medical libraries due to time constraints.
e collections as their primary source of knowledge rather than the electronic resource collections of medical libraries due to time constraints.
constraints.

2.5.2. Lack of Training for Staff in Accessing Electronic Information

Elaiess (2010) observed that special libraries in developing nations face the challenge of adapting to and incorporating the changes brought about by information technology. This is necessary to effectively cater to the needs of experts, scientists, and researchers who require specialised services that are precise, flawless, and reliable. Contemporary scientific information is accessible through various media, including CDs, DVDs, web-based information resources, e-libraries, and e-mobile services. These formats necessitate the use of specialist approaches for managing and processing information. Health professionals require health-related information to carry out policy and decision-making tasks, including drug and medication classifications, patient administration, disease control, hospital management, training and development, human resources, infectious disease outbreaks, and equipment and tools.

Access to digital information resources is impacted by restrictions imposed on IP addresses, login credentials, and insufficient training. Health workers necessitate diverse forms of health-related information based on the tasks undertaken or issues that demand resolution. Librarians should make the clinical staff work more efficiently by raising awareness and providing user-friendly digital information services with evidence-based research, ready-to-use online references, and other health-related information. For digital resources to be utilised, health and medical staff must have primary computer and information literacy skills, as library personnel need such skills together with health literacy skills. The influx of information on the internet makes it hard for users without proper skills to filter relevant information. The lack of standard interfaces on e-resources/ digital information sources is caused by some online databases being not user-friendly. When staff is not well versed in

using different information sources, a lack of awareness of digital information skills can affect their digital access to information.

The literature reviewed uncovered most challenges associated with infrastructure, lack of health information skills, lack of digital skills, and information management due to the production of immense data resulting from advanced digital tools, available information technology resources, poor maintenance culture, outdated and insufficient resources, and neglect by management. The current study is also meant to discover challenges associated with such in KZN DOH.

2.5.3. Finance for Electronic Information Facilities

A lack of finance is one of health libraries' most significant barriers to digital information access. According to Hernon and Young (2015), libraries at healthcare facilities often struggle to get financing for digital technology and services, limiting their capacity to give access to the most recent research and information. Financing restrictions may make it difficult for libraries to keep up with the most recent digital technologies and services, limiting their capacity to give access to the most recent research and information. Another significant barrier to digital information access in health libraries is manpower shortage. According to Wallis et al. (2019), libraries at healthcare facilities often struggle to recruit and keep trained workers with the requisite abilities to give access to digital content.

According to the above study, lacking competent employees may make it difficult for libraries to access the most recent research and information and restrict their capacity to support digital technologies and services. Libraries at healthcare institutes suffer quality and dependability issues with digital information. Mupaikwa (2024) discovered that libraries in healthcare institutions often struggle to ensure the quality and trustworthiness of digital content since assessing the legitimacy of digital sources may be challenging. According to the report, this may make it difficult for libraries to access the most recent research and information and restrict their capacity to promote digital technologies and services. There is also a rising worry regarding the privacy and security of digitally stored personal health information. According to research conducted by Jablonski et al. (2021), libraries at healthcare facilities often struggle to secure the privacy and security of personal health information in digital format since protecting sensitive information from unauthorized access

might be challenging. According to the report, this may make it difficult for libraries to access the most recent research and information and restrict their capacity to promote digital technologies and services.

2.5.4. Health Libraries Infrastructure and Maintenance

Onwubiko (2021:2) outlined that the main obstacles preventing libraries from excelling as agents of transformation include insufficient financial support from authorities, lack of workforce, inadequate Information Communication Technology (ICT) facilities, outdated collections, poor maintenance practices, neglect from management, limited internet connectivity, lack of technical skills, and unreliable power supply. According to Haruna (2016: 912), health libraries encounter various challenges, including inadequate infrastructure, outdated technology, limited facilities and furniture, insufficient and unskilled library staff, absence of health sciences librarians, obsolete and inadequate resources, and limited knowledge and utilisation of information technologies by library users. Health workers often like access to physical and electronic libraries and librarians who possess specific abilities in health information science. This is necessary to adapt to the evolving nature of the medical industry (Haruna, 2016).

According to Chan (2021), the progress in eHealth, specifically Electronic Health Records (EHR), and mHealth, which refers to medical and public health practices using mobile phones and wireless devices, comes with challenges. These challenges arise from the large volume of data generated by digital tools and the need for users to possess technological skills and digital literacy. The proliferation of digital health tools and applications has resulted in the laborious and daunting task of categorising the available possibilities.

Smeby and Rydland (2020) argued that libraries at healthcare facilities often fail to offer access to digital content owing to a lack of infrastructure, such as dependable internet connectivity and technical equipment. According to this survey, infrastructure issues might make it difficult for libraries to give access to digital content and restrict their capacity to promote digital technologies and services. Health libraries confront infrastructural hurdles when it comes to digital information access. Poor ICT infrastructure is caused by the lack of supporting technologies, poor internet connections, and electrical failures, which affect the

user’s access to digital information resources. Access restrictions with IP addresses, login details, and lack of training affect users' access to digital information resources.

2.5.5. Strategies for Overcoming Challenges Encountered by Staff in Electronic Information Provision

The interactive platforms that prioritise the needs of users and rely on factual evidence enable continuous learning and contribute to enhancing healthcare results. Nevertheless, converting healthcare libraries into digital formats presents numerous challenges and opportunities. To effectively implement the digital transformation of healthcare libraries, it is imperative to strategically allocate resources in critical areas such as infrastructure, funding, training, and quality control systems (Singh and Asif, 2019). This initiative is primarily focused on meeting the information needs of patients, as well as health professionals, educators, and researchers. To accomplish this objective, healthcare libraries must fully use the capabilities offered by digital technologies, explore innovative methods, and establish collaborative collaborations to overcome obstacles (Geda, 2021; Chamberlain et al., 2021).

To overcome the financial limitations that hinder successful digital transformation, it is essential to implement a sophisticated and multifaceted approach. Healthcare libraries, such as KZN DOH libraries, must actively engage with many stakeholders to secure funding or financing for implementing digital technologies and services. The stakeholders involved in digital transformation can encompass government bodies, non-profit organisations, commercial firms, and donor agencies. These groups can provide the financial resources for digital transformation (Gleiss et al., 2023). The libraries of KZN DOH should explore alternative forms of funding, including public-private partnerships, crowdfunding, and social impact bonds, as these models can offer additional funds and mitigate the risk of financial losses.

To achieve digital transformation, it is crucial to make substantial investments in cutting-edge infrastructure. Thus, healthcare libraries must prioritise acquiring state-of-the-art technology and software, fast internet connectivity, and dependable network infrastructure (Tait et al., 2016). To ensure the security and privacy of digital systems in healthcare, it is imperative to allocate investments towards safeguarding sensitive healthcare information (Paul et al.,

2023). Implementing digital systems requires a financial investment and strategic partnerships with network operators, technology vendors, and other relevant players. An essential aspect of digital transformation involves providing library professionals and healthcare staff with digital literacy skills (Attahir and Elijah, 2019). Therefore, measures should be taken to enhance their understanding and proficiency in navigating the digital realm.

This may involve offering personalised training programmes focusing on utilising digital technologies, evaluating digital information, and integrating technology into healthcare practice. Healthcare librarians would benefit from extended invitations to partake in medical rounds, teaching sessions, and analogous activities. These encounters will enhance their comprehension of the medical field, enabling them to address the specific information needs of healthcare workers more effectively. Moreover, these encounters can foster improved collaboration and understanding between library personnel and healthcare professionals, enhancing library services provision.

It is crucial to consider the significance of quality assurance in digital transformation (Verheusen, 2008). Consequently, healthcare libraries need to establish robust mechanisms for validating the quality and reliability of digital resources. Furthermore, healthcare libraries should prioritise staying updated on the latest advancements in digital quality assurance standards and best practices. They should also continuously enhance their quality assurance techniques (Verheusen, 2008). Cooperation plays a crucial role in expediting the digital transformation of healthcare libraries. Therefore, healthcare libraries must explore the potential of collaborating with other libraries, academic institutions, technological enterprises, and other relevant stakeholders. These partnerships facilitate the exchange of knowledge and resources, foster creativity, and enable the development of the necessary capacities for digital transformation (Verheusen, 2008).

According to Chamberlain et al. (2021), establishing regional centres of excellence is a potential way to address the lack of technical expertise and promote innovation. These centres have the potential to serve as focal points for education, research, and advancement in the field of digital healthcare librarianship. Chamberlain et al. (2021) suggest offering diverse services, such as training programmes, consultancy services, and research activities.

These centres could also function as hubs for collaboration and networking, facilitating the gathering of experts, professionals, and students from diverse fields and backgrounds. Healthcare libraries can also create online platforms and mobile applications to access library resources, utilise social media for user communication, employ analytics to analyse user needs and behaviours and integrate digital technology into existing services (Singh et al., 2020).

2.6. Health Libraries and the Provision of Electronic Information During Natural Disasters and Pandemics

KZN DOH libraries were closed from March 2020 to June 2020 due to the total lockdown (stage 5) during the COVID-19 pandemic. When the South African government announced a regulation adjustment (stage 4) in June 2020, the libraries in KZN DOH re-opened. Depending on the number of staff members in each library, the librarians opted for working alternate days until the statistics of the pandemic deteriorated and the country was almost back to normal (stage 1). According to Becker (2020: 108), libraries and librarians struggle to stay open and deliver services during natural catastrophes and pandemics. For libraries to maintain their relevance and offer services that their users would enthusiastically adopt, they must be primarily accessible when patrons cannot physically visit the library. Digital resources are useful under such circumstances if the library has such facilities and the librarians and patrons align with digital information handling methods.

2.6.1 Health Librarians as Custodians for Information During the COVID-19 Emergency

A publication by Lor (2021) asserted that the COVID-19 pandemic is an unparalleled global public health calamity of the previous century. The virus's uniqueness and dissemination heightened the need for the accessibility and dissemination of dependable information to mitigate its lethal capacity. Librarians, experienced and trusted providers of accurate information, endeavoured to address the widespread dissemination of false news, disinformation, and propaganda by implementing different tactics. Librarians and related professions had to reassess the ethical foundation of their information dissemination methods in response to the increasing prevalence of conspiracy theories in public discourse and official decision-making (Lor, 2021).

An *infodemic* refers to an abundance of information regarding a problem that is usually untrustworthy, spreads quickly, and hinders the attainment of a solution. As defined by the World Health Organisation (WHO) (Mourad, 2020), an infodemic refers to excessive online and offline information. It encompasses intentional efforts to spread false information to undermine public health measures and promote alternative agendas of certain groups or people. Misinformation and disinformation can have detrimental effects on an individual's physical and mental well-being, amplify stigmatisation, jeopardise the progress made in public health, and result in non-compliance with health protocols, thus diminishing their efficacy and posing a threat to a country's ability to control the pandemic.

Health librarians must prioritise professionalism to ensure they do not distribute any inaccurate material to health professionals, which might potentially harm health groups such as hospitals. A librarian's professional work ethic depends on several crucial factors: relevancy, timing, source of information, and use of information. The literature studied repeatedly emphasised that librarians serve as custodians, ambassadors, and purveyors of information. This implies that they are expected to provide information of high quality, relevance, and reliability and that their function is crucial in health institutions. In the 21st century, health libraries are required to adhere to technological advancements, particularly during the period of digital transformation.

The International Federation of Library Associations and Institutions (Varlejs et al., 2015) released a code of practice for librarians and information professionals. This code emphasises the significance of three fundamental principles: relevance, ethical standards (including responsibilities towards information resources, the professional community, and employing institutions), and the duty to promote professional ethics and compliance. COVID-19 has prompted libraries to implement measures that might have otherwise been delayed in ordinary circumstances.

The need for health librarians to provide timely and accurate information to crucial hospital staff members has been particularly evident during the COVID-19 outbreak. During physical emergencies, hospital vital staff members often lack the time to physically access the library

resources. That is when the library's digital information services are more frequently utilised, with the support of librarians.

2.6.2 The Evolution of Digital Library Services During the COVID-19 Emergency

Pokorna et al. (2020) contended that the growing popularity of digital services has posed a significant threat to the traditional notion of a library as a physical location. The shutdown resulting from the COVID-19 epidemic has expedited this enduring trend. Multiple hybrid libraries, which previously maintained digital and physical holdings, were abruptly compelled to transition into digital libraries. Several libraries have been increasingly embracing virtual presence for several years, dedicating significant effort and money to enhancing the digital dimension of the library.

Libraries are very innovative and adaptable institutions, and the sudden closure of physical libraries resulted in various challenges. According to Charney et al. (2021), a partnership between doctors and librarians at the School of Medicine, Saint Louis University, USA, has supplied vital information during the COVID-19 epidemic. A collaborative team comprising the medical director of disaster preparedness from the hospital and medical school, the director of the medical library, professional librarians, and the IT and marketing departments of a multi-state healthcare system collaborated to create a website that would distribute and curate up-to-date resources during the COVID-19 pandemic. The initial effects of the collaboration mentioned above and the website demonstrated the advantages of an innovative relationship.

The collaboration facilitated the fulfilment of ongoing COVID-19 clinical information requirements and enhanced the pandemic team's disaster response capabilities, enabling a swift reaction in future routine patient care and catastrophe situations (Charney et al., 2021). Pokorna (2020) determined that the crucial inquiry was whether the reopening of libraries would restore the previous state or if the lockdown had instigated a lasting transformation. Will customers maintain interest in reading rooms and lending services after they become accustomed to remote access and digital information? Once the situation stabilises, consumers will likely have adapted to searching for information online and become comfortable with remote access. As a result, library utilisation is expected to decline even

further. Libraries may witness a surge in popularity as users will have been deprived of social interaction.

Chisita and Chizoma (2021) contended that libraries of various kinds have established digital platforms to offer virtual library services, allowing customers to remotely access their holdings. Libraries play a vital role in connecting people with knowledge to help control and prevent the development of the COVID-19 epidemic and the transmission of misinformation. The author noted the exclusion of libraries and librarians from the national initiatives to manage the COVID-19 pandemic in South Africa. However, they possess the ability to grant access to genuine information. During the pandemic in the region, librarians were not explicitly acknowledged as essential in reducing and preventing the spread of the virus. However, they could utilise their digital platforms to offer remote access and support for educational, instructional, and research purposes.

Moreover, their efficacy has been demonstrated through their capacity to offer dynamic hyperlinks to reliable sources of information pertaining to the COVID-19 pandemic (Chisita and Chizoma, 2021). According to Whitney et al. (2017), libraries and librarians in the United States have a crucial role in providing access to knowledge during emergencies, disasters, and pandemics using advanced digital programmes. In March 2020, during the initial outbreak of the COVID-19 pandemic and subsequent lockdowns, Pauwels et al. (2020) reported that The Ghent Knowledge Centre, a medical library in the US, curated and made available a range of resources on COVID-19 for healthcare professionals. These resources included point-of-care clinical summaries, journal articles, e-books, e-learning programmes, resilience hubs, and other relevant materials. The newsletter provides more details, stating that the library information hub was made accessible on the knowledge centre's website and was advertised to the entire hospital. An information professional and a librarian formulated the search tactics. At the same time, the evaluation of content and quality was conducted by a medical specialist, namely a doctor with expertise in both pulmonary and infectious disorders. Queries were promptly addressed and resolved on the same day to aid clinicians in responding to COVID-19 (Pauwels et al., 2020).

2.6.3 Health Librarian's Important Functions for Planning Future Emergency and Disaster Incidents.

According to Wang and Lund (2020), libraries play a crucial role in delivering emergency services. This is emphasised in the provided framework, where librarians engage with stakeholders such as commercial and non-commercial Internet Service Providers (ISPs), communities, local and regional organisations, government, and the World Health Organisation (WHO). According to Chisita and Chizoma (2022), during the COVID-19 epidemic, libraries faced a significant problem due to an overwhelming amount of information. A comprehensive methodology was needed to tackle this situation and ensure proper information management techniques. Featherstone (2012) emphasised that libraries can act as a central hub for various activities during a disaster. They can ensure the preservation of their collections, share accurate information about ongoing events, offer assistance to staff and emotional support to the community, distribute donations, collaborate with the government to create and distribute reports on the evolving situation, educate and train the community about the disaster, curate information, provide guidance to emer According to Featherstone (2012), librarians have a crucial role in the distribution and accessibility of information.

brarians have a crucial role in the distribution and accessibility of information.

- To meet administrators' urgent need for high-quality, evidence-based information during the response phase of an infectious outbreak.
- Selective dissemination of information to distribute updated pertinent clinical information quickly and efficiently.
- Participate in emergency preparedness meetings and listen carefully for unfilled needs and questions.
- Professional development opportunities will assist librarians in developing methods for gathering high-quality evidence, delivering concise summaries, and evaluating emergency information services.
- Maintain a careful watch of PubMed, government agency reports, news reports, and emails for the latest clinical information.

- Formalise librarian inclusion on institution disaster management teams.
- Librarians may anticipate utilising professional skills to support administrative decision-making in future infectious outbreaks.
- Integrating library services into organisational disaster plans, instructing and familiarizing librarians on the use of alerting tools and authoritative sources of disaster information provision, and strategizing assessment methods to optimize the capacity of health librarians for assisting in future pandemic response efforts (Featherstone, 2012).

From the literature reviewed, it has been learned that health libraries played a significant role in information access during the COVID-19 pandemic and can still play a major role in the future. In countries where health librarians are regarded not just as librarians but also as information specialists, they worked hand in hand with the health and medical professionals in the fight to curb the pandemic as they were used as custodians of information for evidence-based practice during lockdowns. Health libraries play a critical role in various parts of the world with digital information services and expertise. Health libraries can add more value to the health fraternity if regarded as essential services, as disasters and pandemics depend on digital evidence-based information to be managed. The availability of health librarians online to assist staff remotely or those who cannot physically visit the libraries could not be more emphasised. Providing access to electronic information has played and will always play a vital role during disasters and pandemics; hence, health organisations must invest in the best digital library information resources and competent library staff.

2.7. Systems and Technologies Used in Health Libraries for Provision of Access to Electronic Information

Various systems and technologies are used to access electronic information in health libraries. Such technologies include photocopiers, printers, computers, email, intranet, internet, online databases, library information management systems, social media facilities, mobile health applications (m-health), electronic health (e-health), Web 2.0 technologies, etc.

2.7.1. Online Databases Used In Health Libraries

A database is a meticulously arranged compilation of data intended for one or more objectives, typically in a digital format. The data is usually structured to represent significant elements of reality to facilitate the information's utilisation for a specific purpose (Odunola and Tella, 2018). Libraries have access to a wide range of online services, including Bibliographic Databases, Full-text Retrieval, Referral Databases, Online Database Services, CD-ROM Database Services, Opac, Union Catalogue, CD-ROM, Scanner, Radio Frequency Identification (RFID), Teletext, Facsimile, Photocopy, Printing Technology, Document Delivery System, Barcode, Inter-library Loans Services, Indexing and Abstracting, Chat Services, Current Awareness Services (CAS), Selective Dissemination of Information (SDI), and Bulletin Board Services (Choudhry et al., 2018). During the digital transformation era, these databases are more cost-effective and provide enhanced accessibility to information.

Online databases process library materials, such as library management systems for cataloguing and accessing scholarly information records. These databases are accessible through subscriptions and an internet connection for full access (Choudhury et al., 2018).

2.7.2. Electronic Health (E-HEALTH), Mobile Health (M-HEALTH), And Web 2.0 Information Applications

Bougioukas (2020: 255-256) states that web-based technological advancements have become valuable for effectively monitoring and acquiring high-quality medical literature and expertise. An example of this is the emergence of online Twitter journal clubs, which have become a popular trend in technology. These clubs allow participants to discuss and analyse the most noteworthy studies, editorials, reviews, and guidelines that influence clinical practice. Using specialised mobile applications, they can share their thoughts through tweets, comments, and links to the original articles (Bougioukas et al., 2020). Chamberlain et al. (2015) described some benefits of adopting user-friendly mobile resources for the opportunities, collaboration, and sharing of resources and expertise, including the following:

- Health librarians can collaborate with staff members to provide suitable mobile resources to enhance decision-making and patient care.
- Health librarians can utilise their knowledge to promote the incorporation of mobile technologies into educational activities within health institutions.

- A mobile technology steering group should be established to oversee resource development in health institutions, including hospitals, and ensure expert information dissemination and best practices.
- Librarians should enhance their utilisation of partnerships to collaborate and exchange knowledge and resources, hence ensuring the success of projects. Additionally, it is recommended that regional centres of excellence be built to tackle the shortage of technology skills in health libraries and foster the growth of innovation.

Venkatesh (2016) states that digital information can be preserved, managed, and disseminated through internet connections using smartphones, iPads, laptops, and social media platforms such as WhatsApp, Twitter, Facebook, and Instagram. Social media refers to a collection of online apps built on the principles and technology of Web 2.0. These applications enable users to create and share content generated by users (Molokisi, 2019). Social media makes access to information easily reachable, instantly shared, communication instant, and the context of education applied even socially. Molokisi (2019) highlighted that social media or Web 2.0 technologies (Facebook, Twitter, blogs, Wikis, Myspace, social bookmarks, podcasting, and YouTube) can be used as innovative online tools to enhance library communication.

Social media apps and services encompass many platforms, such as blogging, video sharing, social networking, and podcasting. These platforms facilitate a more interconnected online environment where individuals can generate and consume content. Social media in health libraries can market library services, disseminate information, promote information sharing by librarians, and communicate more with library users as social media utilisation has the advantage of instant access, answering questions, and sharing using mobile devices and internet connections. The use of telephone, mobile phone apps, photocopying machines with scanners, printers and email, inter/intranet, and other online services with features that create statistics are used by libraries to access digital information services while saving time and improving service (Venkatesh and Bala, 2008). Library use is made more accessible as it is remotely accessed, and that automatically increases usage rate and mobility services as some professionals don’t always have time to go to the libraries physically. KZN DOH libraries must provide digital access to information to stay relevant in the digital transformation era.

Nowadays, there are several digital resources for information, such as digital photography, where a picture is taken and saved as a computer file, or digital music that is converted into a digital format. Additionally, some books are compiled in a computer format and made available on the internet, commonly known as e-books. It is established that digitisation has allowed books and journals to be used electronically through an Internet connection instead of waiting for one print book or journal for days or weeks; they can be accessed or shared by many instantly using Internet connections. Tshuma (2015) asserted that librarians have been acknowledged as crucial participants in the healthcare delivery system, taking on novel responsibilities in facilitating evidence-based clinical practice in healthcare.

Healthcare practitioners have been given access to computerised clinical databases to support evidence-based clinical decision-making at the point of treatment. Online resources such as e-journals, e-books, and articles can be downloaded for convenient offline reading. In addition, users often have the option to save, print, and email these materials. Digitisation enhances customer service and ensures the long-term preservation of information records. Raju (2014) states that digital library applications are intimately associated with web technology and Information Technology (IT) abilities. As information services and research environments increasingly rely on IT and electronic access, libraries will have a growing demand for these skills.

2.7.3. The Internet as an Electronic Information System

According to Becker (2020), librarians must consistently develop tools, curate resources, and offer instructional opportunities to their clients. Clinicians, namely doctors, are keen to receive clinical mobile device application training. These applications serve various purposes, such as enhancing productivity, conducting research, facilitating education, supporting other platforms, and providing patient-oriented services. The internet offers chances to customise courses to suit clinicians' needs and serve as advocates for online research using mobile resources (Becker, 2020). The Internet serves as a global medium for exchanging information among individuals, institutions, and organisations. Health libraries utilise the internet to retrieve e-books, e-journals, journal articles, and other information records. Additionally, it is utilised for inter-library lending across libraries. Computers are crucial in achieving sustainable

development by facilitating activities like generating, processing, storing, managing, and sharing information through the Internet and ICT (Odunola and Tella, 2019). Computer-based internet access has been a prevalent method of retrieving information in health libraries.

2.7.4. Artificial Intelligence as a Technological System

The National Digital Health Strategy for South Africa (NDHS) (2019 - 2024) offers a significant solution for achieving digital health interoperability in South Africa. Efforts are currently underway to broaden and lengthen the scope of a Health Enterprise Architecture (HEA). This establishes a crucial basis for creating a unified structure integrating electronic and paper-based data sources and information flows. It outlines a clear roadmap for developing and consolidating all components within a digital development maturity model. The NDHS offers a unified platform for collaboration and creates a conducive environment for innovation.

Implementing a universal, collaborative digital health platform facilitates equal access to the development arena for health information systems, allowing a more significant number of stakeholders to engage. The process involves setting up technological resources, such as cloud infrastructure, and creating a conducive environment to facilitate complex data science tasks (NDHS 2019 - 2024). Whitney et al. (2017) mentioned an innovative technology in which gaming is developed with other-than-entertainment primary objectives called the *serious gaming movement*. Serious games like Wii, One, Two, Get Fit, and Health Savy @ Your Library are used in emergency management and healthcare to connect staff with authoritative health information. Librarians can introduce these games by offering consoles during fairs, meetings, and wellness events for quality health information.

2.8. The Role of Library Staff in Facilitating Access to Electronic Information

Library staff play an important role in building and maintaining digital collections by choosing, collecting, and conserving digital materials appropriate to the requirements of the library's users (Zungu, 2018; Mthembu et al., 2019). Another significant responsibility of librarians in promoting access to digital information is to offer digital technology training and assistance. Training involves teaching users how to utilise digital resources and technology and offering technical help to those who run into issues (Elkin, 2018). Librarians formulate and execute policies and procedures for digital material access and producing and maintaining digital

collections. This involves defining copyright and fair use rules, procedures, and guidelines for using digital resources and technology.

The function of librarians in promoting access to digital information in libraries is crucial. Librarians ensure that users can successfully discover and utilise digital resources and offer assistance and advice when necessary. Librarians are responsible for several digital content-related responsibilities, such as producing and maintaining digital collections, providing training and support for digital technology, and formulating and executing digital content access rules and procedures (Mupaikwa, 2024; Baro et al., 2019). Libraries in healthcare institutions play a critical role in providing healthcare professionals access to the latest research and information, essential for providing high-quality patient care. Several studies found that libraries in healthcare institutions are often the primary source of information for healthcare professionals, helping healthcare professionals stay current with the latest research and information in their field (Hernon and Young, 2017; Mupaikwa, 2024; Wallis et al., 2019; Smeby and Rydland, 2020).

Creating and maintaining digital collections is one of the primary duties of library employees in providing access to digital information. This includes identifying, purchasing, and maintaining digital materials appropriate to the library's users' requirements. Library staff must also ensure that digital collections are structured and indexed to be simple to search and retrieve (Hernon and Young, 2017). Librarians are responsible for marketing digital information resources to consumers. This involves raising knowledge of the available digital resources and services and conducting marketing and outreach operations to reach out to prospective users. Library personnel is essential in analysing and measuring the effect of digital information and resources. This involves obtaining data on the use and impact of digital resources and utilizing that information to enhance the resources and services offered (Hernon and Young, 2017).

Librarians play an essential role in analysing and measuring the effect of digital content and resources by collecting data on the use and impact of digital resources and utilising that data to enhance the resources and services offered. The role of libraries in healthcare has evolved significantly in recent years, as digital technologies have transformed how healthcare professionals access and use information. Libraries in healthcare institutions play an essential

role in providing access to the latest research and information, supporting research and education, and promoting evidence-based practice (Hernon and Young, 2017).

Healthcare institutions' libraries promote evidence-based practice by providing access to the latest research and knowledge integrated with clinical expertise. Libraries often offer various services to support patient care and education, including literature searching, utilisation of digital information services, and training on critical appraisal. Geda (2021) contended that medical libraries enhance health professionals' information literacy and information-seeking behaviour by integrating patient care information, database search, and basic computer skills acquisition into their service model. Medical librarians incorporate medical and health-related websites and blogs into their library websites to enhance accessibility to information, distribute free and subscription electronic resources, promote open-access publication, and manage licencing (Chan 2021).

Medical librarians play a critical and crucial role in bridging gaps and overcoming barriers related to electronic health records (EHRs) through overcoming challenges imposed by resource constraints, provision of training and technical support, ensuring accurate, complete, and consistent data, provision of user-friendly data access interfaces and health literacy (Tsai et al., 2020; Makeleni and Cilliers, 2021). The advent of digital transformation and technical advancements has provided healthcare consumers and providers with diverse new technologies that significantly influence health monitoring, information sharing, and records maintenance. Masenya and Ngulube (2020) stated that the digital revolution had altered the information environment, transforming the responsibilities of information professionals, such as librarians. These professionals now play a crucial role in managing and preserving digital resources.

Library information professionals should be able to convey the specifications of digital libraries effectively, develop plans for arranging and safeguarding digital resources, incorporate technologies, tools, software, and media into current collection management operations, and facilitate access to digital resources (Tsai et al., 2020). According to McKnight (2014), it is unsafe for librarians to presume that providing online access to papers for currently employed nurses guarantees their ability to effectively utilise the knowledge. Document retrieval and document reading are distinct processes that require a significant amount of time. Health

librarians should provide on-duty nurses with on-call ready reference services, which involve selecting, filtering, and even underlining essential parts in the given papers. In hospitals, nurses are a critical part of staff members; sometimes, they study while working; however, their line of duty is not easy to work and study simultaneously, so they require more assistance accessing authentic information from the libraries.

Librarians should be willing to go the extra mile as, most of the time, it seems complicated for nursing staff to master the digital ways of handling information (McKnight, 2008; McKnight, 2014; Makeleni and Cilliers, 2021). Semertzaki (2011) posited that, historically, libraries were primarily concerned with amassing physical and documented information, such as books, journals, reference materials, and other written records. However, nowadays, the library's primary emphasis has evolved towards adopting modern formats like online resources. It is no longer necessary for a library to possess these materials, as they can access them. Special libraries heavily depend on internet resources and traditional materials to maintain up-to-date holdings. Tshuma (2015) contended that South African librarians have actively participated in several networks, allowing them to access their colleagues' knowledge and skills domestically, internationally, and internationally.

South African Health librarians have contributed to the shift facilitated by the greater accessibility of digital content via online databases, electronic journals, and e-books. Health librarians play a role in helping adopt electronic systems for managing information, utilising information and communication technologies (ICTs) to establish health information systems, and instructing individuals in health and information literacy. Three essential trends positively impacting health librarianship are collaborations, the introduction to evidence-based medicine, and the evolution of South African libraries, whereby healthcare scientific information has evolved into many models, channels, distribution means, and media (Tshuma, 2015: 67-68).

2.9. Optimising the use of Electronic Information Services in KZN DOH

Onwubiko (2021) suggested that libraries and librarians should initiate awareness programmes to familiarise employees with the importance of utilising libraries and how they can positively influence their personal growth and job performance. Special libraries must be provided with information and communication technology (ICT) facilities and equipment. In

today's era, no organisation can achieve excellence without being connected to current realities and trends. The librarian has the duty to initiate awareness campaigns in order to familiarise employees with the importance of utilising the libraries and the influence it has on their personal growth and job effectiveness (Onwubiko, 2021). KZN DOH can embrace and apply the new technologies described below. However, evaluating each library user's needs, compatibility with existing infrastructure, and potential modifications to better access and service delivery is essential.

Martens et al. (2022) proposed several cutting-edge technologies that might be utilised in libraries to optimise the potential for digital transformation:

- Blockchain: blockchain applications in libraries include developing a metadata system for libraries to connect a network of libraries, hosting digital peer sharing, and sharing partnerships.
- Libraries are integrating cloud computing into their services, allowing them to use the cloud anytime and from any location. Cloud computing has numerous promising opportunities for libraries to enhance performance in various technology-related operations. This technology will enable library workers to be liberated from server management responsibilities.
- Artificial intelligence aims to identify an efficient and superior technique for performing tasks.
- Remote access to electronic resources has facilitated the improvement of educational standards, particularly during a pandemic or state of emergency.
- Some publishers are currently offering expanded access to electronic resources, such as e-books, e-journals, and e-databases, in response to the uncertain and challenging times caused by the COVID-19 pandemic. This expanded access includes additional materials not typically subscribed to by the library. However, please note that this access is only available for a limited period during the emergency.
- Open access materials refer to e-books and e-journals that are freely available on the internet or online databases provided by certain publishers.
- Web 2.0 technologies enable libraries to establish collaborative and participatory environments, enhancing their capacity to deliver customer-centric services.

- Synchronous communication refers to using instant messaging (IM) by libraries to offer real-time reference services. This allows users to communicate with librarians in real-time, like in a face-to-face reference setting.
- Content delivery: Simple Syndication (RSS) enables a website or e-publisher to display the most current updates, such as the table of contents of journals and recent articles, using XML technology. It facilitates monitoring recent updates on the selected website for a web user. Libraries are currently generating RSS feeds for users to subscribe to, which include information on new items in their collection, new services, and new content in subscription databases.
- Podcasting refers to recording audio digital-media files that may be shared over the internet via RSS feeds. These files can then be played back on portable media players and computers. Users can subscribe to these feeds and automatically retrieve these files directly into an audio management programme on their personal computers. Many libraries utilise podcasts to enhance their library orientation initiatives.
- Vodcasting, often known as video podcasting or vlogging, involves adding video content to the downloadable audio files that podcast listeners utilise. Libraries can utilise vodcasts to showcase their activities and entice the community to participate in upcoming programmes.
- Short Message Service (SMS) is a method to transmit brief messages via mobile networks. The SMS enquiry services in a library enable users to utilise their mobile phones to send inquiries via SMS to the library. The reference personnel assigned to handle such inquiries can promptly provide responses or direct users to more comprehensive explanations. Tools for disseminating information (Blogs and wikis): One of the most evident uses of blogs for libraries is to utilise them to promote, publicise, and extend outreach services. Libraries can distribute information to users and communicate updates about their new resources and events through their blogs. Wikis serve as a communication medium that facilitates social contact between librarians and patrons. Users can exchange information, pose inquiries, and respond, whereas librarians possess the same capabilities within a wiki.

Hartfiel (2020:99) suggested that the following are some of the strategies that can be used to optimize the use of digital information services:

- Each week, the librarian can schedule particular times to present to the devoted unit, engage in discussions with personnel, address inquiries, and provide support relevant to knowledge.
- Academic study support provides training and direction to nurses in postgraduate training on various abilities such as academic writing, information seeking, critical evaluation, referencing, and proofreading.
- Our team provides comprehensive and meticulous summaries of evidence on specific issues as requested by staff members. Librarians can aid staff members in locating, evaluating, and presenting appropriate research projects.
- The Facebook group page serves as a closed online forum, overseen by the librarian, to exchange knowledge and promote learning among staff members.
- An online journal club is available for anyone unable to attend the monthly face-to-face journal club. This online club focuses on critically appraising research works that the librarian and staff select.

Various health librarian services effectively and efficiently contribute to the professional development needs of critical care workers. The advantages of health librarian services are frequently linked to the time saved by hospital workers searching for information, along with cost avoidance. Demonstrating a return on investment for clinical librarian services focused on the professional development of healthcare personnel is feasible. Statistics can be conveniently monitored by determining the frequency of downloads for a particular e-book title. This provides an idea of the most visited subjects, contributing to selection decisions (Mdhuli 2019). Khoro (2019) discovered that social media platforms could be utilised as a knowledge-sharing platform among special libraries' staff. Furthermore, social media should be considered a knowledge-sharing (KS) platform for collaboration in all libraries. KS culture should be implemented in all special libraries in KZN. Librarians can play a crucial role as facilitators of learning forums such as Community of Practice, where members teach and learn from each other (Khoro, 2019).

Agboke (2019) argued that ICT skills are recommended for health librarians to share information within themselves and with library members. It is also important to share such skills with library members as librarians also act as facilitators of learning; therefore, teaching and learning are somewhat expected from them. Onwubiko (2019) suggested that in addition to hiring professional librarians for special libraries, management should frequently provide training and continuing education opportunities for the special library personnel by financing their attendance at conferences, seminars, and advanced studies. Librarians believe that redundancy is caused by management's failure to recognise them as information custodians and disseminators, instead considering them as ordinary staff members. By securing sufficient money, libraries can acquire appropriate collections, obtain ICT facilities and equipment, and maintain highly skilled staff.

Nadkarni and Pruglt (2020) emphasised that middle management's role is affected by digital transformation as they are expected to influence a digitally transformed environment ranging from administration to leadership aspects. Librarians liaise with middle managers to make informed decisions regarding digital information services. Onwubiko (2019) stressed the importance of including libraries in financial plans. Monies allocated to departments and agencies must be genuinely used for libraries in accordance with the proposals, planning, and prioritisation. Patil and Pradhan (2014: 251) elaborated that unless and until what is available in the library is marketed, promoted, made accessible, and disseminated to the users, users will not be aware of the resources available.

Libraries are allocating substantial financial resources to acquire reading materials and subscriptions to periodicals and online databases to meet their users' demands (Patil and Pradhan, 2014: 251). Investing such an amount in library resources means the usage should also increase. Library promotion is about raising awareness of library services librarians provide to staff members. Library displays, workshops, emails, in-house broadcasts, internet-based platforms, blogs, vlogs, etc., can be used to promote digital resources in a library. Evaluating digital resources by librarians helps verify whether there is optimal utilization and determines the resources that are in demand.

Training provided to both librarians and staff members helps them to be able to fully utilize digital resources optimally (Patil and Pradhan, 2014; Onwubiko, 2021). Healthcare librarians can play a crucial role as leaders or contributors in initiatives aimed at enhancing the health literacy of healthcare institutions. The library staff at KZN DOH should gain insight into the patrons' viewpoint regarding the digital information resources and ascertain the perceived value of the services through surveys, interviews, statistics, and so forth. Healthcare librarians are responsible for raising awareness, facilitating training, and assessing the relevance of their digital services to determine the most essential needs and target audience. According to Whitney et al. (2017), healthcare librarians assist patients in improving their health literacy and fulfilling the health information requirements of clinical professionals.

Healthcare librarians primarily contribute to developing health literacy in outpatient and inpatient clinical settings by providing support for information in prescription programmes. Information prescription programmes, also called Information Rx, entail physicians issuing patients with prescriptions for high-quality, evidence-based health information carefully chosen to meet the patient's condition (Whitney et al., 2017). Information items that a healthcare professional recommends can be customised to align with the patient's specific attributes, such as their preferred learning method and reading proficiency. These programmes focus on educating patients in general or offering services related to consumer health information.

The KZN Department of Health libraries can implement these tactics as part of their outreach programme to support physicians and nurses in improving health literacy in inpatient and outpatient clinical environments. Healthcare librarians can engage with physicians to obtain such information by utilising designated internet databases designed for this purpose. They can also participate in rotations during clinic days in both the inpatient and outpatient sections and help with the targeted distribution of information. Access to information grounded in empirical evidence is crucial for effectively controlling and mitigating the impact of diseases. Consequently, patients and healthcare personnel with access to accurate information are more likely to make educated decisions and effectively handle health concerns. Health information specialists have expertise in processing, preserving, managing, and distributing information for evidence-based practice within the health sector.

These specialists can help manage and store health information from many online sources, making it easily accessible through online databases, computers, the internet, intranet, scanners, mobile technologies, social media networks, and other platforms. Libraries are crucial assets for holistic health promotion programmes that seek to convey their message through several channels, forms, and places inside an organisation. Librarians are in a favourable position to study how patrons assess health information resources and incorporate information from different sources. Healthcare librarians at the KZN Department of Health (DOH) should research health literacy and establish enduring programmes inside their libraries. Librarians can enhance the connection between research and practice by conducting thorough evaluations of their health information outreach projects to identify the elements that facilitate or impede their performance.

Librarians can utilise their skills in conducting thorough literature searches to perform meta-analyses of the literature on the relationship between health information literacy and behaviour (Whitney et al., 2017). A recent Geda (2021) study found that medical or healthcare libraries have a crucial function in distributing free and subscribed electronic materials, open-access publishing, and licencing. Healthcare librarians depend on electronic resources, with subscribed databases being health professionals' primary information sources. Geda (2021) observed that over 50% of doctors expressed interest in acquiring MEDLINE search abilities, although they did not avail themselves of the training programmes offered by librarians. Librarians might utilise the inquiries of walk-in patients to demonstrate to doctors how to conduct information searches on databases. Therefore, handling and providing assistance for electronic resources is essential for healthcare libraries.

2.10. Chapter Summary

The literature review comprehensively explores various aspects of access to digital information in health libraries. It covers the current state of access, challenges faced, systems and technologies used, the role of library staff, strategies for optimisation, health/medical libraries during disasters and pandemics, and the implications of the literature reviewed. By synthesizing existing knowledge and research, the literature review establishes a foundation for the study and informs the research questions, methodology, and analysis. The literature

review aims to provide a comprehensive overview of the existing knowledge and research on a specific topic or study area. It seeks to identify gaps, trends, and key findings in the literature and provide a foundation for the research. The literature review helps establish the study's theoretical and conceptual framework, informs the research questions, and guides the methodology and analysis.

Implications of the literature reviewed discussed literature about the theoretical framework of the study. It highlights the importance of situating research findings within a theoretical framework, the role of the theoretical in guiding research, and the need for academic rigour and skills in higher-degree research. It also discusses the implications of the literature for health libraries and the provision of digital information services. In this study, the theoretical framework included elements such as access to digital information, technological infrastructure in health libraries, the role of library staff, optimizing the use of digital information services, and providing information digitally during disasters and pandemics. The literature review map provided a structured overview of the different themes and subtopics covered in the review.

The map of literature reviewed also helped to organize the information and present it logically and coherently. The map highlighted the main focus areas and provided a roadmap for the reader to navigate the review. The state of access to information explored the current state of access to information, specifically in the context of health libraries. It discussed the importance of access to digital content and resources and how technological advancements have transformed how information is accessed and utilised. It addressed the shift from traditional hard copies to digital formats and highlighted the benefits and challenges of digital access. Challenges encountered in health libraries to access electronic information focused on the challenges that health libraries face in providing access to electronic information.

This chapter discussed issues such as limited infrastructure, lack of funding, and the need for ongoing training and support for library staff. It also addressed the importance of addressing these challenges to ensure effective and efficient access to digital content in health libraries. The Systems and technologies used to provide access to information section explored the systems and technologies used in health libraries to facilitate access to digital content. It discussed electronic resources, e-books, e-journals, online databases, and other digital

platforms. It highlighted the role of web-based technological innovations and social media platforms in disseminating and validating information. It also emphasises integrating technologies and tools within existing library functions.

The role of library staff in facilitating access to a digital content section focused on the role of library staff in promoting access to digital information. It discussed their responsibilities in creating and maintaining digital collections, providing training and support for digital technology, formulating access rules and procedures, marketing digital resources, and analysing the impact of digital content. It emphasises the importance of library staff in bridging the gap between users and digital resources. Optimising Use of Digital Information Services: This section explores strategies for optimising digital information services in health libraries. It discusses pop-up libraries, academic study support, evidence-searching support, and the benefits of health librarian services. It highlights the importance of promoting awareness, providing training, and monitoring usage statistics to improve the effectiveness and efficiency of digital information services.

Health/Medical Libraries and the Provision of Information Digitally during Disasters and Pandemics: This section focuses on the role of health/medical libraries in providing information digitally during disasters and pandemics. It highlights the challenges faced during such events and the need for alternative plans for information access. It discusses the importance of health librarians in curating and disseminating reliable information, collaborating with healthcare professionals, and utilizing digital platforms to support response efforts.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explores the research technique procedure utilised in the investigation. This focuses on the research design, which includes the target population, sample methods, data collection instruments, data processing techniques, and considerations of validity and reliability. Goundar (2019) defined research methodology as the framework that provides the theoretical basis for determining which method, set of procedures, or optimal approaches can be utilised to address a particular issue, such as calculating a given outcome. Research methodology refers to a collection of systematic approaches employed in research. It serves as a guide for conducting research (Goundar, 2019).

Research methodology examines and evaluates various approaches, highlighting their limitations and resources and elucidating their underlying assumptions and outcomes. It also explores their possibilities in the unexplored areas of knowledge. According to Ngulube (2015), research technique is the perspective through which a researcher examines and obtains knowledge about social phenomena and addresses research inquiries. It outlines the specific research strategies and procedures that can be used to acquire knowledge about a particular topic.
e knowledge about a particular topic.

3.2 Research Methodology Map

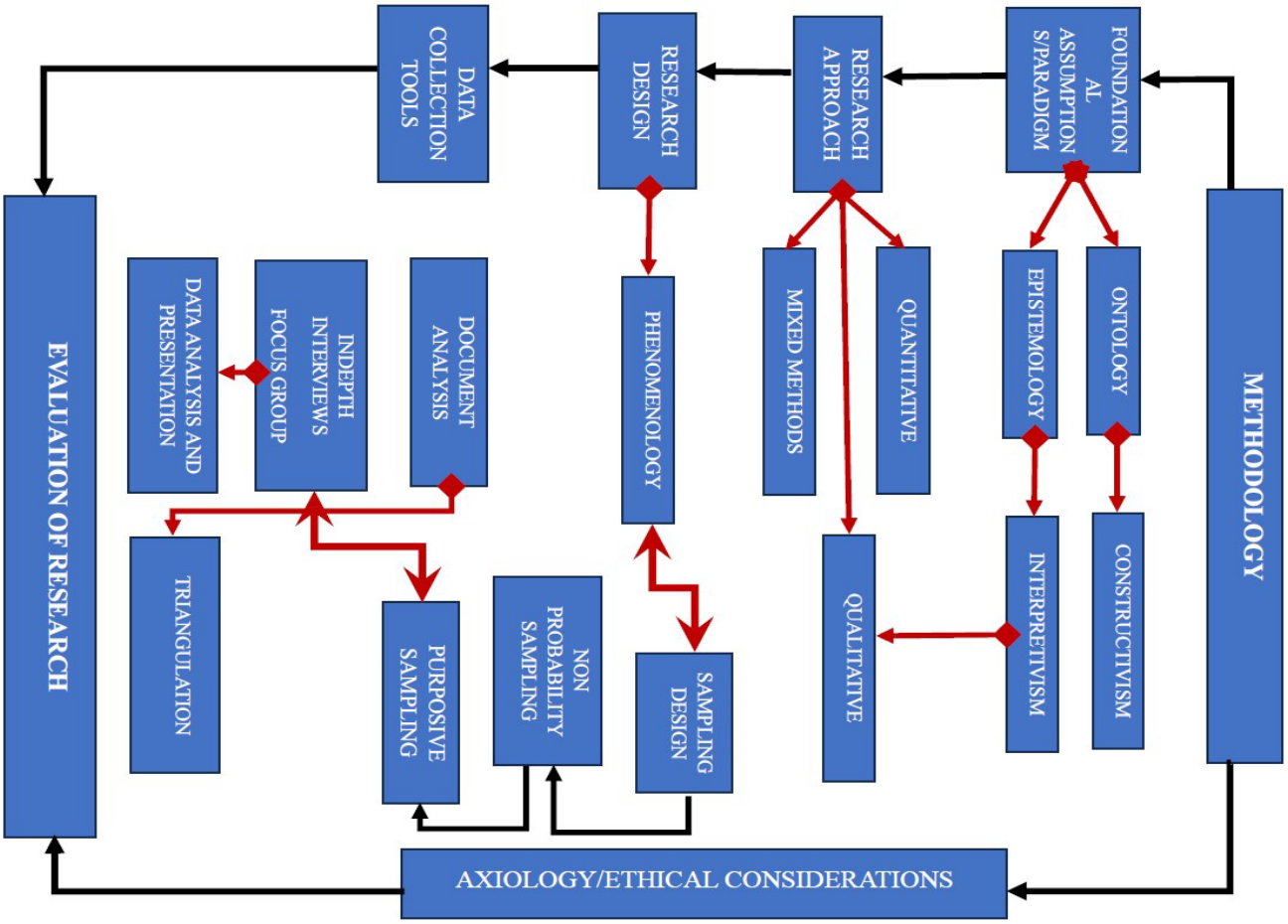

Figure 3.1: Research Methodology Roadmap

3.3 Research Paradigms

Olsen (1992:16) in Thomas (2010) describes a research paradigm as a coherent and organised set of scientific and academic concepts, principles, and beliefs. Philosophical assumptions aid researchers in selecting the problems to investigate, the questions to pose, and the theories to generate reliable information (Creswell, 2014). The research process consists of three primary dimensions: ontology, epistemology, and methodology (Ngulube, 2015).

3.3.1 Ontology and Epistemology

Ontological and epistemological features pertain to an individual's worldview, which significantly impacts their perception of the relative significance of different elements of reality (Thomas, 2010). Paradigmatic study in a subject field is built upon philosophical assumptions regarding the nature of knowledge, the presence of social reality (ontology), and the criteria for determining what counts as knowledge and how we come to know it (epistemology). A paradigm deals with fundamental assumptions that are accepted without question, such as ideas about the nature of reality (ontology), the connection between what is known and what is unknown (epistemology), and assumptions regarding methodology (Maree, 2016: 52).

According to Merriam and Tisdell (2015), it is beneficial to place qualitative research in a philosophical context alongside other types of research. This orientation involves one's beliefs regarding the fundamental nature of reality (ontology) and the nature of knowledge (epistemology). Paradigms are shaped by either a realist or objectivist ontology and a constructionist ontology. The positivist paradigm is based on realist ontology, while the constructivist paradigm, also known as a nominalist, according to Neuman (2011), is inspired by interpretivism as stated by Ngulube (2015).

3.3.2. Interprevist Paradigm

This study employed the interpretivist paradigm due to its reliance on observation and interpretation. In this context, observation refers to gathering information by making inferences or assessing the correspondence between the information and an abstract pattern. The knowledge produced within the interpretivist paradigm is subjective, whereas positivists generate objective knowledge independently of individual perspectives. Interpretivists employ approaches focused on meaning, such as interviewing or participant observation, which depend on a subjective connection between researchers and respondents (Thomas 2010: 296). Researchers practising interpretivism favour interacting and dialoguing with research participants to understand the social world from their experiences and the subjective meaning they are attached to (Shelembe, 2021).

The researchers ground their work in specific philosophical ideas, which may be rooted in one or more paradigms depending on the nature of their research. Interpretivism, which involves

seeing and interpreting data, allows researchers to explore the influence and impact of certain factors and investigate the reasons behind adopting specific technical paths (Thomas 2010). According to Merriam and Tisdell (2015), interpretivism is the predominant form of qualitative research. It asserts that reality is socially constructed, meaning no singular, observable reality exists. Instead, there are multiple interpretations or versions of a single event. In this approach, researchers do not discover knowledge but rather create it.

3.4. Research Approach

According to Thomas (2010), a research methodology refers to a particular method for gathering and evaluating data, which might be quantitative, qualitative, or a combination of both (mixed methodologies). When devising a research strategy, it is necessary to make two crucial determinations. Firstly, the methodology for data collection must be established. The choice of methodologies is contingent upon the specific data type required to address the research inquiry. Comparison between qualitative and quantitative methods: Will data be represented in the form of words or numerical values? Next, determine the method by which the data will be analysed: Statistical analysis tools can be employed to examine relationships between variables in quantitative data. Thematic analysis is a strategy commonly employed to interpret patterns and meanings in qualitative data (Thomas, 2010). Quantitative research can identify patterns and averages, make predictions, examine causal linkages, and extrapolate results to larger groups (Creswell, 2014).

Quantitative research is the antithesis of qualitative research, as it entails collecting and analysing data that is not numerical, such as text, video, or audio. Quantitative research is extensively employed in various disciplines such as biology, chemistry, psychology, economics, sociology, and marketing. Creswell (2014) explained that mixed methods research involves the sequential use of both quantitative and qualitative data in the design. The researcher's inquiry is predicated on the premise that gathering a variety of data yields a more comprehensive comprehension of a research problem than relying solely on quantitative or qualitative data. The study commences with an extensive survey aimed at generalising the findings to a larger population. Subsequently, in a subsequent phase, the study concentrates on conducting qualitative, open-ended interviews to gather in-depth perspectives from participants. These interviews are intended to provide more insights and explanations for the original quantitative survey results (Creswell, 2014).

Table 3.1: Differences between Quantitative, Qualitative and Mixed Methods (Adapted from Creswell, 2014)

QUALITATIVE	QUANTITATIVE	MIXED METHODS
Constructivist knowledge, phenomenology, Ground Theory, Ethnography, Case study and narrative.	Positivist knowledge, surveys, experiments	Pragmatic knowledge, sequential, concurrent and transformative
Open-ended questions, emerging approaches, and text or image data are also included.	Closed-ended questions, predetermined approaches, numeric data.	Both open and closed-ended questions, both predetermined approaches, both qualitative and quantitative data analysis.
Focuses on a single concept or phenomenon	Tests or verifies theories or explanations	Collects both qualitative and quantitative data
Brings personal value into the study	Identifies variables to the study	Develops a rationale for mixing
Studies the context or setting of participants	Relates variables to study	Develops a rationale for mixing
Validates the accuracy of findings	Uses standards of validity and reliability	Presents visual pictures of the procedure in the study.
Makes interpretation of data	Observes and measures information numerically	Employs the practices of both qualitative and quantitative
Creates an agenda for change or reform	Uses unbiased approaches	
Collaborates with the participants	Employs statistical procedures	

3.4.1. Qualitative Research

This study employed qualitative research methodology due to its naturalistic nature, which aims to investigate the daily lives of various groups of individuals in their authentic environments. Additionally, it utilises an interpretive and naturalistic approach to its subject matter (Booth, 2016). This study employed qualitative research methods and techniques to

investigate the provision of access to electronic information in KwaZulu Natal Department of Health libraries in the digital transformation era. Qualitative research aims to comprehend and interpret phenomena by examining the significance that individuals attribute to them (Thomas 2010). In qualitative research, gathering and reviewing non-numeric data is used to gain insight into the participants' concepts, opinions, or experiences. Unlike numerical quantitative research, qualitative research delves into the richness of human experiences and provides an in-depth insight into perspective on phenomena as experienced and lived by human subjects (Goundar, 2019).

3.5. Research Design: Phenomenology

This study used a phenomenological approach to investigate individuals' perceptions and comprehension of granting access to electronic material at the KZN Health Libraries. Phenomenology is a method used in the interpretivist research paradigm that highlights the significance of individual viewpoint and interpretation (Phathak, 2017). Creswell (2014) contended that problematizing a research inquiry often necessitates a deep comprehension of the shared human experiences within a specific group in qualitative research. Consequently, phenomenology operates within a paradigm of personal insight and subjectivity, placing greater significance on individuals perceptions and interpretations.

The primary focus of phenomenological research is to closely examine individuals' subjective experiences, distinguish and analyse the underlying structures of these experiences, and uncover the significance attributed to them by the research participants in relation to the observed occurrences (Matua and Van der Wal, 2015). The choice of the phenomenological approach in this study was motivated by the primary need to describe and interpret the lived experiences of patrons and users at the KZN health libraries as the basis for understanding factors influencing the provision and access to electronic information. Furthermore, phenomenology is a powerful approach to qualitative research that delves into the essence of human experiences, providing unique perspectives based on how people experience and perceive events rather than merely examining their existence. By exploring these subjective experiences, phenomenology enables researchers to gain insights that transcend objective observations (Pathak, 2017).

3.5.1. Target Population and Sampling

Goddard and Melville (2012) stated that population is any group that is the subject of research interest. Population represents all units of interest for which a researcher intends to make definite deductions (Creswell, 2014). The target population is the number of people involved in a study, which, in this case, is staff of KZN Health libraries patrons, including nurses, doctors, and other staff members. However, during the data collection stage, the researcher established that some KZN health libraries are on nursing campuses and consist of students and lecturers; one library in the head office caters to all head office staff members, who are barely doctors and nurses.

Goddard and Melville (2012) asserted that to make general conclusions about a group, it is imperative that the samples used for the study accurately represent that population. Taherdoost (2016) argued that sampling decreases the number of instances under investigation, as researchers often lack the time or resources to study the complete population. The study employed non-probability purposive sampling, which is considered the most suitable approach for a phenomenological study, as Phathak (2017) stated. Previous research indicates that phenomenologists commonly utilise open or semi-structured interviews to gain insight into an individual's life experiences.

3.5.2. Purposive Sampling

Taherdoost (2016) states that purposive sampling is commonly used in qualitative research and requires a well-defined justification for selecting specific examples over others. Purposive sampling is an economical way of selecting samples. The researcher relies on their expertise to choose the most suitable individuals for the systematic inquiry. Purposive sampling also helps to filter out irrelevant responses (Phathak, 2017). Health/medical libraries specialise in Health and Medicine; their information services cater primarily to nursing students, lecturers, nurses, doctors, and other medical staff (Jablonski et al., 2021). Therefore, the selection of three doctors and three nurses (or three nursing students and three lecturers) per library is representative of the population as they are the prominent patrons of health libraries. Librarians are the custodians of information, and each library in the population has one librarian who manages electronic resources; hence, they select each librarian to represent their libraries.

This demonstrates that the purposive sampling approach is characteristic of this study. The advantages of such an approach include its flexibility, which allows the use of a wide range of research designs and allows specific techniques to be applied to achieve research goals. While the non-random sampling characteristic of qualitative research methods offers no scope for generalisation in the study's findings, such that information cannot be extrapolated from the targeted groups to make claims about an entire population, purposive sampling allows for valid generalisations. The nature of such generalisations is logical, analytical and or theoretical, leading to the development of theories in some research contexts, such as the grounded theory method (Charmaz and Keller, 2016).

Furthermore, purposive sampling allows the targeting of niche demographics, thus enabling researchers to extract relevant data points for research contexts. However, purposive sampling is also riddled with several limitations, with the principal ones most pertinent to this study being vulnerability to researcher's biases, limited representativeness, and its ineffectiveness for large populations. Concerning vulnerability to researcher bias, purposive sampling relies heavily on the researcher's judgment and subjective decision-making, with decisional patterns not based on sound theoretical or design thinking capable of producing poor sampling and narrow-focused results (Given, 2008).

Limited representativeness and ungeneralisable findings imply that purposive sampling does not guarantee a representative sample since researchers intentionally select specific individuals or groups that may not reflect the entire population. Results from studies with purposive sampling designs will yield results that differ across studies (Booth, 2016). Thus, while there can be generalisation of analytical approaches to data, logical implementation of the study and/or theoretical foundations, the results can't be applied to the population from which the sample was extracted. The sampling frame included nurses, doctors, student nurses, lecturers, and librarians. Three doctors, three nurses (or three nursing students and three lecturers) and one librarian from each hospital were selected to make a sum of seven participants per library. The study sample consisted of ninety-one participants (7 participants per health library x 11 health libraries). The sample is presented in the table below.

Table 3.2: Study Sampling and proposed number of participants.

Name of Institution	Selected participants	Sample size
Inkosi Albert Luthuli Central Hospital	1 library manager, 3 doctors, 3 nurses	7
Addington Nursing Campus	1 librarian, 2 doctors, 2 lecturers, 2 nurses	7
Benedictine Nursing Campus	1 librarian, 3 lecturers, 3 nursing students	7
King Adward viii Nursing Campus	1 librarian, 3 lecturers, 3 nursing students	7
Charles Jonson Nursing Campus	1 librarian, 3 lecturers, 3 nursing students	7
Madadeni Nursing	1 librarian, 3 lecturers, 3 nursing students	7
Harry Gwala Nursing Campus	1 librarian, 3 lecturers, 3 nursing students	7
EMRS College of Emergency Care	1 librarian, 3 lecturers, 3 paramedic students	7
Port Shepstone Nursing Campus	1 librarian, 3 lecturers, 3 nursing students	7
Greys Hospital	1 librarian, 3 doctors, 3 nurses	7
RK Khan Nursing Campus	1 librarian, 3 lecturers, 3 nursing students	7
Head Office Library	1 library manager, 6 patrons	7
Total = 11 libraries	Total = 77 participants	Sample size = 77

During the data collection phase, two institutions were not attainable for this study: Ngwelezane Nursing Campus and Prince Mshiyeni Memorial Nursing Campus. In one institution (King Edward viii College Campus), only the librarians participated, and no patrons

were involved since the nursing college campus was still sorting out licencing issues as per the librarian, so the patrons were unavailable. In one institution, Port Shepstone Nursing Campus, only the librarian participated, and patrons were not involved since the library does not have digital information services or is not automated as per the librarian. The sample size ended up consisting of 77 participants, considering the above changes. The sample consisted of nursing students, lecturers, nurses, and doctors as patrons for some health librarians, who turned out to be nursing students and lecturers. However, 6 participants per library were still used by the patrons.

3.6. Data Collection Tools

Creswell (2014) highlighted that qualitative researchers commonly collect various types of data, including interviews, observations, documents, and audio-visual information, to enhance the depth and comprehensiveness of their data collection and analysis, thereby facilitating a more comprehensive understanding of the phenomena being studied. The researchers subsequently analyse the data, derive meaning from it, and categorise it into overarching themes encompassing all data sources. The following section involved the execution and examination of interviews, focus group discussions, and document analysis.
volved the execution and examination of interviews, focus group discussions, and document analysis.

3.6.1. Interviews

An interview is a research method in which the researcher establishes direct and specific contact with the respondents. The interviewer asks questions to the interviewee during the data-gathering process (Bless et al., 2013). Interviews are utilised in phenomenology to achieve data saturation as they enable extensive extrapolation of data. The interview approach is highly beneficial and crucial in qualitative studies as it allows for a full and systematic investigation of occurrences or conditions through nature (Creswell, 2014).

According to Giorgi (2009), qualitative interviews involve the researcher directly interacting with participants through face-to-face, telephone, or focus group interviews to collect qualitative data. Interviews have the benefit of facilitating direct interaction, which results in targeted and valuable recommendations, as well as obtaining comprehensive and intricate information. The drawbacks of interviews, such as dependence on the accuracy of

respondents and the time, cost, and potential emotional strain involved, were addressed by conducting interviews with librarians. Librarians, being the custodians of library services, do not face these issues. Additionally, the use of telephone interviews reduced travel expenses and saved time. During the interviews, the researcher also warned of the shaman effect, which refers to the situation in which one individual with specialised knowledge of a subject can overshadow the data, purposefully or unintentionally (Maisiri and Ngulube, 2021).

The interview questions were derived from the research questions to achieve the objective of the study. The interview questions consisted of both closed-ended and open-ended inquiries. Researchers utilise closed-ended questions to obtain precise and structured data from participants. These questions often employ response options such as yes/no, multiple choice, or rating scales (Booth, 2016). While these questions offer valuable insights, they fail to fully encompass the participants' profound perspectives, perceptions, experiences, or opinions surrounding events. This study employed closed-ended questions in semi-structured telephone interviews to gather background information on the topic from a sample of 11 librarians.

Librarians work directly with patrons, better understand the libraries' usage, and are highly likely to give valuable subject information. Eleven librarians were reached for interviews, but two were not available. Open-ended questions provide a broad spectrum of potential answers and motivate respondents to offer elaborate and individualised responses. Such questions are usually unstructured and typically start with “how”, “what”, or “why” and require participants to share their thoughts, opinions and experiences, leading to the understanding of complex phenomena, studying subjective experiences, developing theories and models, and evaluating programs and interventions (Given, 2008, Charmaz and Keller, 2016). In this study, such questions were implemented through the interview guide used in both interviews and focus group interviews, where the researcher used dialogue and follow-up questions to gain a deeper understanding of the issues being shared by participants on their lived experiences in access to electronic information.

3.6.2. Focus Group Discussions

Social science researchers, particularly those using qualitative methods, rely on focus group talks to gather data from multiple individuals concurrently. Focus group talks are a form of qualitative research that brings together a small group of people, usually 6 to 10 participants, to engage in a structured conversation on a particular topic (Booth, 2016). Focus groups may exhibit greater confidence when discussing specific study topics. These talks provide members with a valuable platform to express their thoughts, opinions, perspectives, and experiences (Akyldiz and Ahmed, 2021:6). During focus group conversations, and the participants have a tendency to influence one another to engage in more conversation due to the surrounding environment.

Focus group discussions offer a valuable means of exploring internal perspectives and emotions, making them particularly suitable for understanding feelings, thoughts, perceptions, sensitive topics, experiences, and knowledge within a group of participants. This distinguishes them from other data collection techniques like questionnaires and observations (Akyldiz and Ahmed, 2021). According to Akyldiz and Ahmed (2021), focus groups have several disadvantages. These include the need for a skilled moderator, as the quality and usefulness of the discussion depend on their expertise. Additionally, analysing the data from focus groups can be complex, mainly when individual opinions differ from the overall group opinion. Furthermore, the sample of participants in a focus group may not accurately represent the larger population being studied. Another drawback is less control over the data collected in focus groups, and the collected data may lack confidentiality and anonymity.

The limitations were considered in the design and preparation of the focus group discussions. As the moderator, the researcher used interview guides to structure the discussion so that responses could be directed towards aspects of the phenomena under consideration. Furthermore, while cross-discussions were encouraged during the deliberations around the questions, the researcher tried to structure individual responses by directing and regulating the discussion to give individual participants enough time, such as providing structure and order. This enabled perspectives, options, and ideas shared to be traced to the participants and their time stamps during the discussion. These can be referenced during data analysis while accounting for the anonymisation of the study participants.

Focus group discussions comprised 6 participants invited on Microsoft Teams to have a focus group discussion in the form of a workshop. Participants were three doctors, three nurses from the hospital libraries, and three students and three lecturers from nursing college campus libraries. The first focus group meeting was used to test the data collection tool. Participants from the first hospital were called to ask for their permission to participate, with structuring for possible days of the week and scheduled times. The meetings were scheduled according to participants' scheduled days where their work schedules were likely to confer them with open time to participate in the focus group discussions. Then, the letter of information and consent was sent to them by email, followed by an invitation.

During the focus group discussions, the same principle as in interviews was applied. Participants were not pressured but informed of what the data would be used for and advised of their rights. Most participants showed great interest and supported the study's aim despite their limited availability. The focus group discussion data was audiotaped and digitally stored for transcription and analysis preparation. Access to the data was delimited to the primary researcher and secondary researchers.

3.6.3. Document Analysis

As a qualitative research method, document analysis involves examining existing texts, documents, or records to gain insights into a specific research topic. The source documents may include primary sources, such as original documents created during the event or period being studied, such as diaries, letters, or official reports. Secondary sources include interpretations or analyses of primary sources such as scholarly articles or textbooks (Creswell, 2014). In the implementation of document analysis, the researcher undertakes the selection of the document sources and engages in familiarisation with the data through reading and re-reading it, followed by coding and categorisation where themes, patterns and recurring elements are identified. The data thus processed is interpreted with meaningful conclusions drawn from the data and presented in the form of substantive writing and concept visualisation (Charmaz and Keller, 2016).

This study's primary data sources for document analysis included standard treatment guidelines and essential medicines lists, medical circulars, clinical tools and strategic documents and plans. The researcher aimed to use other reliable sources for document

analysis, such as the departmental library's policy documents from the head office, the department's online library, and each library's digital services policies. It turned out that the libraries did not have such policies in writing, and the researcher used other relevant documents like The National Health Act, the Promotion of Access to Information Act and the National Department of Health Strategy documents. The researcher read and summarised information from such sources and made notes that represent exactly what is stipulated in the documents to add to the data collected during interviews and focus group discussions. Information solicited from such documents had to do with strategies for handling digital health information systems to promote, encourage, and make awareness and ease of access to information.

3.6.4. Data Triangulation

Triangulation, as defined by Phathak (2017), is the practice of employing various methods or data sources in qualitative research to thoroughly understand the phenomena under study. Triangulation is the utilisation of many data collection methods by researchers to corroborate the findings of a study. Employing diverse methodologies helps to mitigate the inclusion of study bias (Leedy, 2012). According to Ngulube (2015), triangulation is crucial in qualitative and quantitative research. Enhancing rigour and trustworthiness in qualitative investigations, as well as the validity and reliability of quantitative studies, is achieved using this approach. Triangulation enables researchers to comprehensively address many facets of a phenomenon and enhance the study data gathered. Data triangulation is a crucial factor in achieving data saturation and validating evidence.

Triangulation was employed in this study to derive the significance of data from many perspectives, ensuring comprehensive and detailed information. Nevertheless, it is crucial to acknowledge that triangulation can occasionally yield conflicting and incongruous outcomes. Under such circumstances, the researcher would be required to explain the discrepancies. According to Ngulube and Ngulube (2017), the inconsistencies may lead to opportunities for additional research. No discrepancies were found in this study.

3.7. Data Analysis Methods

Data analysis is an essential process in research and decision-making. It entails evaluating, cleansing, manipulating, and interpreting data to extract valuable insights. Qualitative data analysis encompasses three primary methodologies in qualitative research designs: content analysis, thematic analysis, and the grounded theory method (Creswell, 2014). The primary objective of data analysis is to diminish the amount of data (Rabiee, 2004). Additional data analysis involves employing several techniques to tackle a study's primary objective, such as scrutinising, classifying, and organising or merging material. The data obtained from focus group conversations was evaluated using the steps outlined by Rabiee in 2004. The initial stage involved adeptly guiding the conversation to elicit valuable data, making observations, and transcribing the recorded material.

The second phase involved becoming acquainted with the data through listening to audio recordings, reviewing written transcripts, and taking detailed observational notes. Engage deeply with the specifics and comprehensively understand the conversation by analysing it into smaller components. The convergence of significant themes is achieved by annotating the text with concise phrases, concepts, and categories, establishing a thematic framework. Descriptive statements were formulated during this stage, and a thorough analysis was conducted. The final stage involved indexing the data by carefully combing through it, identifying and organising relevant quotes, and comparing different situations. In the fourth stage, the quotes were extracted from their original context and rearranged according to the newly developed subject content to reduce the data. The last stage of data analysis for focus group talks involved the interpretation of data.

Phenomenological reduction or bracketing was used to analyse the data from the interviews. According to Phathak (2017), the researcher must put aside or bracket what they already know, the researcher’s assumptions and theoretical framework about the phenomena and only use the data collected for the study to analyse it without being judgemental and to avoid bias. Creswell (2014) described the following steps to elaborate phenomenological analysis:

- The researcher uses self-reflection to examine their personal experiences with the object of study, aiming to discover any subjective biases or preconceived notions that could potentially influence the analysis process.

- Horizontalisation refers to assigning equal importance to all statements made by participants in a research study.
- The researcher categorises pertinent subjects into meaningful units.
- The researcher produces written explanations.
- The researcher composes structural descriptions.
- Ultimately, through textual and structural analysis, the researcher determines the fundamental nature of the phenomena (i.e., the shared features identified in each person under investigation).

3.8. Strategies for Ensuring Rigour in Qualitative Study

Credibility – In qualitative research, the truth value of data is used to ensure that validity and reliability are justifiable. A researcher must examine the individual transcripts, searching for commonalities inside and across all individuals. The study's final report will use peer examination, peer debriefing, and participants' words (Creswell, 2014:251).

Transferability is the capacity to apply research findings or methodologies from one group to another using qualitative language. It is similar to external validity and involves describing the population examined, including their demographics and geographic borders. The researcher presented various experiences that can serve as a foundation for developing interventions and knowledge, enabling the reader to determine the applicability of the research to practical situations (Creswell, 2014:252). The researcher designed this study to ensure the same processes could be replicated in another study with various demographic groups and geographic areas.

Dependability refers to the ability of another researcher to replicate the decision-making process utilised by the original researcher. To accomplish this, the researcher demonstrated transparency by providing a clear description of the study's specific objective, the criteria used to select participants, the methods and rationale behind data collection, the duration of data collection, the process of data reduction and transformation for analysis, as well as an explanation of the techniques employed to ascertain the credibility of the data (Creswell, 2014:252).

Confirmability is when credibility, transferability, and dependability have already been established. Qualitative research necessitates a reflective approach, characterised by a keen

awareness and receptiveness to the study and its outcomes. Interviews were recorded using the iPhone recorder, and notes were taken immediately after interviews and focus group discussions regarding personal feelings, biases, and insights. The researcher followed rather than led the interviews and asked for clarification when needed (Creswell, 2014: 253).

3.9. Ethical Considerations

Durban University of Technology's research ethics policy was followed and is based upon widely accepted principles and policies governing research involving human participants. The key elements are:

- Potential for the benefit of society
- Maintenance of the dignity of participants
- Minimal risk of harm to the environment
- Voluntary informed consent by participants or special safeguards where this is not possible
- Transparency in declaring funding sources
- Confidentiality of information supplied by research participants and anonymity of respondents.
- Acknowledgement of assistance
- Appropriate publication and dissemination of research results;
- Independence and impartiality of researchers.

The Durban University of Technology’s Research Ethics Committee approved this study. Ethical considerations guided the researcher's interactions with the subjects in this study. The study preserved the interviewees' confidentiality and supplied a letter of information and consent to participants before conducting interviews. Participants were assured of confidentiality and anonymity during the data collection process. Confidentiality ensured participants that no personal names were asked for in the group discussions and no personal information except for designations. Covering letter explaining the purpose of the group discussions and the fairness of the use of data to be collected to assure participants that there wouldn’t be any negative effects to them from their honest answers but instead the more

honest and careful when answering was the more the study was going to get valid results to improve services.

The researcher monitored the data collection process considerably, and no data will be leaked and used for uninformed agendas except for this study. Informed consent, which is the permission to be granted by librarians of the libraries, concerns the patrons who participated in using information from their libraries and clarifies what data was collected and for what purpose.

3.10. Chapter Summary

This chapter discussed the current study's research design. The interpretivist research paradigm guided the study in thoroughly examining the subject. This study used a qualitative research approach and implemented a phenomenological qualitative research design that informed sampling, nature of data, and phenomenological reduction/bracketing for qualitative data analysis. The target population comprised student nurses, student doctors, lecturers, nurses, doctors, and other hospital staff members. A purposive sampling method was employed to represent the study's population, which included nursing students, lecturers, nurses and doctors from hospital libraries and nursing college campus libraries.

The data collection method adopted semi-structured interviews, focus group discussions and document analysis. Data for focus group discussions was analysed according to Rabiee et al. (2009) five steps for analysing data. Phenomenological reduction or bracketing was used to analyse data from the interviews using Pathak (2017) and Creswell (2014) strategies. Strategies for ensuring rigour in a qualitative study, including credibility, transferability, dependability and conformability, were considered. DUT research ethics were followed. The next chapter summarises the research findings.

CHAPTER 4: PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents an analysis of interviews with librarians, focus group discussions with library patrons and document analysis, which comprise the data sources for the present study as discussed in the preceding section. These findings offer insights into understanding the evolving state of health library systems in KwaZulu Natal. This chapter synthesises the data gathered from three primary sources: interviews with librarians, focus group discussions with patrons, and document analysis. Each source provides unique insights into the challenges, opportunities, and dynamics of health library services in the context of digital transformation and evolving information needs in the healthcare sector.

The librarians' interviews illuminate the internal workings of the libraries, including the resources available, challenges encountered, and strategies implemented to navigate the digital era. The focus group discussions with patrons reveal the users' perspectives, highlighting their experiences, needs, and expectations of the library services. The findings from document analysis are presented, including a summary of the documents and the conclusions of the analysis instead of digital information access systems connected with the design and implementation of the digital health libraries. By integrating these diverse perspectives, this chapter aims to present a holistic view of the state of health libraries within KZN DOH, identifying key themes and areas for improvement to enhance the effectiveness of library services in meeting their patrons' current and future needs.

4.2. Librarian’s Interviews

The interviews conducted among the librarians were directed towards understanding the roles they play in the procurement and development of library materials, development of the health information database, interaction with the library patrons in enabling access to information resources and training and the various challenges they face at a structural level and through interaction with patrons and providing their services. The analysis of the transcribed interview data revealed five key themes which coalesced the responses of the librarians, which are roles of librarians, knowledge of librarians concerning digital databases and skills, challenges in library service provisioning, solutions to challenges faced and knowledge of databases

utilised by the health libraries where they work. These are summarised in pictorial forms, and each subthemes is discussed.

4.2.1. Challenges Faced by Librarians when Accessing Electronic Information in KZN Health Libraries

The challenges faced by librarians among the different participating libraries are connectivity and internet challenges, database access restrictions, infrastructure and patron dynamics, patron diversity or lack thereof, procurement challenges, skills among librarians and staff shortages.

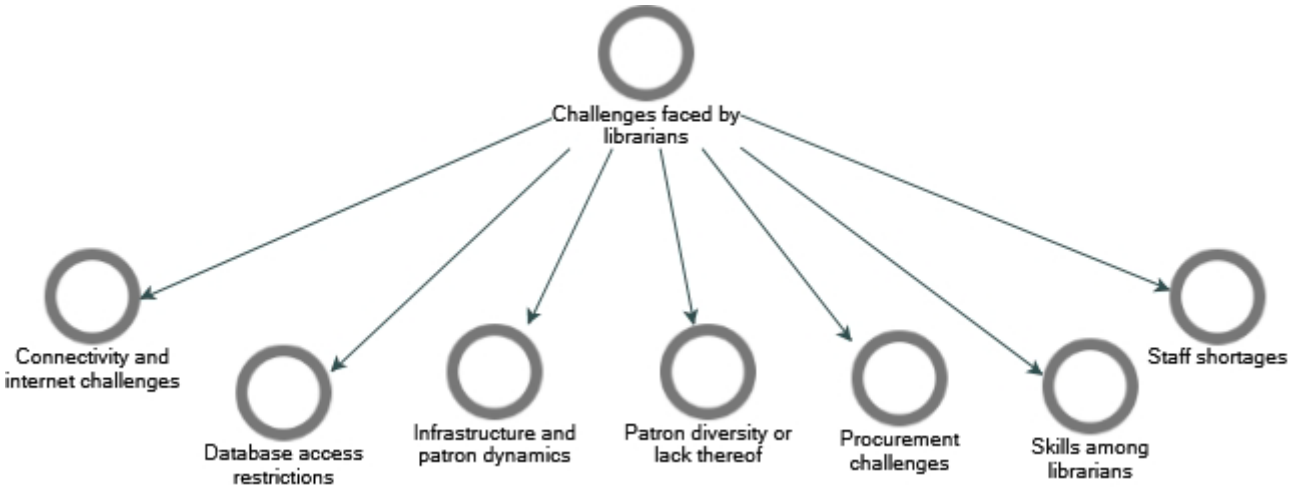

Figure 4.1: Pictorial representation of challenges faced by librarians when accessing electronic information at KZN Health libraries.

4.2.2. Connectivity and the Internet Challenge

Concerning connectivity and internet challenges, librarians were concerned with internet infrastructure and network problems, load shedding, which causes protracted internet access downtimes, internet accessibility by clients/patrons and inefficient intranet systems resulting in tedious library management protocols.

"Internet problem for over 5 years. Internet network problems and students not there during the library opening hours but attending classes. Only 1 period in a week is dedicated to the library". Librarian, Charles Johnston Hospital.

"Internet network is mostly down. Not much but internet has network problems, and photocopier not working when there's no internet". Librarian, Grey Hospital

“Network problem, load shedding, not much online services, circulation done manual and only intra/internet available”. Librarian Inkosi Albert Luthuli Hospital

Internet nonavailability and downtime implied that digital services were not always accessible, and librarians’ efforts in shaping up digital databases, training in digital services and promoting digital material access were limited. As shown in the interview extract above, Internet connectivity challenges have been protracted at some libraries, such as Charles Johnston Hospital.

4.2.3 Database Access Restrictions

The challenges with database access restrictions were multifaceted. The librarians were concerned that users could not remotely access the database, implying that digital-based access worked only through the dedicated intranet (Librarians, Charles Johnston and Harry Gwala Hospital). Subscriptions on online databases, such as Sabinet, implied that users experienced access restrictions for unsubscribed content; thus, digital access restricted the possibility of accessing research information (Librarian, Charles Johnston Library). This implies that fees and monetary costs for materials are an inherent challenge for access to electronic databases that may limit both librarians' information provision and patrons' digital information access. Furthermore, the digital platform was reportedly not user-friendly, and thus, it was difficult to interact with and access information (Librarian, EMRS Campus).

“SABINET only gives what’s in the package purchased, access to journals/ articles restricted”. Librarian, Charles Johnston, Harry Gwala Hospital.

“Restrictions for patrons not being able to access on-line information remotely system not user friendly and very slowly at times”. Librarian, EMRS Campus Library

“System not accessible remotely, our collection does not have latest editions, no latest e-books and library is only accessible during office hours. Yes, self- check machines to allow patrons to easily borrow, return and renew items at conveniently placed self-service stations. Yes, online collection does not have latest editions of books that patrons are currently using which make it difficult for them to access information when not in campus”. Librarian Harry Gwala Hospital.

The librarians were concerned that internal collections were not updated with the latest editions of books or documents and were accessible only during office hours. The system is inaccurate in some libraries and does not update book loans and returns. This implies that the digital database does not have accurate records of available materials when requested by library patrons. Furthermore, no interlibrary loans on digital materials and other materials not accessible when the database is down due to network challenges.

"System not 100 % accurate, cannot locate library items, cannot tell if a book is in or out, cannot do interlibrary loans. No interlibrary loans, no AMLIB, no hard copies for journals needed by lecturers and cannot work when the iterant is down". Librarian, Madadeni Nursing Campus Library

4.2.4 Infrastructure and Patron Dynamics

The librarians were concerned that there was a lack of infrastructure for digital information access, such as computers connected to the internet. These challenges were compounded by the lack of digital skills among the patrons to interact with digital platforms unaided. Limited infrastructures may imply that librarians may be hindered in facilitating training and development of patrons in digital library skills such as online book searches or accessing institutional procured online databases.

"Only computer laboratory available all else done manual, no online cataloguing and classification". Librarian, Madadeni Nursing Campus Library

"They have a difficulty in searching the books on their own and there is a lack of computers connected to the internet". Librarian, RK Khan Hospital

The findings also revealed patron dynamics that posed challenges for librarians at various institutions. Librarians were concerned that patrons resource usage patterns did not align with librarian-established regulations, thus causing challenges with the organisation of information for access and use by other patrons. The differences in usage patterns and the challenges they pose were worsened at some institutions by the busy schedules of the normal patrons, who would be under pressure during library utilisation and might not be open to training and consultation with librarians on issues pertaining to library utilisation. The libraries have restrictive hours, such as being closed on weekends, which prevents most patrons from

accessing the library since they are attending to work duties or classes. This makes planning to undertake training or consultation impossible or even designing training interventions due to irregularity of patron attendance or possible open schedules to consult on resource usage on electronic databases.

"Patrons (student nurses and lecturers) prefer to organize the library materials differently from our set of rules that we use, and the other problem". Librarian, Port Shepstone Library

"Their busy schedules as their core duty is to attend to patients, library hours (don't open after hours and on weekends). To ensure that we get the information needed by all health workers that information is easily accessible, and to inform them about what is new". Librarian, Inkosi Albert Luthuli Hospital.

"Lack of time because their working hours and some attend classes during the day when the library is open, and the limited number of computers available to them in the library". Librarian, King Edward Library

4.2.5. Patron Diversity and Lack Thereof

The librarians were concerned with the pattern of patron attendance at the libraries. Due to classes and work commitments, students were less likely to utilise the library than lecturers. It was also observed that for student patrons, less time was dedicated to library utilisation at some libraries. This implies that during the limited time that the students in their numbers utilised the library space, the number of requests and demands for access to information became weighty, given the reported staff shortages at the libraries. Furthermore, the librarians are placed in a position where, apart from increasing the number of staff attending to student requests, they cannot effectively respond to the high increase in student requests when they frequent the library after work or during the periods between their classes.

"Lecturers use the library more, and students are in class during the library opening hours. Students not there during the library opening hours but attending classes. Only 1 period in a week is dedicated to the library". Librarian Charles Johnston Library

"Changes in patron requests: a lot of demand for services by patrons as the library is new". Librarian EMRS Campus Library

“Lack of time as their timetable for classes’ clashes with library opening hours, so they can only visit the library during their breaks”. Librarian, Harry Gwala Hospital

“Their busy schedules as their core duty is to attend to patients, library hours (don’t open after hours and on weekends). To ensure that we get the information needed by all health workers that information is easily accessible, and to inform them about what is new”. Librarian, Inkosi Albert Luthuli

4.2.6. Procurement Challenges Regarding Electronic Information Services

The librarians were concerned with the challenges that procurement systems at their respective institutions imposed upon their work as librarians. The librarians were concerned with delays caused by procurement procedures impacting the availability of new books and the latest editions requested by the library patrons. The librarians were concerned that the provincial-centric nature of the procurement system negatively affected local library needs in reception and provision of library materials. The lack of updated library resources, e-books and books implied that patrons were less frequent at libraries.

“Limited budget, shortage of the library staff as the librarian works alone, and purchasing of books process takes long for the library to get books”. Librarian, King Edward Hospital

“Two to three times a week in person when they are on campus, they hardly access information online because we don’t have current editions of books on our online collection. Budget constraints, shortage of library staff as the librarian runs the actual library and the computer laboratory all by himself”. Librarian, Harry Gwala Hospital

“Limited budget, shortage of the library staff as the librarian works alone, and purchasing of books process takes long for the library to get books”. Librarian, King Edward Hospital

Thus, procurement challenges arising from budgetary constraints can lead to a lack of updated library resources and staff or delays in accessing ordered library materials, resulting in less efficient work by librarians responding to library patrons' requests.

4.2.7 Skills Among Librarians

Various issues were observed connected with skills challenges among librarians or interns, where dedicated librarians were not available due to constraints such as budgetary

processes. The interns utilised where librarians were unavailable were reportedly under-skilled and had limited authority to implement library rules and regulations. Lack of developmental and training opportunities implied that some librarians and library interns did not have opportunities to develop their library management skills as required, thus experiencing stagnation and inefficiencies in their disposal of library duties. Finally, computer skills and expertise were reported at another library, which may imply that librarians or staff were not equipped to provide training or manage digital information databases to promote access to digital resources.

"Patrons (student nurses and lecturers) prefer to organize the library materials differently from our set of rules that we use, and the other problem". Librarian, Port Shepstone Library

"Not sure bot librarian and library intern have only been taken to a cataloguing training ever since we joined the department, and the other skills, experience were obtained before working for the department, and its skills that help us to be able to perform our duties". Librarian, Harry Gwala Hospital

"Lack of computer literacy". Port Shepstone Library

4.2.8 Staff Shortages Among Librarians

The librarians were concerned with the impact of staff shortages. At one library, it was reported that there was a single librarian and an intern, and the library closed when the librarian was unavailable. At another facility, this shortage of library staff was alluded to as a possible budgetary constraint; however, this implied that the librarian handled a multiplicity of roles unaided, such as managing library resources, curating data, consulting with patrons and manning the limited computer resources unaided. Non-permanent patrons were not viewed as the best strategy for library management. This could follow from the skills gap between dedicated librarians and low-skilled interns and continuity since a settled librarian might be able to implement solutions based on observations of patron dynamics as described in the preceding results.

"Staff shortage because there is only one permanent librarian and an intern, library sometimes closes in absence of the librarian and shortage of computers for librarians". Librarian, Charles Johnston Library

"Budget constraints, shortage of library staff as the librarian runs the actual library and the computer laboratory all by himself". Librarian, Harry Gwala Hospital

"Not having a permanently employed librarian, relying on interns - not a best option, time challenge – no sufficient staff". Librarian, Head Office Library

4.3. The Role of Librarians in Accessing Electronic Information in Health Libraries

Among the perceived roles of librarians at the various institutions, four key roles were identified from the librarians' responses: development of the health information database, education development and training, library resource development and procurement, and meeting patron resource needs.

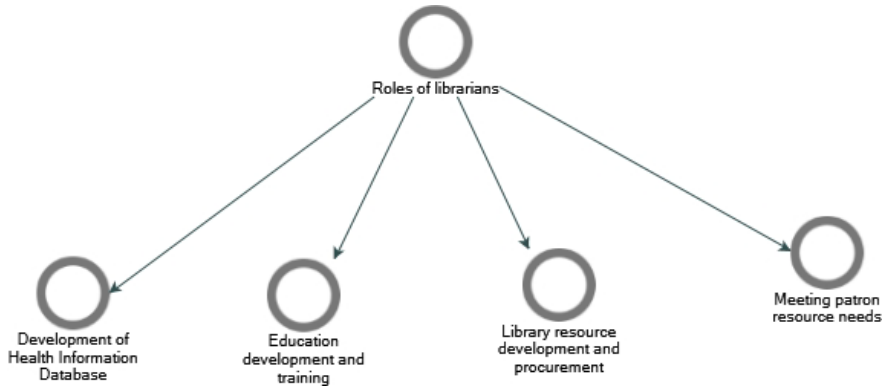

Figure 2.2: Pictorial representation of perceived roles of librarians

4.3.1. Development of Health Information Databases

The librarians perceived themselves as pivotal in developing the KZN health system by handling and disseminating information. However, they saw their role more broadly as spanning the development and integration of the health system since their roles intersect at training, procurement, and information provision, as discussed in the findings on the procurement challenges librarians face.

"To support KZN DOH's mission to develop a sustainable, coordinated, integrated and comprehensive health system at all levels. To deliver information service in all formats to all KZN College of Emergency stakeholders. To support efficient and quality emergency medical care". Librarian, EMRS Campus Library

4.3.2. Education Development and Training

Through providing information and responding to client requests at the libraries, the librarians perceived themselves as playing a central role in educational support, teaching and other administrative duties that intersect with the learning and development of students and staff who utilize the libraries and access information. In this perceived role, a librarian from the Inkosi Albert Luthuli Hospital stated that:

"To support the educational, teaching, research and administrative of the hospital staff". Librarian, Inkosi Albert Luthuli Hospital

4.3.3. Library Resource Development and Procurement

The librarians perceived their resource development and procurement role as being related to overseeing the library's running, cataloguing and classifying library resources and developing library policies. They relay local library information concerning procurement needs for library resources databases and report on the state of library operations.

"Oversee the running of the library, catalogue and classify library materials, make sure the business plan fits the college vision, orientation of patrons, marketing of the library, development of library policies, communication with stakeholders, management, KZNCN, and bookshops". Librarian, Harry Gwala Hospital

"Library information Services to head office staff, procure books for KZN DOH libraries, provide print and electronic info material, responsible for systems for departmental libraries management, caters for all staff members at head office". Librarian, Head Office

"Collect, organize, package and disseminate information". Librarian, King Edward Hospital

"To provide reference and research services by a variety of means, including printed material and electronic resources". Librarian, RK Khan Hospital

Through their roles of cataloguing, collating and relaying information procurement, which is connected to their role as points of contact with patron requests, librarians develop library resources and make recommendations for the development of resource access channels, tools and needed materials.

4.3.4 Meeting Patron Resource Needs

The librarians perceived their role in meeting patron needs as assisting students with accessing books and study materials, fulfilling patrons' information needs by providing available information resources and placing orders to procure information resources not currently available.

"To serve staff with their information needs, assist physicians, health professionals, students, patients, consumers, medical researchers, and information specialists in finding health and scientific information to improve, update, assess or evaluate health care". Librarian, King Edwards Hospital

"To provide the campus students, staff and lecturers with relevant information resources and develop lifelong learning". Librarian Port Shepstone Library

"To provide reference and research services by a variety of means, including printed material and electronic resources. Assisting patrons in accessing information". Librarian, RK Khan Hospital

"To fulfill the user's information needs with all the information that they will require within the library as the target market is paramedics with KZN Health. Make sure they provide patrons with best service that they can and users information searching, borrowing and returning of library books". Librarian EMRS Campus Library

In meeting the resource needs of patrons, librarians not only provide available resources to a wide spectrum of library users, but they also improve, update and evaluate the resource needs of patrons.

4.4. Solutions and Recommendations to Challenges Faced by Librarians

The librarian's recommendations and suggestions for improving the state of access to and provision of information at the various libraries are categorised as the need to utilize digital communication platforms, increasing library staff, strategic brainstorming sessions among librarians and staff, technology updating and provision of technology tools, training and support services provision and the need for constant updating of library databases. These are summarised in Figure 5, below.

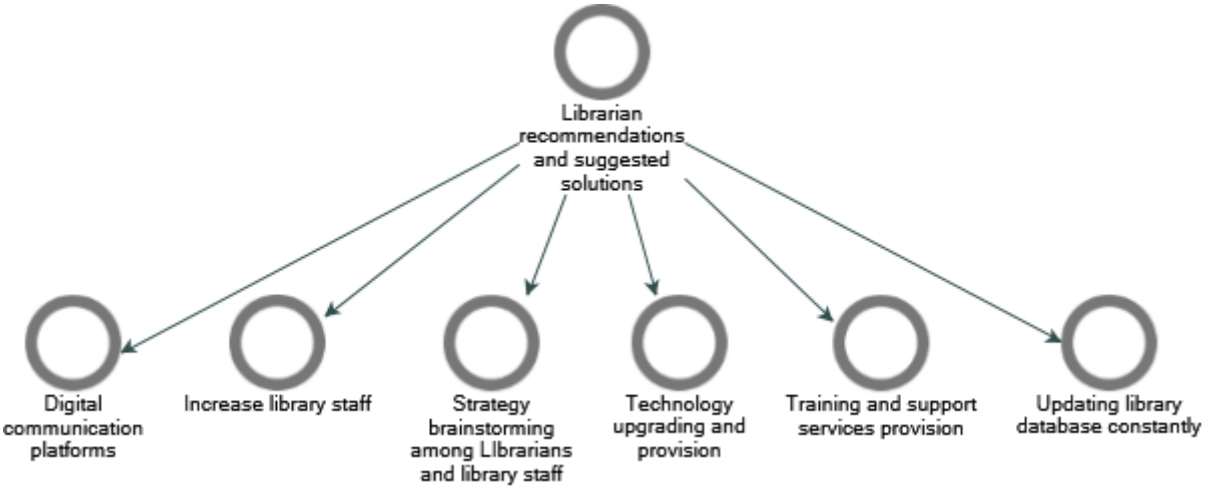

Figure 4.3: Summary of recommendations and suggested solutions by librarians

4.4.1. Training and Support Services Provision

The librarians recommended awareness events and campaigns and set up systems to help lecturers with research and training to equip patrons with knowledge of the electronic databases and systems used at the libraries. Such training would include library training, website management training, web design and electronic database management. Periodic training courses and library staff workshops were also recommended to upskill and equip libraries to carry out their tasks.

"Awareness events according to the health calendar assist lecturers with research. Training on the system used". Librarian, Charles Johnson Library

"UKZN – librarian training, website management training, library management and web design. Program to walk around departments promoting services to staff face to face marketing, creating posters". Librarian, Head Office Library

"Refresher courses should be provided each year". Librarian, Inkosi Albert Luthuli Hospital

"Staff needs to be trained and have workshops regularly". Librarian, King Edwards Hospital

"Outreach programs, visits to schools on career days, incentives (e.g. rulers, pens & pencils), and e-mails to inform staff of library services in the hospital". Librarian, Grey Hospital Library

4.4.2. Digital Communication Platforms

The librarians recommended using digital tools for timely relaying of information instead of traditional systems or methods. They recommended the establishment of library email address systems to enable patrons to relay requests, particularly for off-campus databases and library access. Furthermore, a digitalised communication platform can allow the historical collection of use requests more efficiently and provide the basis for evaluating library performance and areas where improvements can be required. Emails, digital displays and making resources available on the internet were recommended strategies for digital communication platforms.

"Created a library e-mail address for patrons to be able to send requests when off-campus and the library is always open during their tea and lunch breaks". Librarian, Harry Gwala Hospital

"Developing student's information retrieval skills update and promote services on the college website page". Librarian, Port Shepstone Library

"Emails, displays, making resources available on the intranet". Librarian, Inkosi Albert Luthuli Hospital

"To assist lecturers and students with their internet information queries". Librarian, Madadeni Hospital

4.4.3. Strategic Brainstorming Sessions among Librarians and Staff

A subset of the libraries in the sample suggested the efficiency of regular brainstorming sessions among librarians and staff to exchange ideas and find pathways to library-related challenges. The librarians can discuss information relayed to the libraries by patrons and information collection tools such as questionnaires and materials in suggestion boxes as the basis for making needed changes and strategic plans.

"Strategies observed to improve: encourage health librarians to have group forum meetings where they will discuss the issues pertaining to their libraries and possible solutions to solve them". Librarian, EMRS College Campus

“Questionnaires, Suggestion boxes, and involve patrons and the management in book selection process”. Librarian, King Edward Library

4.4.4. Updating Library Databases Constantly

The earlier results on the challenges faced by librarians, which included poorly maintained and inundated databases where patrons failed to obtain updated editions of e-books or did not have user-friendly interfaces, were related to the state of the libraries' e-resource databases. The need to constantly update the library resource databases in conjunction with better procurement processes was recommended to ensure that resources were available when needed. This would ensure optimal e-library performance and promptly meet patron requests.

“Providing latest research in Health/Medicine patrons, collection development & circulation”. Librarian, Grey Hospital Library

“System not accessible remotely, our collection does not have latest editions, no latest e-books and library is only accessible during office hours. Yes, self- check machines to allow patrons to easily borrow, return and renew items at conveniently placed self-service stations. Yes, online collection does not have latest editions of books that patrons are currently using which make it difficult for them to access information when not”. Librarian, Harry Gwala Hospital

4.4.5. Technology Upgrading and Provision

Stemming primarily from concerns with nonuser-friendly digital platforms, challenges with database access and challenges with off-campus digital materials access, the librarians suggested providing new technology and upgrading currently available tools. The librarians suggested new digital technologies where patrons can access information at their convenience and be enabled to access and return e-books or request manual books remotely. They further suggested new technology enabling automated library information resource management systems.

“New technologies / systems to be implemented: College of Emergency care website where patrons can access the information they need at their convenience, and self-service for book returns and renewals”. Librarian, EMRS Campus Library

“Self-check-out and returns machine, and a scanner can help with shelving correctly”. Librarian, King Edward Library

“Automated library information resources management system”. Librarian, Madadeni Nursing Library

4.4.6. Increasing Library Staff

The analysis of the challenges showed that staff shortages affected the disposal of responsibilities and meeting patron requests at the libraries in this sample. Due to staff shortages at some libraries, librarians took on a multiplicity of roles, from curating resources, making orders, training and manning the physical digital tools at patron requests. However, procurement of library staff was outside the realm of the stationed librarian beyond making reports or suggestions. In the reports on staff shortages and the challenges imposed by such challenges, librarians implied the need to assign more staff to the libraries.

“Staff shortage because there is only one permanent librarian and an intern, library sometimes closes in absence of the librarian and shortage of computers for librarians. Add staff to rotate and work after hours, students can then leave queries with library staff and respond by e-mail later and to have more access to info electronically”. Librarian, Charles Johnston Library

“Budget constraints, shortage of library staff as the librarian runs the actual library and the computer laboratory all by himself”. Librarian, Harry Gwala Hospital

“Not having a permanently employed librarian, relying on interns - not a best option, time challenge – no sufficient staff”. Librarian, Head Office Library

4.5. Analysis of Patrons Focus Group Discussions

The results presented in this section are based on researcher notes on the issues raised by library patrons during focus group discussions at the various health institutions. The data extracts presented as evidence in the discussion are summarised points raised by the participants. Generally, the participants in the focused group discussions were inclined towards a hybrid approach to library information access. They utilised online resources and manual copies depending on their information resource needs. The findings are summarised under several main themes, including conflicting time schedules, resource shortages and

constraints, information access skills among patrons, state of information systems and information access, staff shortages and the need for infrastructure and expanded information databases. These are summarised in the illustration in Figure 6 below, and each theme is discussed in turn.

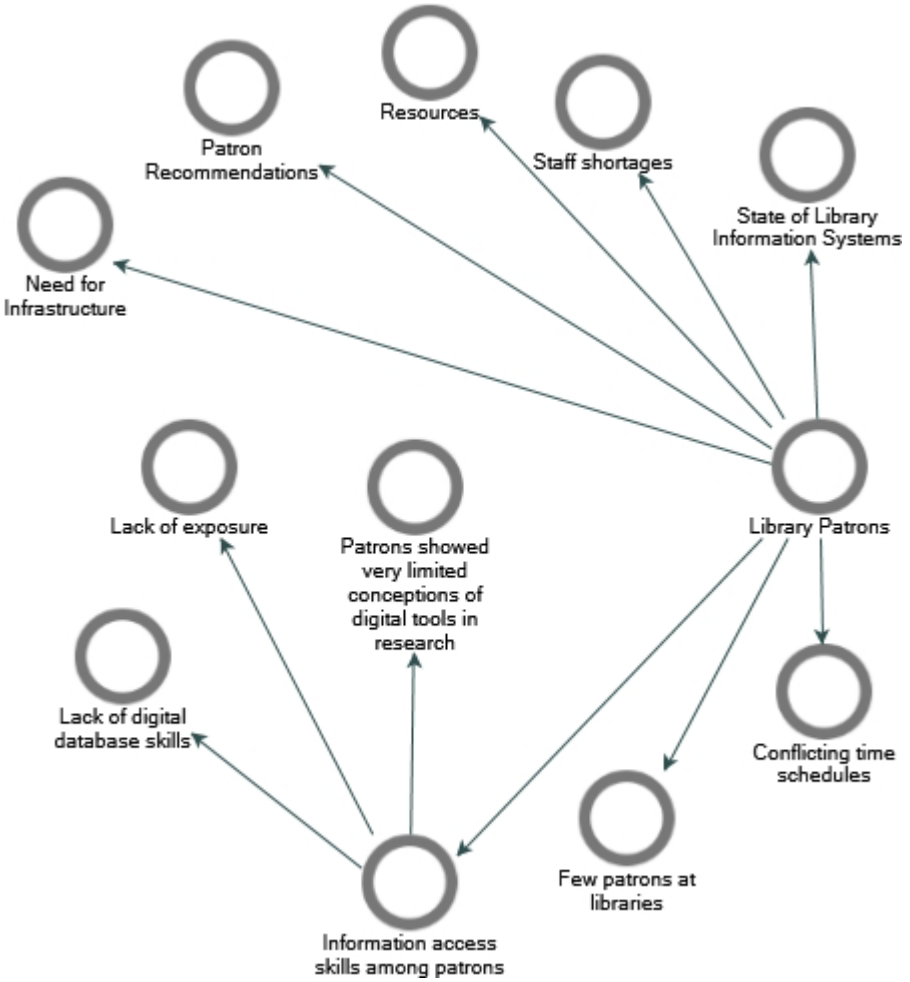

Figure 4.4: Patron's data analysis

4.5.1. Conflicting Time Schedules

Most of the patrons in the sample were working personnel or students undertaking their studies who reported being ordinarily busy with either work or attending classes. The libraries' scheduled opening and closing hours were reportedly inconvenient to the patrons, further exacerbated by restrictions with remote access to library electronic databases and resources. The participants intended to utilise the library resources and space at times that

accommodate their open schedules, such as weekends or after work hours. Patrons from Harry Gwala Hospital alluded to more extended time and accommodation of their work schedules in library time planning.

"A clinical lecturer at Harry Gwala Nursing Campus elaborated that the library is accessible but only opens during office hours. The patron feels that being not able to use the library after hours and on weekends when he is free is a barrier for him to information access. The patron has interacted with the library staff to access information and found them helpful, however would like the library to extend the opening hours and open on weekends". Patron 2, Harry Gwala Hospital Library.

Another patron accessing the library services and resources at the Albert Luthuli Hospital library was concerned with the opening and closing times. The patron believed the opening and closing times were restrictive as the agreed time frame was minimal. Extending closing times was conceived as increasing access to information for patrons whose schedules conflict with the library time schedules.

"Is a pediatrician and noted that assistance at IALCH is readily available should one needs it; however, the time is too limited as the library is open from 8 to 4pm week days. The doctor feels that if the library opening hours can be increased to 8pm, it will improve access to information". Patron 1, Inkosi Albert Luthuli Hospital

Patrons interviewed at RK Khan Hospital had similar concerns about time schedules. They suggested that, if possible, the library can be made accessible on evenings of weekdays and Saturdays so that they can access the library when not attending work commitments.

"The patron would like the library hours to be extended in the evenings and on Saturdays so they can have enough time to visit the library when not attending lectures". Patron 3, RK Khan Nursing Campus

4.5.2. Few Patrons Attending Libraries

Due to conflicting library times and patron work schedules or class attendance times, the library space was less frequented, which was also observed in the librarian data. From the perspective of the librarians, planning was made complex, as at times when patrons frequented the library, there were too many of them at the same time, increasing requests and

patrons' demands directed towards librarians. While a patron from one of the libraries observed that fewer patrons meant librarians and staff were readily available, less frequency of usage poses a barrier to gaining information for the development and improvement of library space since user demands, requests and preferences are not readily documented.

"The patron mentioned that the library staff is well-informed and always available to assist. The library is never overcrowded and staff is always available to assist so the patron does not feel that the library needs to improve or implement more strategies or best practices". Patron 2, Head Office Library.

4.5.3. State of Library Information Systems

The patrons' perceptions of the systems at the libraries and their connected components, such as infrastructure, staff and general resources such as books and other materials, were generally positive. Among the perceptions shared by the patrons, the various systems they utilised were considered well-functioning and enabled access to the latest information resources to meet their research and learning needs. There were no barriers to accessing information, and requests were promptly handled with desired materials that were timeously received. They saw the present design of the system optimally meeting the information requirements of the patrons.

"Is a Senior Medical Officer feels that they are fortunate to have a well-run facility at the hospital which facilitates amenities to accessing latest electronic information. The doctor stated that he requests textbooks and are promptly delivered to him. The doctor mentioned that currently no barriers have been faced in accessing information since the level of service delivery is one of the best functioning units in the hospital".

"No challenges with have been experienced regarding the quality or accuracy of the information provided. No changes in the information needs of the patron have been noticed over time. The patron usually uses the internet and the DOH intranet for information needs". Patron 1, Addington Hospital Academic Library

At Benedictine Library, patrons considered the systems to be optimally operational, providing accurate information with digital interfaces and technologies that provided user-friendly access to information needs upon request. The breadth of digital information provided and

accessed was comprehensive and adequate for the needs of the patrons. Furthermore, the infrastructure was considered sufficient for accessing digital resources, with the technological tools meeting the needs of information and research materials.

"The patron uses the library almost every week and stipulated that the system is user-friendly and is satisfied with the digital information resources provided. The patron has never experienced any challenges with the quality or accuracy of the information provided, and the patron's information needs have not changed over time".

"The patron uses the computers and the internet in the library to access e-books and e-journals, and has never faced challenges or limitations with the technological systems used". Patrons 1, 2; Benedictine Hospital Library

At other libraries and institutions, the patrons believed that the online databases were comprehensive and helpful and manned and managed by efficient staff members who could assist upon request with information access requests. Thus, it can be observed that information requests and access based on technological tools, library staff, and online databases were considered comprehensive and adequately met the needs of the patrons.

"The patron usually requests information once a week without any challenges. The patron finds the online databases helpful, the library staff as well". Patron 1, Charles Johnston Library

"Patron 1 mentioned that they have never experienced challenges or limitations with the technological systems used to access information, and there are no new technologies they would like to be implemented in the library. Patron 1 has interacted with the library staff and acknowledged that they are informative". Patron 1, EMRS College Library

"Patron 4 has not face any challenges regarding the quality or accuracy of the information provided by KZN health libraries, have not noticed any changes in the information needs and has used the internet to access information in the library. Except for the lack of computer skills no challenges and limitations have been faced with the technological systems in accessing information". Patron 4, EMRS College Library

However, challenges were reported at some libraries regarding access to information. As stated earlier, most library patrons pursued a hybrid approach of utilising both online

information resources and manual books housed at libraries and available through in-person visits and borrowings, and some access methods may work more optimally than others. The sub-optimal state of access to information at these other libraries stemmed from limited online information databases, which were not regularly updated and lacked recent information materials required for research. Some technological tools were limited due to the limited availability of supporting infrastructure, such as computers and internet connectivity tools. The challenges with updating information databases, which restricted access to information in line with changing research needs among patrons, were also highlighted among the patrons.

"Patron 3 is happy with the digital information resources provided even though some information resources are outdated for more than 5 to 10 years". Patron 3, EMRS College Library

"The patron uses the library more often as she is currently doing her master's research and there is inadequate availability of books. The patron is often faced with the barrier of in-availability of books that are needed for conducting certain studies. The patron is partially satisfied with the types of digital information resources provided in the library". Patron 1, Harry Gwala College Library

"The doctor is satisfied with the types of digital information resources available and has not experienced any challenges with the quality or accuracy of the information provided. The doctor mentioned that the information needs and requests change over time particularly the journals information as one grows in the career". Patron 1, Inkosi Albert Luthuli Hospital

"The nurse mentioned that she has noticed a change in information needs as she has made fewer and fewer enquiries than before due to lack of time and staffing in her department. On Medi-Tech sometimes the information is not updated, for instance patient information, their diagnosis which is sensitive and critical and may cause confusion and delays. Sometimes there are demographic typos regarding patient's gender (i.e. male or female)". Patron 3, Albert Luthuli Hospital Library.

Notably, patrons accessing the same library can have varying experiences and reports on the state of access to information for research purposes. In this presentation of findings, it can be observed that while Patron 1 from EMRS finds the technology and the databases adequate, it does not seem to be the case with Patron 3, who finds the information outdated and

inadequate to their research or information needs. These differences may be accounted for by differences in digital skills and information requirements, although such differences imply differentiated experiences for those utilising the libraries. They must also be accounted for when changing the tools and platforms for information access.

4.5.4. Digital Information Skills and Implications for Patrons

Most of the patrons in the sample had adequate digital skills to interact with electronic database access tools. However, the breadth of technological tools and digital knowledge does not seem expansive, and opportunities for training and development are open, given the transforming landscape of digital tools in information access, handling, utilisation, and dissemination in research. A patron at the Benedictine Library indicated they did not experience challenges with technological tools for electronic information access and recommended no changes to the existing systems. Another Patron from the Head Office library stated that they did not face any challenges regarding information access using existing technology tools. However, it does seem that where their skills are limited in digital information handling, they have relied on library staff to request specific information needs. A patron from Albert Luthuli Hospital indicated that while they could access the needed information, their skills were inadequate, with low computer literacy levels, relying on library staff and personnel assistance.

"The patron uses the computers to access information and has not faced any challenges or limitations with the technological systems. No new technological systems the patron would like to be implemented in the library to improve information access". Patron 2, Benedictine's Hospital Library

"The patron prefers and typically accesses information in-person and on-line. The patron often requests information weekly and more especially on-line articles. The patron is able to use on-line databases with confidence, no challenges and the library always has current journals". Patron 3, Head Office library

"The patron prefers and typically uses the library in-person and on-line. The patron uses the libraries resources confidently without experiencing staffing, technological glitches, quality and accuracy of information problems. The patron stated that library staff is very helpful and patient". Patron 4, Head Office Library

"The nurse uses the library more often when-ever she is a registered student studying for a course and mentioned that some of her information queries are usually fulfilled. The nurse mentioned that the barrier she usually faces is the one of computer literacy and usually requires more assistance from the library staff but is learning and becoming better". Patron 4, Albert Luthuli Hospital

4.5.5. Lack of Digital Database Skills

There was some evidence that most patrons lacked digital skills,, particularly in accessing and retrieving information from online information databases and portals. This seems to have been exacerbated when they attempted remote database access without the aid of the librarians or personnel. A patron from Charles Johnston Library indicated that they faced challenges with accessing digital information and would greatly benefit from learning digital information access and retrieving tools. The specific nature of the responses differentiating between digital information access and computing skills shows that the participants differentiate between computer literacy and digital skills, the latter of which is concerned with online databases and information handling. Patrons from the EMRS College Campus Library indicated they lacked computing and digital skills, although these inadequacies were compensated by access to digital skills from library staff.

"Patron 2 has a challenge with accessing information digitally but mentions that the library staff are helpful and she is also learning to search information online with their assistance". Patron 2, Charles Johnston Library

"Patron 1 Barriers faced at the library include the lack of computer skills for document processing". Patron 1, EMRS College Campus Library

"Patron 2 experiences lack of internet and computer skills even though the library provides the relevant services. Information needs have not changed over time and have used the intranet, SABINET and internet to access information". Patron 2, EMRS College Campus Library

"Patron 3 does not frequently request information from the library and has faced the barriers of internet and computer skills when using the library". Patron 3, EMRS College Campus Library

"Patron 5 uses the library in an ad-hoc basis as the librarian usually assists. Lack of computer skills is a barrier even though the patron is satisfied with the types of digital information services provided. No changes have been noticed in this patron's information needs and the technological systems that are used are the Intranet and Amlib system". Patron 5, EMRS College Campus Library

"The patrons stated that her information queries are fulfilled timeously depending on their nature. The patron has faced the barrier of computer skills, requires more help when using computers but is gradually learning". Patron 6, Inkosi Albert Luthuli Hospital

The data extracts reveal the need for skills such as digital information access, web scrapping for information, online document processing, internet skills, and research databases such as SABINET and the internet to access information. Librarians at the EMRS College campus can make a difference through training and workshops to equip patrons with computer and digital skills.

4.5.6. Lack of Exposure to Digital Tools and Technology

Generally, the patrons reported some limitations in digital and computer-related skills, implying the challenges discussed above in managing online information access, process, and use in research and learning. However, concerning changes to the technology platforms for digital information access, they recommended no specific changes or adjustments, which does not seem to align with reported challenges in digital information skills. The lack of suggestions does not seem to describe a perfect system. However, it does seem to suggest that given their limited comprehension of digital and computer tools, making suggestions to improve library information access is incomprehensible. The following extracts from participant responses must be understood more in that perspective.

"Patron 1 has never experienced any challenges or limitations in accessing information due to staff issues, but the library has a limited stock, and does not have a suggestion for best practices that have been observed in other libraries that could help to improve". Patron 1, EMRS College Campus

"Patron 2 has never experienced challenges regarding staff issues, does not have any suggestions for strategies to implement to improve service, and has not observed any best

practices from other libraries that can be adopted by this library". Patron 2, EMRS College Campus

"The doctor also mentioned that there are no best practices that have been observed in other libraries that could improve access to information. No best practices have been observed from other libraries that can be adopted to improve access to information". Patron 1, Patron 3; Inkosi Albert Luthuli Hospital

"The patron does not have any ideas regarding ways to improve access to information, and no best practices observed from other libraries that could be adopted to improve services". Patron 1, Addington Hospital Library

"The patron has interacted with the library staff and finds them helpful as they go an extra mile given the circumstances. No best practices have been observed by the patron from other libraries that can be adopted to improve service". Patron 1, Grey's Hospital Library

4.5.7. Need for Infrastructure

The patrons at the libraries highlighted the need for technologies and tools that may improve their experiences when accessing information at the libraries. Several tools were mentioned, including Wi-Fi installations for internet access and improved connectivity, digital information resources such as updated databases and computers, and technological tools.

"The patron would like to see Wi-Fi installations and access to library workshops where staff can be trained on how to search for research materials autonomously, since there are many sectors of the healthcare staff, e.g. nurses (Patron 1)… The patron does not use the library frequently. The patron stated that she is not satisfied with the library digital information resources as they are hard to utilize when the network is always down". Patron 2, Addington Hospital Library

"The patron also uses the on-line library even though sometimes there is a challenge of the connection to the network. The patron interacts well with the library staff as they are helpful and informative". Patron 3, Benedictine Library

"Patron 1 is a lecturer who uses the college campus library and finds the library quite efficient although there are gaps in terms of availability and access to electronic data. The patron has

used the computers and the internet in the library as technological systems and has experienced some technical glitches. Patron would like to see new technologies in the library like; Science Direct, Google Scholar, PubMed, e-books and a free Wi-Fi access". Patron 1, Harry Gwala College Campus

"The patron feels that the library should add more computers in the library because sometimes patrons end up having a limited time for using the computers since they are few"

"The library computers sometimes don't work properly when needed even though the library staff is always there to assist. The patron feels that the library should add more computers since there are only 2 for patrons. The patron also feels that on-line databases need to be promoted more". Patron 1, 2; Head Office Library

The patrons were concerned that lack of tools and limited access to online databases restricted access to information and information processing-related tasks. Slower internet connectivity implies that more time is consumed in attempting to interact with online databases. The limited number of online databases implies that digital information resources are not comprehensive, placing restrictions on the breadth of information access for patrons. These concerns were captured aptly in the responses of an RK Khan Academic Library patron.

"Patron is confident with electronic access to information and does not have challenges except for the network and connection problems due to load-shedding, slow system and faults in computers". Patron 1, RK Khan Library

"Challenges faced involve the internet access, network connection problems in the KZN DOH network and the system tends to be slow most of the time. Computer software not up to date and not compatible with the latest electronic information facilities. The patron would like the library to invest in the library infrastructure, particularly electronic information systems for ease of access to information". Patron 2, RK Khan Library

4.5.8 Recommendations from the Patrons

The library patrons proposed several recommendations, mainly centred around digital information access, training, technology needs and library scheduled access times to accommodate work and school attendance schedules. The patrons highlighted the need for

greater engagement with librarians and other library staff to improve learning and information skills.

"The patron has interacted with library staff especially the librarian whom he acknowledges that the librarian runs the library excellently, paying meticulous detail to all aspects of information provision as well as regularly dispensing information on upcoming events. The patron would like to see greater engagement of the library with staff and encouraging staff and students to participate". Patron 1, Addington Hospital Library

They also recommended investments and improvements in tools that improve digital access and connectivity. They recommended improved intranet and internet access for better access to electronic information. While the patrons were concerned with internet access for accessing online databases, they were concerned with restrictions in the current design of the library information system, which virtually made remote database and information access impossible. At one of the libraries, the patron requested that the OPAC system for remote access to information be improved and made accessible.

"The patron would like the intra/internet connectivity to be improved for more access to online information". Patron 2, Addington Hospital Library

"The patron would like to see the library allowing remote access to the library digital information resources for convenience. The patron would like the library to offer access to OPAC remotely so that patrons can have access at their most convenient time". Patron 3, Addington Hospital Library

Other patrons recommended increasing the number of accessible online databases and strengthening technical services. Concerning technical services, they highlighted investment in more computer programs compatible with available online resources. Such investments are designed to address network challenges and glitches that hamper online information access, such as connection and network problems.

"The patron would like the number of online databases to be increased for a wide coverage and would like the technical services to be strengthened". Patron 1, Charles Johnston Library

“She would like the library to invest more on computer programs compatible with the available online resources as currently there are glitches when it comes to online access to information, i.e. connection problems and network problems”. Patron 2, Charles Johnston Library

“The patron would love to access information electronically on their own if they can be trained although they also have time constraint, time not allowing to attend the library physically most of the time. Patron also would appreciate remote access to the library services”. Patron 3, Charles Johnston Library

While some technology at the libraries, such as better Wi-Fi networks or an increase in the number of available computers, can improve patron's experiences in information access, remote access will not be improved by addressing library-related technology or connectivity requirements. Furthermore, remote access challenges addressed by patrons seem to be linked to access-related issues such as database login or authentication. These issues may reflect the needs for training and equipping patrons on the workings of the technological and information access tools used at the libraries.

“Patron 5 has faced internet network problems in the library, would like the internet network coverage to be improved, and more books to be available in the library. Patron feels that the network coverage needs to be improved and the user’s needs must to be understood better”. Patron 5, EMRS College Campus

“However the patron would like to some software programs to be installed (i.e. MS Word, Excel), and SABINET database. Patron feels that library users need to be trained more on digital information services and that the library lacks audio visual equipment”. Patron 6, EMRS College Campus

Another patron recommended that expanding information databases at the librarians was necessitated by external factors such as changes in health challenges and disease profiles, which require more and increasingly recent data.

“Due to vast changes occurring in the health system in terms of disease profiles and patients’ needs, there seems to be a huge need for more data sources and information in order to enhance understanding”. Patron 1, Harry Gwala College

The patrons also recommended revising library operating schedules to accommodate their different work schedules. The call for more extended library opening hours is connected with the need for more training and equipping with digital information access skills or the use of digital services and other software for referencing research materials, such as EndNote or AI tools, to improve patron productivity at the library.

"The doctor feels that if the library opening hours can be increased to 8pm, it will improve access to information". Patron 1, Inkosi Albert Luthuli Hospital

"The doctor would like the library to have more training sessions especially when new doctors join so they can learn how to access information online and use the digital services. Online video tutorial on YouTube showing staff how to access the online content would help". Patron 2, Inkosi Albert Luthuli Hospital

"The patron would like the library opening hours to be extended for them to have more access. The patron would also like the library to have EndNote software to help with referencing and organizing information when doing research". Patron 6, Inkosi Albert Luthuli Hospital

"The patron suggested that artificial intelligence (AI) should be adopted by the library for more access to online content". Patron 6, Inkosi Albert Luthuli Hospital

The recommendations by the patrons reveal the dynamic nature of information access at the libraries. Access is not restricted to information provision; however, access to information is limited to the technological system and other access parameters, including the skills and dynamics of the patrons themselves. The complex intersections of these issues reveal the complex role that librarians and library staff occupy in mediating information access and interacting with library patrons.

4.6. Document Analysis Findings

The source documents analysed in this research study, the findings of which are reported in this section, are the National Health Act of 2003, the Promotion of Access to Information Act (PAIA) of 2000, and the National Digital Health Strategy of 2019/2024. These documents define access to health information and its provision through various institutionalised structures, including health libraries operated by the Department of Health at various hospitals

and academic institutions in KwaZulu Natal. These documents provide a framework for understanding the regulatory and strategic environment within which these libraries function. The insights from an analysis of these are presented here as a framework within which the activities of librarians and the experiences of the patrons at the librarians are perceived from the perspective of the provisions contained in these source materials.

4.6.1. The National Health Act of 2003

The analysis of the National Health Act of 2003 revealed that no direct provisions were made in the policy document concerning access to general health information. However, the central concern of the policy was patient empowerment through ensuring patient access to their medical records. The policy was designed to balance a patient's right to know and their right to privacy. Furthermore, the act relies on legislation such as the Promotion of Access to Information Act to handle information requests. Concerning the provision of information, the National Health Act of 2003 Chapter 9 covers national health research and information. It makes provision for institutionalization of access to information directed at improving disease and medical practice research. The Act makes provision for coordination of the national health information system to ensure the provision of information to healthcare practitioners and researchers.

"*The National Department must facilitate and coordinate the establishment, implementation and maintenance by provincial departments, district councils, municipalities and the private health sector of health information systems at National, provincial and local levels to create a comprehensive national health information system"*. NHA 2003, Chapter 9, Subsection 74(1)

This provision communicates the design of a centralized health information system which integrates provincial and local health records. Furthermore, provision was made for the nature of the information to be submitted to this database, as well as the designated personnel for data curation for submission to the national department.

"The minister may for the purpose of creating, maintaining or adapting databases within the National Health information system contemplated in subsection (1), prescribe categories or kinds of data for submission and collection and the manner or format in which and by whom the data must be compiled or collated and must be submitted to the National Health Department". NHA 2003, Chapter 9, Subsection 74(2)

The Act furthermore made provisions for maintaining a health information system at the provincial and local levels. At the provincial level, through various institutions, establish, maintain, facilitate and implement the health information systems at the provincial and local levels.

"The relevant member of the Executive council must establish a committee for his or her province to establish, maintain, facilitate and implement the health information system contemplated in section 74 at the provincial and local level". NHA 2003, Chapter 9, Subsection 75

"Every district health council and every municipality which provides a health service must establish and maintain a health information system as part of the National Health information system contemplated in section 74". NHA 2003, Chapter 9, Subsection 76

These provisions for a national, provincial and local health information system were designed to enable comprehensive access to information for diverse health care practitioners and, importantly, for research purposes. Chapter 2, subsections (12-15) made provision for the duty to disseminate information and enable access to health records, which, according to subsection 16(b), for research, study, and teaching through the agency of authorized personnel managing access to the information. This implies the role of health librarians to curate, prepare and manage access to such information, thus interacting primarily with the health records database and ensuring the provision of information.

"The person in charge of a health establishment in possession of a user's health records must set up control measures to prevent unauthorized access to those records and to the storage facility in which or system by which the records are kept". NHA 2003, Chapter 2, Subsection 17(1).

Thus, the National Health Act of 2003 established a comprehensive health information database at the local, provincial and national levels, coordinated by dedicated personnel to enable curation and access primarily to health and medical records for various purposes, including study and research.

4.6.2 Promotion of Access to Information Act (PAIA) of 2000

The Promotion of Access to Information Act of 2000 provides regulations governing access to information for various applications, including information for research and practice. The Act's definition of the Information Officer, or a person designated with the sole role of managing information resources and implementing defined parameters of curation, access and provision, is relevant to the present enquiry. While the Act describes and defines comprehensive access to information, it also emphasises authorised access to information and protection from misuse in whatever form the information may be provided. Essentially, the Act defines regulations governing the provision and access of information.

"The objects of this act are (a) to give effect to the constitutional right of access to (i) any information held by the state, and (ii) any information that is held by another person and that is required for the exercise of the protection of any rights. To give effect to that right, (i) subject to justifiable limitations including but not limited to, limitations aimed at the reasonable protection of privacy, commercial confidentiality and effective, efficient and good governance and, (ii) in a manner which balances that right with any other rights, including the rights into the Bill of Rights in Chapter 2 of the Constitution". PAIA Chapter 3, Subsection (9).

The information officer plays a central role in mediating access to information within these specified parameters. The information officer plays the role of guardian to the information portal, which is defined in the act as a public information body.

"In deciding whether to delegate a power or duty in terms of subsection (3), the information officer must give due consideration to the need to render the public body accessible as reasonably possible for requesters of its records". PAIA Chapter (3), Subsection 17(4).

Under the PAIA, KZN DOH libraries are recognised as repositories of health information and active facilitators of information accessibility. This role is crucial in healthcare, where access to accurate and timely information can have significant implications for patient care, research, and policy-making. The Act supports transparency in healthcare services and research, underscoring the libraries' responsibility to ensure that health professionals, researchers, and the public can easily access the health information they need. Compliance with PAIA for KZN DOH libraries goes beyond merely making information available. It involves ensuring that the processes for obtaining information are streamlined, efficient, and user-friendly. This means

that libraries must develop systems and practices that enable patrons to easily navigate their collections and find the information they require without unnecessary barriers. For instance, libraries must ensure that their cataloguing and indexing systems are intuitive and that their digital platforms are accessible and easy to use.

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“(1) For the purposes of this Act, each public body must, subject to legislation governing the employment of personnel of the public body concerned, designate such number of persons as deputy information officers as are necessary to render the public body as accessible as reasonably possible for requesters of its records”.

Moreover, compliance with PAIA means that KZN DOH libraries must continually evaluate and update their information holdings to ensure they are relevant and current. This involves maintaining a comprehensive collection of health resources and keeping abreast of the latest healthcare and information technology developments. It also means proactively identifying and acquiring new resources that will meet the evolving needs of their patrons. Furthermore, the Act emphasises the need for transparency in information provision processes. This requires libraries to be clear and upfront about their information access policies, including any limitations or restrictions on access. It also means being responsive to information requests and assisting patrons navigate the information retrieval process.

4.6.3. National Health Strategy of South Africa 2019 – 2024

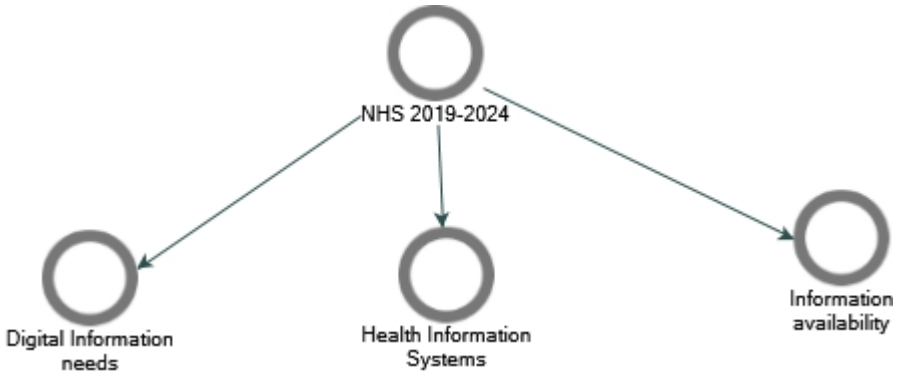

Figure 4.6: The National Health Strategy

An analysis of the National Health Strategy of South Africa for 2019 to 2024 relating to the present study revealed three key facets, as summarised in the chart above: digital information needs, health information systems and information availability. The concept of digital information needs from an analysis of South Africa's NHS is premised on developing a knowledge hub described as a central electronic interface to promote easy access to information and relevant professional development opportunities. This envisioned electronic information hub is designed to access research data and learning and development materials for health needs.

"Digital learning, also known as eLearning, offers promise; and early modules have been developed focusing on data quality, DHIS and the NIDS. Guidelines have been developed on eLearning courses and administration of an eLearning hub but there are still a number of challenges that need to be overcome".

*"The National Department of Health has developed the knowledge Hub, which is a central, electronic interface that promotes easy access to relevant professional development opportunities. The knowledge Hub is supported by an open-access learner management system and e-library, piloted in June 2017" (*NDHS, 2019-2024: 23).

The roadmap envisioned in the NDHS for South Africa includes developing and maintaining an electronic health record for South Africa that integrates existing solutions on a common platform and integrates digital skills in a digital ecosystem for sustaining evidence-based clinical decisions.

"Establish a roadmap for achieving an electronic health record for South Africa, which integrates existing solutions on a common platform, prioritises functionality that will enhance service delivery and continuity of care, while addressing known risks".

*"Establish a data science capability to secure technologies such as big data, AI and predictive analytics for enhanced benefits of the digital health ecosystem, particularly more sustainable health systems approaches and evidence-based clinical decisions". (*NDHS, 2019-2024: 24).

Concerning digital information needs, the strategy views connectivity as the central infrastructure for digital health, platforming health delivery, eLearning, electronic health records and information access, and designing a health network across relevant government departments. This goal can be seen to be in alignment with the health information systems database envisioned under the auspices of the National Health Act of 2003. This strategy is a call to action for KZN DOH libraries to integrate and embrace digital technologies comprehensively. The strategy's emphasis on leveraging technology for better health outcomes aligns seamlessly with the libraries' mission to provide timely and accurate health information. This alignment necessitates a significant adaptation by the libraries in terms of their service offerings and infrastructure. A key aspect of this strategy is the focus on establishing integrated information architecture and robust network infrastructure. For the libraries, this means developing and maintaining information systems that are not only comprehensive but also interoperable and user-friendly. The goal is to create a seamless digital environment where health professionals, students, and researchers can easily access and utilise a wide array of health information resources.

"Connectivity is a prerequisite for digital health and many other social developmental initiatives. Connectivity will therefore be addressed as a national imperative, with a definitive, sustainable solution, at scale, across the entire government".

"Adequate bandwidth provides opportunities for sharing connectivity with employees and clients, via free Wi-Fi and other methods, which will be transformative and support citizens to

*embrace the opportunities of the fourth industrial revolution. Establish a health network to provide digital health broadband connectivity, in conjunction with the relevant government departments" (*NDHS, 2019-2024: 26).

The strategy's emphasis on electronic health (e-health) and mobile health (m-health) information services is particularly relevant for KZN DOH libraries. This involves expanding the libraries' digital offerings to include a variety of e-health resources, such as digital databases, online journals, and e-books that cater to the evolving needs of the healthcare community. In addition, promoting m-health resources aligns with the increasing use of mobile technology in healthcare. Libraries are thus encouraged to develop mobile-friendly platforms and applications that allow users to access health information on the go, catering to the needs of a mobile and technologically adept user base. The implementation of this digital strategy also implies that KZN DOH libraries need to ensure their digital platforms are user-friendly and accessible.

This includes designing intuitive user interfaces, providing adequate search functionalities, and ensuring that digital resources are easily navigable. Such user-friendly designs are essential to encourage the wider adoption and use of digital resources among all library patrons, regardless of their level of digital proficiency.

*"Another significant mHealth application is the Stock Visibility System (SVS) implemented in clinics and hospitals as an electronic stock management system. The system is designed to increase access to accurate, timeous medicine availability information from health facilities. For the new strategy, there is a need to consolidate and rationalise mHealth investments and scale up initiatives with the greatest potential impact. Previously mHealth and eHealth were separate strategies, but they have now been integrated into one digital health strategy" (*NDHS, 2019-2024: 36).

Moreover, the National Digital Health Strategy's focus on digital transformation extends to the need for libraries to participate actively in the broader digital health ecosystem. This involves collaborating with other health information providers, participating in digital health networks, and contributing to developing shared digital health resources. Such participation enhances the libraries' service offerings and positions them as integral players in the national health information landscape.

4.7 Chapter Summary

The preceding section focused on information provision access and utilization through analysis of source documents, librarian interviews, and library patrons-focused group discussion. The document analysis defined the Department of Health's commitment to build a digital health information database collating national, provincial and local health information and data. The study considers three primary sources: The National Health Act of 2003, the Promotion of Access to Information Act (PAIA) of 2000, and the National Digital Health Strategy of South Africa 2019-2024. The National Health Act establishes a framework for a comprehensive health information system with provincial and local databases. Librarians play a role in curating and managing access to this information. The PAIA emphasizes authorized access to information and outlines regulations for information provision. KZN DOH libraries must ensure their information access processes are user-friendly and efficient. The National Digital Health Strategy calls for developing an electronic health record system and highlights the importance of digital literacy and information access for healthcare workers. Libraries need to adapt and integrate digital technologies to meet these evolving needs.

The roles of librarians are described as delegated information officer roles comprised of curating, policing and defining the parameters for access and utilisation of health information systems databases based on user requests. In the analysis of the librarians' data, it was observed that similar roles were accomplished in their roles in mediating procurement of library materials, maintaining and managing access to manual and digital forms of information. Librarians face internet connectivity issues, database access restrictions, lack of user-friendly digital platforms, infrastructure limitations, and staff shortages. The focused group discussion data analysis showed that access to information was multifaceted and that several issues were connected with patron access to information and data. The recommendations proposed by the patrons showed that requests received by librarians were multifaceted and complex, showing the complex roles that librarians fulfil in mediating information access at the various health libraries at the KZN Department of Health. In the next section, the results are discussed, and the study is concluded.

CHAPTER 5: DISCUSSION AND INTERPRETATION OF THE FINDINGS

5.1 Introduction

This chapter delves into a comprehensive discussion of the Kwa Zulu Natal Department of Health (KZN DOH) library study findings. The aim is to synthesize and interpret the rich data obtained from librarian interviews, focus group discussions, and document analysis. This discussion is structured around the key research objectives of the study, which include determining the state of access to information, identifying challenges in accessing digital information, establishing the systems and technologies used for information provision, understanding the role of library staff in facilitating access to electronic information and recommending strategies for optimizing the use of digital information services. Each of these objectives offers a unique lens through which the KZN DOH libraries' current state, challenges, and opportunities are examined and understood. The insights drawn from this discussion are instrumental in painting a holistic picture of the libraries' operation in the digital era, highlighting their successes and improvement areas.

5.2 Determine the State of Access to Information by Staff Members in KZN DoH Libraries

One of the primary findings is that KZN DOH libraries offer a rich and diverse array of information resources, including print materials like books and journals and digital resources like e-books, e-journals, and databases (Banks, 2017). This diversity is crucial in catering to the varied information needs of healthcare staff, ranging from clinical information to research and academic materials (Banks, 2017). However, while the availability of these resources is a positive indicator, the findings also revealed challenges that impact access to these materials. A significant challenge affecting access to information is the varying levels of digital literacy among staff members. The increasing shift towards digital resources in libraries necessitates adequate digital literacy skills among users. However, as revealed in the focus group discussions, a notable portion of staff members lack these essential skills, thus hindering their ability to utilise digital library resources fully.

This gap underscores the need for targeted digital literacy training and support programs, which some libraries have begun implementing. Network problems, often exacerbated by load shedding, emerged as a significant obstacle in accessing digital resources. These technical

issues disrupt not only the continuity of digital services but also the reliability of online access to information. Such disruptions can have significant implications in a healthcare environment where timely access to accurate information is crucial. Budget constraints are another critical factor impacting access to information (Ashikuzzaman, 2023). Limited budgets affect the acquisition of new resources, maintenance of current subscriptions, and the ability to invest in new technologies. This financial limitation directly impacts the range and currency of resources available to staff members, potentially hindering their access to the latest information in their field.

The hours of operation of the libraries also play a role in access to information. Many staff members have expressed the need for extended library hours, including after-hours and weekend availability, to accommodate their schedules better. This need is particularly acute among healthcare professionals who often work long and irregular hours. The users highly value the role of library staff in facilitating access to information. Library staff members' knowledge, helpfulness, and availability significantly enhance the user experience. However, staff being occupied with other duties has led to delays in receiving assistance, indicating a need for adequate staffing levels and possibly more streamlined processes. The users consistently highlighted the desire for more extensive and current digital collections. This includes access to the latest editions of e-books and a broader range of databases.

Additionally, infrastructure improvements, such as better internet connectivity and more computers, were suggested to improve access to digital resources. Finally, the implications of national health policies and strategies, particularly the National Health Act of 2003 and the National Digital Health Strategy of South Africa 2019-2024, emphasise the need for libraries to align their services with broader health objectives and embrace digital transformation (Tshuma, 2015). This alignment is crucial for ensuring that library services are relevant and contribute effectively to the healthcare system.

5.3 Identify Challenges Encountered by KZN Health Staff Members in Accessing Information Digitally

Identifying the challenges KZN Health staff members encounter in accessing information digitally is crucial for understanding the gaps in library services and formulating strategies to address these issues. The data from the librarian interviews, focus group discussions, and

document analysis reveal several key challenges that impede effective digital access to information (Tsai et al., 2020). A primary challenge identified is the staff's varying levels of digital literacy. The reliance on digital resources in libraries necessitates a certain level of proficiency in using these technologies. However, it became evident from the focus group discussions that many staff members lack these essential digital skills (Tshuma, 2015). This gap in digital literacy is a substantial barrier, preventing staff from fully utilising online resources such as e-journals, databases, and digital libraries. The need for training and support in this area is thus pronounced, with some libraries initiating programs to enhance these skills among their users.

Another significant hurdle is the prevalence of network and technological issues. Patrons frequently mentioned difficulties related to internet connectivity, which hampers their access to online resources. These problems are often compounded by load shedding, leading to disruptions in digital services. Such interruptions are particularly challenging in a healthcare setting where access to up-to-date information can be critical. These technical challenges affect the continuity of services and the reliability and speed at which data can be accessed. Budget constraints also emerged as a vital factor impacting digital access to information. Limited financial resources hinder the libraries' ability to acquire new digital resources, maintain current subscriptions, and invest in updated technology (Agboke, 2019). This issue directly affects the range and quality of digital resources available to staff, potentially limiting their access to the most current and relevant information in their respective fields.

The operational hours of the libraries are also a concern, especially for healthcare professionals who often work long or irregular hours. Many staff members expressed a need for extended library hours, including after-hours and weekend availability, to better fit their schedules. This need for more flexible access to library resources is crucial for ensuring that staff can utilise them when they are most needed. In addition, the role of library staff in facilitating access to digital information is pivotal. While staff members are generally appreciated for their knowledge and assistance, there are instances where they are occupied with other duties, leading to delays or challenges in providing support. This situation highlights the need for adequate staffing and possibly more efficient processes to ensure timely assistance. Furthermore, the staff consistently voiced the desire for an expansion of digital collections.

There is an apparent demand for more current e-books, journals, and access to a broader range of databases. Such an expansion would enable staff to access more up-to-date information relevant to their work and professional development. Infrastructure improvements were also suggested to enhance digital access. Better internet connectivity, an increase in the number of computers available, and the introduction of self-service stations were among the improvements proposed by patrons to facilitate more accessible and reliable access to digital resources. Lastly, the challenges identified align with the broader context set by national health policies and strategies, such as the National Health Act and Digital Health Strategy. These documents underscore the need for KZN DOH libraries to adapt their services and infrastructure to effectively support the healthcare system's digital needs.

5.4 Establishing the Systems or Technologies Used for the Provision of Access to Information

Establishing the systems or technologies used to provide access to information in KZN Health libraries is integral to understanding how these libraries function in the digital era. The collected data from librarian interviews and focus group discussions offers insights into the technological landscape of these libraries. Various systems and technologies facilitate access to information, each playing a crucial role in the libraries' operations and services. The core of these systems is the integrated library systems (ILS), such as Amlib, used for managing library resources. These systems are essential for cataloguing, classification, borrowing, and returning library materials. They provide a structured and efficient way of organising the vast information resources available in the libraries, making it easier for staff and patrons to locate and access them.

Implementing such systems represents a significant advancement from traditional methods of library management, offering a more streamlined and user-friendly approach to resource management. However, it's noteworthy that some patrons have reported these systems to be occasionally slow, indicating a need for ongoing updates and maintenance to ensure optimal performance. In addition to ILS, the libraries utilise a variety of digital platforms and databases. These include renowned medical and health databases like Medscape, Up-to-date, Health Premium Collection, Proquest and SABINET, and broader academic databases that provide access to various journals and books. These digital resources are crucial in the

current information landscape, where access to up-to-date research and data is essential for healthcare professionals and researchers.

The availability of these resources online also means that patrons can access them remotely, which is particularly beneficial for those who cannot regularly visit the library in person. This remote access, however, is contingent on reliable internet connectivity, which, as identified in the focus groups, can be a significant issue. Network problems and load shedding frequently disrupt access to these digital platforms, highlighting the need for robust and reliable library IT infrastructure. Mobile technology is also becoming increasingly important in the libraries' technological ecosystem. With the growing prevalence of smartphones and tablets, mobile applications and platforms are becoming a popular means of accessing information. These mobile solutions offer the convenience of accessing information anywhere and anytime, aligning with the modern user's needs and preferences.

This trend aligns with the broader push towards mobile health (m-health) services, as outlined in the National Digital Health Strategy of South Africa 2019-2024. The libraries also place a strong emphasis on user-friendly interfaces and systems. The ease of use of their platforms and technologies ensures patrons can efficiently navigate and utilise the available resources. This aspect is essential, given patrons' varying levels of digital literacy. User-friendly systems help bridge the gap for those who may not be as comfortable with complex digital interfaces, promoting inclusivity and accessibility.

5.5 Determine the Role of Library Staff in Facilitating Access to Electronic Information

Determining the role of library staff in facilitating access to electronic information is crucial to understanding the functionality and effectiveness of Kwa Zulu Natal Department of Health (KZN DOH) libraries in the digital age. The insights gathered from librarian interviews and focus group discussions shed light on the multifaceted roles that library staff play in enhancing the digital experience of their patrons. Library staff is instrumental in guiding and assisting patrons in navigating the diverse electronic resources available. Their role extends beyond traditional librarian duties to encompass digital facilitation and support aspects. In the current landscape, where digital resources such as e-journals, databases, and e-books have become integral to healthcare research and education, library staff is often the primary point of contact for patrons seeking assistance accessing these resources.

Their expertise in the digital domain is invaluable, particularly for patrons who are less familiar with the online environment or may face challenges in using digital platforms effectively. For instance, staff members assist in troubleshooting access issues, guiding patrons in database searches, and providing instructions on using various electronic resources. Moreover, the role of library staff has evolved to include training and education in digital literacy. Recognizing the challenges some patrons face in using digital resources, many libraries have initiated training programs to enhance the digital skills of their users. These programs, often led by library staff, cover essential skills such as effective online searching, accessing electronic journals and databases, and using e-books and other digital materials. Such training is crucial in empowering patrons to independently access and utilise digital information.

Additionally, library staff plays a crucial role in maintaining and updating the library's digital platforms and systems. This involves ensuring that the electronic resources are current, accessible, and relevant to the needs of the healthcare community. They are involved in curating the digital collection, ensuring that the latest and most pertinent resources are available to patrons. In this capacity, they often liaise with digital content providers, manage subscriptions, and stay abreast of new developments in the field of health information. The staff also contributes to making the library's digital resources more user-friendly. They provide feedback and suggestions to improve the library's online interfaces based on their interactions with patrons and their understanding of user needs. This aspect of their role is essential in ensuring that digital resources are accessible to all patrons, regardless of their level of technological expertise.

Furthermore, library staff often engages in outreach activities to promote the use of digital resources. These activities include email communications, creating online guides and tutorials, and organizing informational sessions or workshops. Such initiatives are essential in raising awareness among patrons about the available digital resources and how to access them effectively.

5.6. Recommend the Strategy for Optimising the use of Digital Information Services in KZN DOH Libraries

Recommending a strategy for optimising the use of digital information services in KZN DOH libraries involves a comprehensive approach that addresses the various challenges identified

and leverages the strengths of the existing library system. The insights from librarian interviews, focus group discussions, and document analysis suggest a multifaceted strategy that includes enhancing digital infrastructure, improving digital literacy, expanding digital collections, and fostering collaboration and integration. Firstly, enhancing the digital infrastructure is crucial. This involves investing in reliable and high-speed internet connectivity to overcome the network issues frequently experienced by patrons. Improving the technological infrastructure also includes updating and maintaining the integrated library systems (ILS) to ensure they are efficient, user-friendly, and capable of handling the growing demand for digital resources.

Additionally, incorporating more computers and self-service stations in the libraries can facilitate more accessible access to digital resources and streamline borrowing. Improving digital literacy among staff and patrons is another critical strategy component. Libraries should implement regular training programs and workshops to develop skills for effectively using digital resources. These programs can cover various aspects, such as navigating online databases, effective search strategies, and utilizing e-books and e-journals. Tailoring these programs to cater to different skill levels will ensure that all users, from novices to more experienced patrons, can benefit. Moreover, creating online tutorials and guides that patrons can access remotely would further support self-directed learning in digital literacy. Expanding the digital collections to include a broader range of up-to-date resources is essential for meeting the diverse information needs of the healthcare community.

This involves increasing the number of e-books, e-journals, and databases available and ensuring that these resources are current and relevant to the latest developments in healthcare. Libraries should actively seek feedback from patrons to identify gaps in the collection and prioritize acquisitions accordingly. Additionally, providing access to a broader range of specialized databases and online platforms can enhance research and learning opportunities for healthcare professionals and students. Fostering collaboration and integration within the healthcare information ecosystem is also vital. Libraries should work towards building partnerships with other health information providers, both within and outside the KZN DOH, to facilitate resource sharing and exchange of best practices.

Collaborating on digital projects, such as developing shared digital repositories or platforms, can enhance access to a broader array of resources and foster a more integrated approach to

health information services. Embracing innovative technologies can play a significant role in optimizing digital information services. This includes exploring mobile technologies, artificial intelligence, and other emerging digital tools to enhance the accessibility and functionality of digital library services. For instance, developing mobile applications for accessing library resources can cater to the needs of users who rely heavily on mobile devices. Lastly, continuous evaluation and adaptation are necessary to ensure the long-term effectiveness of the strategy. Libraries should regularly assess their digital services' usage, user satisfaction, and impact and be open to adjusting based on changing needs and technological advancements.

5.7. Chapter Summary

Discussing the findings from the KZN DOH libraries provides valuable insights into the multifaceted nature of library services in South Africa's healthcare context. It is evident that while these libraries are rich in resources and committed to serving the information needs of the health community, they face a range of challenges that need strategic attention. From the varying levels of digital literacy among patrons to the technical and infrastructural hurdles, these challenges impact the effective utilization of library services. The role of library staff emerges as a cornerstone in facilitating access to electronic information, demonstrating the critical importance of their skills and expertise in the digital domain. Furthermore, the analysis underlines the need for libraries to evolve continually, embracing digital transformations and adopting collaborative approaches to meet the demands of a dynamic healthcare environment.

The recommendations for optimising digital information services offer a roadmap for KZN DOH libraries to enhance their capabilities and services. The libraries can significantly improve their offerings by addressing these key areas - enhancing digital infrastructure, improving digital literacy, expanding digital collections, and fostering collaboration. This benefits the health professionals, researchers, and students they serve and contributes to the broader goal of improving healthcare through informed evidence-based practices. The findings and discussions from this study thus provide a foundation for ongoing development and innovation in the KZN DOH library services, ensuring they remain vital resources in South Africa's healthcare landscape.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter encapsulates the essential findings and insights from the comprehensive study conducted on the Kwa Zulu Natal Department of Health (KZN DOH) libraries. It serves as a culmination of the research, drawing together the various strands of data and analysis to present a coherent picture of the current state of these libraries. The aim is to synthesize the study's findings into actionable recommendations, providing a clear path forward for enhancing library services within the KZN DOH. These recommendations are tailored to address the specific challenges and opportunities identified during the research to optimize the role of libraries in supporting healthcare professionals, researchers, and students. The overarching goal of this chapter is not only to conclude the study but also to chart a course for future developments and improvements in the services provided by KZN DOH libraries.

6.2 Limitations

- One of the primary limitations was the geographic and institutional scope of the study. The focus on KZN DOH libraries meant that the findings might not universally apply to other regions or types of libraries, particularly those outside the healthcare domain or in vastly different socio-economic settings. This limitation could affect the generalizability of the study's conclusions, as the challenges and strategies identified may be unique to the specific context of KZN DOH libraries.
- Another limitation was the reliance on qualitative methods, specifically interviews and focus groups, for data collection. While these methods provided in-depth insights, they might also have introduced biases. The perspectives and experiences shared by participants could be influenced by their perceptions, potentially leading to subjective interpretations of the library services and their effectiveness. Furthermore, selecting participants for interviews and focus groups might not have captured the full range of experiences and opinions among all library users, particularly those who might be less engaged or have differing views.
- The study also faced limitations in terms of the diversity of participants. While efforts were made to include a range of voices, certain groups of users or staff members may have been underrepresented. For example, the views of infrequent library users or those who primarily access services digitally may not have been adequately captured. This limitation

could affect the comprehensiveness of the findings, especially concerning understanding the needs and challenges of less active or remote users.

- Technological limitations also played a role. The study's insights into the digital capabilities of the libraries were based on the current state of technology and digital resources. Rapid advancements in digital technologies and online resources could mean some findings become quickly outdated. Additionally, the study's exploration of digital access and literacy issues might not have fully captured the complexities of digital divides and varying levels of technological infrastructure across different facilities.
- Finally, budgetary and time constraints inherent in any research project also pose limitations. These constraints might have impacted the depth and breadth of the study, particularly in terms of the number of libraries and participants that could be included. A broader study with more extensive resources could explore additional aspects, such as longitudinal changes in library services or comparative analyses with non-healthcare libraries.

6.3. Recommendations

The recommendations derived from the study on Kwa Zulu Natal Department of Health (KZN DOH) libraries are aimed at enhancing the effectiveness and accessibility of their services. These recommendations address the challenges identified and leverage the current strengths of the libraries to optimize their role in supporting healthcare professionals, researchers and students.

- Enhance Digital Infrastructure: A critical recommendation is to upgrade and maintain robust digital infrastructure. This involves investing in high-speed, reliable internet connectivity to overcome network issues, a frequent barrier to accessing digital resources. Updating and maintaining the integrated library systems (ILS) are essential to ensure they are efficient and user-friendly. Additionally, increasing the number of computers and installing self-service stations can facilitate more accessible access to digital resources and streamline the borrowing process.
- Improve Digital Literacy: Given the varying levels of digital literacy among staff and patrons, libraries should implement regular training programs and workshops. These should cover essential skills such as effective online searching, accessing electronic journals and databases, and utilizing e-books and other digital materials. Tailoring these programs to

different skill levels will benefit all users. Online tutorials and guides for remote access would support self-directed learning in digital literacy.

- Expand Digital Collections: Expanding and updating digital collections is vital. This includes increasing the number of e-books, e-journals, and databases and ensuring they are current and relevant to the latest healthcare developments. Libraries should actively seek feedback from patrons to identify collection gaps and prioritize acquisitions accordingly. Access to a broader range of specialized databases and online platforms can enhance research and learning opportunities.
- Foster Collaboration and Integration: Libraries should build partnerships with other health information providers and participate in digital health networks. Collaborating on digital projects, such as developing shared digital repositories or platforms, can enhance access to a wider array of resources and foster a more integrated approach to health information services.
- Embrace Innovative Technologies: Incorporating innovative technologies like mobile applications and platforms is key. These solutions cater to users who rely heavily on mobile devices, offering the convenience of accessing information from anywhere. Libraries should also explore emerging digital tools like artificial intelligence to enhance the accessibility and functionality of their services.
- Continuous Evaluation and Adaptation: Regular assessment of digital services' usage, user satisfaction, and impact is crucial. Libraries should be open to adjusting based on changing needs and technological advancements to ensure the long-term effectiveness of their digital services.
- Enhance User Experience: Focus on improving the user experience of digital platforms. This includes designing intuitive user interfaces, providing adequate search functionalities, and ensuring that digital resources are easily navigable for all patrons.
- Outreach and Awareness Programs: Libraries should conduct outreach activities to promote the use of digital resources. These can include informational sessions, workshops, and creating online guides and tutorials. It is crucial to raise awareness about available digital resources and how to access them effectively.
- Address Staffing Needs: Ensure adequate staffing levels to provide timely assistance to patrons. This may involve hiring additional staff or training existing staff to manage multiple

roles efficiently. Staff development programs focusing on the latest trends in library science and digital technologies can enhance their capabilities in serving patrons effectively.

- Incorporate User Feedback in Decision Making: Regularly solicit and incorporate user feedback into library operations. This can include conducting surveys, setting up suggestion boxes, and engaging in dialogues with patrons to better understand their needs and preferences. This feedback is vital for guiding library policies, resource acquisitions, and service improvements.
- Promote Equitable Access: Work towards ensuring equitable access to all patrons, including those with limited technology or specific needs. This involves providing resources in various formats and catering to different language preferences, ensuring inclusivity in service provision.
- Develop Comprehensive Policies: Establish clear and comprehensive policies regarding access to digital resources, user privacy, and data security. These policies should align with national health information guidelines and international best practices.
- Strengthen Community Ties: Libraries should strengthen ties with the broader healthcare community, including hospitals, research institutions, and educational facilities. This can enhance the relevance of library services and ensure they are attuned to the evolving needs of the healthcare sector.

6.4 Future Studies

The study on Kwa Zulu Natal Department of Health (KZN DOH) libraries opens avenues for future research endeavours to extend and enrich the understanding of library services within healthcare settings. A comparative analysis across different regions and healthcare systems is one area ripe for exploration. Such studies could shed light on how regional variations and diverse healthcare infrastructures influence the functioning and effectiveness of library services. Another promising direction for future research is the undertaking of longitudinal studies. These studies would track the evolution of library services over time, especially in the context of rapid digital transformation. They would provide invaluable insights into the long-term effectiveness of strategies implemented by libraries to adapt to changing information needs and technological advancements.

Assessing the impact of digital literacy programs introduced in libraries is also an area that merits attention. Investigating the outcomes of these programs would offer a deeper understanding of their effectiveness in enhancing user engagement with digital resources and, in turn, the overall utility of the libraries. Moreover, conducting detailed studies on user behaviour, particularly regarding digital resource utilisation, could provide crucial data to guide more user-centric development of library services. Such studies would delve into user preferences, challenges, and patterns in accessing and using digital information, contributing to more tailored and effective library services. Exploring the adoption of emerging technologies, such as artificial intelligence, in library services and assessing their impact on user experience and service delivery could offer insights into potential future directions for library technology integration. Post-intervention barrier analysis is another significant area of study.

Research assessing the barriers to information access after implementing recommended strategies would help evaluate their success and identify areas that require further improvement or new approaches. Conducting a cost-benefit analysis of expanding digital services in libraries could yield valuable information on such initiatives' financial aspects and return on investment. This analysis would be particularly beneficial for policy-making and strategic planning in library services. Lastly, investigating the effectiveness of collaborative models and partnerships between libraries and other healthcare entities could provide a comprehensive view of such collaborative approaches' potential benefits and challenges.

This research could uncover best practices and innovative models for cooperation that enhance the value and reach of library services in the healthcare sector. These potential areas for future research contribute to the academic understanding of library services in healthcare and offer practical insights and recommendations for enhancing their effectiveness and relevance in the ever-evolving healthcare landscape.

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APPENDIX A: RESEARCH PROPOSAL APPROVAL

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:

P/Bag X9051 Pietermaritzburg 3200
330 Langalibalele Street, Pietermaritzburg 3201
Tel: 033 395 2743 Fax: 033 395 2941
www.kznhealth.gov.za

Corporate Communications

Email address Kathryn.potgieter@kznhealth.gov.za

05 July 2023

Dear Ms Ntloko

Subject: Approval of a Research Proposal

1. The research proposal titled **'The provision of access to information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era'** was reviewed by Mrs K Potgieter, Deputy Director: Web and Library Services in the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **supported** for research to be undertaken at KZN-DoH.

2. Kindly ensure that the study follows the application processes of the KZN Department of Health. The full protocol should be submitted online at the website of the National Health Research Database (nhrd.hst.org.za/), together with the letter of ethics approval and this letter of support.

3. Enquiries regarding the submission process can be made to the **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT UNIT** at hrkm@kznhealth.gov.za

4. Please ensure that a copy of the dissertation is made available to Departmental Librarians.

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

K Potgieter

Mrs K Potgieter
Deputy Director: Web and Library Services
Corporate Communications

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APPENDIX B: DEPARTMENT OF HEALTH APPROVAL

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:

Physical Address: 330 Langalibalele Street, Pietermaritzburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3793
Email: [redacted]

Health Research & Knowledge Management

NHRD Ref: KZ_202307_003

Dear Ms NP Ntloko
(DUT)

Approval of research

1. The research proposal titled '**The provision of access to electronic information by staff in Kwa Zulu Natal Department of Health libraries in the digital transformation era.**' was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at KZN Department of Health libraries.

2. You are requested to take note of the following
   a. ***Kindly liaise with the facility manager BEFORE your research begins.***
      This is to ensure that conditions in the facility are conducive to the conduct of your research. These include, but are not limited to, an assurance that the numbers of patients attending the facility are sufficient to support your sample size requirements, and that the space and physical infrastructure of the facility can accommodate the research team and any additional equipment required for the research.
   b. *All research conducted in KwaZulu-Natal must comply with government regulations relating to Covid-19. These include but are not limited to: regulations concerning social distancing, the wearing of personal protective equipment, and limitations on meetings and social gatherings.*
   c. *Please ensure that you provide your letter of ethics re-certification to this unit, when the current approval expires.*
   d. *Provide an interim progress report and final report (electronic and hard copies) when your research is complete to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za*
   e. *Please note that the Department of Health shall not be held liable for any injury that occurs as a result of this study.*

For any additional information please contact Mr. X Xaba on 033-395 2805.

Yours Sincerely

Dr E Lutge
Chairperson, Provincial Health Research Committee
Date: 04/08/2023

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APPENDIX C: ETHICS APPROVAL FULL

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
FACULTY OF ACCOUNTING & INFORMATICS

Faculty of Accounting & Informatics
Durban University of Technology
Faculty Research Office
Block D Ritson Campus
DURBAN, 4001

P O Box 1334, DURBAN, 4000
South Africa
Tel: (031) 373 6767
Fax: (031) 373 5593

www.dut.ac.za

2 August 2023

Student: Nonhlanhla Princess Ntloko
Student Number: 19751470
Degree: Master of Management Sciences in Library and Information Studies
Email: 19751470@dut4life.ac.za
Supervisor: Dr Tlou Maggie Masenya
Supervisor email: Tloum@dut.ac.za

Dear Ms Ntloko

'The provision of access to electronic information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era.'

The FAI-Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the FAI-FREC.

Please note that any deviations from the approved proposal require the approval of the FAI-FREC before data can be collected.

It is compulsory for a student or researcher to apply for recertification on an annual basis. The failure to do so will result in withdrawal of ethics clearance. It is the responsibility of the researcher and the supervisor to apply for recertification.

Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-FREC office on completion of your study.
Yours Sincerely,

Dr. M. Rajkoomar
Faculty Research Committee Chairperson
Tel: +2731 373 6776
Email: mogier@dut.ac.za

APPENDIX D: LETTER OF INFORMATION AND CONSENT

LETTER OF INFORMATION

Title of the Research Study: The provision of access to electronic information by staff in Kwazulu Natal Department of Health libraries in the digital transformation era.

Principal Investigator/s/researcher: Nonhlanhla P. Ntloko (B-Tech: LIS)

Co-Investigator/s/supervisor/s: Dr Tlou M. Masenya (PhD Info Science)

Brief Introduction and Purpose of the Study: The study will be undertaken in Kwazulu Natal Department of Health (KZN DOH) libraries. KZN DOH has thirteen hospitals with medical libraries used by staff ranging from student nurses, nurses, student doctors, doctors, support staff and other health professionals. This study will investigate the provision of access to electronic information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era. Current state of access to information will be determined, challenges encountered will be identified, systems and technologies used for the provision of access to information will be assessed and the level of digital skills for staff members to access information through digital technologies will be examined. The aim of the study is to investigate provision of access to electronic information by staff members in Kwazulu Natal Department of Health libraries in the digital transformation era.

Dear Sir/Madam

I am a master's degree student at DUT doing research for my Master of Management Science in Library and Information studies (MMSLIS). I would like to invite you to participate in the research. Research is a systematic search or enquiry for generalized new knowledge. Interviews and focus group discussions will be used for data collection. Semi-structured interviews will be used to collect background and in-depth information regarding the topic from thirteen librarians individually. Focus group discussions will be used to collect data from the rest of the sample. Group discussions will be done with thirteen groups, each consisting of three nurses and three doctors from each hospital.

The aim of the research is to investigate the provision of access to electronic information by staff in Kwazulu Natal Department of Health libraries in the digital transformation era. The objectives of the study are: to determine the current state of access to information by staff members, identify challenges encountered by staff members in accessing information digitally, establish the systems or technologies used for the provision of

access to information, determine the role of library staff in facilitating access to digital content and recommend the strategy for optimizing use of digital information services.
ng access to digital content and recommend the strategy for optimizing use of digital information services.

You are requested to avail yourself as a librarian for an interview that will be undertaken with a telephone or a teams meeting on 15/08/2023 or as a staff member for a focus group discussion that will be under taken with a meeting or telephone on 09/08/2023, time 10am, for 15 minutes. You are expected to answer questions that will be asked by the researcher honestly and to your best possible consideration for the researcher to solicit relevant information. Librarians will be interviewed individually for approximately 20 minutes each, and the other staff members (doctors and nurses) will be grouped into six and according to their hospitals for meetings that will take approximately 45 minutes each. This research will help you to get better digital services from the library, help to understand the challenges that you face regarding access to digital information in the library, to understand your digital information needs and determine if the library's infrastructure suits your information needs.
pproximately 20 minutes each, and the other staff members (doctors and nurses) will be grouped into six and according to their hospitals for meetings that will take approximately 45 minutes each. This research will help you to get better digital services from the library, help to understand the challenges that you face regarding access to digital information in the library, to understand your digital information needs and determine if the library's infrastructure suits your information needs.
proximately 20 minutes each, and the other staff members (doctors and nurses) will be grouped into six and according to their hospitals for meetings that will take approximately 45 minutes each. This research will help you to get better digital services from the library, help to understand the challenges that you face regarding access to digital information in the library, to understand your digital information needs and determine if the library's infrastructure suits your information needs.

Please note that:
This research will not be for monetary profit to you and to the researcher but only for studying purpose.
You are not expected to cover any costs related to this research.
You may, at any stage, without prejudice, withdraw my consent and participation in the study.
Confidentiality will be practiced as no personal names, address, sex and age will be required except maybe designations, for instance librarian/ doctor/ nurse.
No sensitive information that may put you at risk will be required.
You are allowed to ask questions when explanation is needed.
The significant new findings developed during the course of this research which may relate to your participation will be made available to you.
The data collected during this study will be processed in a computerized system by the researcher.
Only the researcher and the supervisors will have access to the information obtained from you but when the research process is finished a report will be compiled and a thesis will be published for other researchers to refer, for policy making and improvement of information services. Results of the research will be available upon request.

Persons to contact in the Event of Any Problems or Queries:
Please contact the researcher (cell 0734978860/ tel. 031 2402106)
Supervisor (tel. 031 3735639, cell. 0649991939)
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: The provision of access to information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era.

Names of Researcher/s: Nonhlanhla P. Ntloko

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Nonhlanhla Ntloko, about the nature, conduct, benefits and risks of this study: Research Ethics Clearance Number: _____,
- 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 and initials 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.

I, Nonhlanhla herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Nonhlanhla P.Ntloko	22/06/2023	NP Ntloko
Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

APPENDIX E: SURVEY QUESTIONNAIRE

Interview Guide for KZN Health Librarians:

I. Introduction

- Welcome the interviewee and introduce yourself as the interviewer.
- Explain the purpose of the interview, including the objectives and how the data will be used.
- Obtain informed consent from the interviewee to participate in the interview and record their responses.

II. Demographic Data

- Ask the interviewee to provide their name, job title, and years of experience as a health librarian.
- Ask the interviewee about their current role and responsibilities in providing access to information.
- Ask the interviewee about their education and training in library science and information management.

III. Objective 1: Determine current state of access to information

- What types of information resources are available in your library (e.g., databases, journals, books)?
- How do patrons currently access information (e.g., in-person, online)?
- How frequently do patrons request information, and how are those requests fulfilled?

IV. Objective 2: Identify challenges encountered

- What barriers to accessing information do patrons commonly face (e.g., language barriers, lack of computer skills)?
- What challenges do you personally encounter in providing access to information (e.g., budget constraints, staffing shortages)?
- Have you noticed any changes in patron information needs and requests over time?

V. Objective 3: Establish system technologies used

- What technology systems are used in the library (e.g., integrated library system, online catalog)?
- What challenges or limitations do these systems have in providing access to information?
- Are there any new technologies or systems you would like to implement to improve access to information?

VI. Objective 4: Determine the role of library staff

- What are the responsibilities of library staff in providing access to information?
- Is training or support provided to library staff to improve their ability to provide access to information?
- Have you observed any challenges or limitations in the ability of library staff to

provide access to information?

VII. Objective 5: Recommend strategies for optimum use of accessing information digitally

- What strategies have you implemented or observed to improve access to information?
- Do you have any recommendations for improving access to information through digital means?
- Are there any best practices you have observed in other libraries or institutions that could be adopted to improve access to information?

VIII. Conclusion

- Thank the interviewee for their time and participation.
- Explain any next steps in the research process (e.g., analysis of data, follow-up interviews).
- Reiterate the importance of their input and how it will contribute to improving access to information in KZN health libraries.

Focus Group Guide for Patrons:

I. Introduction

- Welcome the participants and introduce yourself as the moderator.
- Explain the purpose of the focus group, including the objectives and how the data will be used.
- Obtain informed consent from the participants to participate in the focus group and record their responses.

II. Demographic Data

- Ask the participants to provide their name, age, occupation, and level of education.
- Ask the participants about their experience using KZN health libraries for accessing information.
- Ask the participants about their preferred methods for accessing information (e.g., in-person, online).

III. Objective 1: Determine current state of access to information

- How satisfied are you with the types of information resources available in KZN health libraries (e.g., databases, journals, books)?
- How do you typically access information from KZN health libraries (e.g., in-person, online)?
- How frequently do you request information from KZN health libraries, and how are those requests fulfilled?

IV. Objective 2: Identify challenges encountered

- What barriers have you faced in accessing information from KZN health libraries (e.g, language barriers, lack of computer skills)?
- Have you experienced any challenges with the quality or accuracy of the information provided by KZN health libraries?
- Have you noticed any changes in your information needs and requests over time?

V. Objective 3: Establish system technologies used

- What technology systems have you used to access information from KZN health libraries (e.g., integrated library system, online catalog)?
- Have you experienced any challenges or limitations with these systems in accessing information?
- Are there any new technologies or systems you would like to see implemented to improve access to information?

VI. Objective 4: Determine the role of library staff

- Have you interacted with library staff in accessing information from KZN health libraries?
- How helpful and knowledgeable were the library staff in assisting you with your information needs?
- Have you experienced any challenges or limitations in accessing information due to library staff issues?

VII. Objective 5: Recommend strategies for optimum use of accessing electronic information

- What strategies do you think KZN health libraries should implement to improve access to information?
- How can KZN health libraries improve their digital presence and resources?
- Are there any best practices you have observed in other libraries or institutions that could be adopted to improve access to information?

VIII. Conclusion

- Thank the participants for their time and participation.
- Explain any next steps in the research process (e.g., analysis of data, follow-up interviews).
- Reiterate the importance of their input and how it will contribute to improving access to information in KZN health libraries.

APPENDIX F: EDITOR CONFIRMATION

GOOD TO GREAT RESEARCH

CONFIRMATION OF EDITING

18 May 2024

Client: Ms NP Ntloko
Durban University of Technology
~~Masters~~ Dissertation

Title: The provision of access to electronic information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era

Dear Ms Ntloko

Thank you for the privilege of editing your submission in fulfilment of your Masters qualification entitled ~~The~~ *provision of access to electronic information by staff in Kwazulu-Natal Department of Health libraries in the digital transformation era.*

This letter confirms that this document has been edited:

- All grammar has been corrected.
- All punctuation and sentence construction has been corrected.
- Interview (raw data) has not been edited to maintain authenticity.
- Spelling has been corrected and standardised.
- Queries and recommendations are raised in the comments.

References:

- All references have been standardised to Harvard.

All the best!

Many thanks
Dr Ara

Dr Ara Ramnund-Mansingh PhD (UKZN)
083-3665635
The Research Coach is part of the
DARA Group (PTY) LTD
Currie Road, Musgrave, Durban
2020/067901/07