DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

Development of a mobile digital library model for teaching support in selected under-resourced public high schools in KwaZulu-Natal

By

Musawenkosi Phumelela Khomo

19550507

A dissertation submitted in fulfilment of the requirement for the Doctor of Philosophy in Library & Information Science

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

July 2023

Supervisor: Prof. R. Sucheran Date: 19/01/2024

Co-Supervisor: Prof. M. Rajkoomar Date: 19/01/2024

DECLARATION

I, Musa Phumelela Khomo, declare that:

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

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

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Signature: Musa Phumelela Khomo Date: 7 December 2023

ACKNOWLEDGEMENTS

My research project was made possible by many individuals and organisations that I wish to acknowledge. I would like to offer my thanks and respect to my main supervisor, Dr R. Sucheran and co-supervisor, Dr M. Rajkoomar for their guidance, patience and encouragement. I am also grateful to Information Systems Department (DUT), especially LIS staff - thank you for being available when I desired wisdom to solve problems, I encountered during my research journey. Your contribution is highly appreciated. Thank you for all the help you provided.

Sincere gratitude goes to the KZN Department of Basic Education under the leadership of the HoD, Mr. G.N. Ngcobo; Chief Directors, Mrs. T.P.J. Khoza; Mr. T. Mbanjwa and all other Chief directors whose names were not listed above. Thank you for granting me permission to carry out the study in sampled public high schools throughout the province. Special thanks go to the District Managers and Circuit Managers. I am very grateful to the principals, teachers and teacher librarians from sampled high schools in Amajuba; Pinetown; Ugu; Umgungundlovu; and Umlazi districts for taking their time to participate in focus group or individual interviews and for completing the questionnaires.

I am sincerely grateful to Ms. Thembelihle Thabethe for developing, maintaining and hosting the mobile digital library website. I thank Mr. Nhlanhla Thabethe for his assistance during data collection in Amajuba district.

To my family (Siziwe Khomo; Thandolwethu Sisanda Khomo and Palesa Sinelihle Khomo) - Thank you a million times for supporting me during my research journey. Thank you for putting up with me during difficult times and also for understanding when I had to be physically away for days during data collection. I really appreciate it.
Lastly, I would like to thank my brothers and sisters. A special thanks goes to my late brother, Mathu “Nkonka omancushela, ohlaba okuzilethayo” for believing and keeping on telling me that I would “achieve everything” I want to achieve including this achievement.

ABSTRACT

This study aimed to identify the contributing factors to the successful development and use of a mobile digital library model, assess its feasibility for teaching purposes, determine the technological competences of teachers in utilizing mobile technology, and develop a suitable mobile digital library model for under-resourced schools. The objectives of the study were to identify the factors that would contribute to the successful development and the use of mobile digital library model for teaching and learning support at selected under-resourced public high schools in KwaZulu-Natal; to establish the feasibility of using a mobile digital library model for teaching in selected under-resourced public high schools in KwaZulu-Natal; to ascertain the technological competences of teachers to use mobile technology; and to develop a mobile digital library model suitable for teaching in under-resourced schools. The study employed an exploratory sequential mixed method design. The preferred research paradigm for this study was pragmatism and interpretivism. The study surveyed eleven selected under-resourced public high schools in KwaZulu-Natal, categorized as quintile one, quintile two, and quintile three. Ninety-three teachers and three teacher librarians contributed to the study. Cluster-sampling method was employed to select the participating schools. Data collection instruments included individual interviews with teacher librarians, focus group discussions with teachers, and self-administered questionnaires for teachers and librarians. The study consisted of two distinct phases i.e. qualitative data collection through focus group and individual interviews then quantitative data collection with the usage of questionnaire. A mixed methods approach for data analysis was used. Both individual interviews and focus group interviews were transcribed and later edited, with the audio recordings serving as the primary source of data. The themes were formulated by the researcher, and the findings were subsequently synthesized and organized within these thematic categories. For quantitative data, the researcher employed multivariate analysis, a statistical technique aimed at investigating relationships among multiple variables. The findings revealed several factors influencing the development and use of a mobile digital library, such as the need for digital literacy training for the school community, user-friendliness of the mobile digital library platform, and financial support from the organization. The feasibility of implementing a mobile digital library relied on factors such as financial support, robust internet connectivity, digital literacy among the school community, and improvements in technological infrastructure. Additionally, the study found that younger teachers demonstrated greater technological competence compared to more experienced

teachers. A mobile digital library model was developed to support teaching, ensuring a conducive learning environment where teachers and learners have access to information anytime and anywhere. The study recommends regular training for teachers and learners on the utilisation of a mobile digital library, adequate funding for hosting and maintenance, and improvements in technological infrastructure.

Keywords: mobile digital library, schools, information access, teaching model

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LIST OF ABBREVIATIONS

FET Further Education and Training Phase (FET – Gr 10-12).

KZN KwaZulu-Natal

SMT School Management Team

DoE Department of Education

DBE Department of Basic Education

LIST OF TERMINOLOGY

Connectivism is a theoretical framework for understanding learning in a digital age. It emphasizes how internet technologies such as web browsers, search engines, wikis, online discussion forums, and social networks contributed to new avenues of learning.

Constructivism is the theory that says learners construct knowledge rather than just passively take in information. As people experience the world and reflect upon those experiences, they build their own representations and incorporate new information into their pre-existing knowledge.

Library resources are those materials, both print and non-print, found in school libraries which support curricular and personal information needs. Print items include books, magazines, newspapers,

Mobile digital library is a collection of digital objects, such as books, magazines, audio recordings, video recordings and other documents that are accessible electronically with the usage of digital devices like smart phone; tablet; laptop; etc.

Quintile level for a school is the ranking of a school according to its financial affordability. A school quintile ranking determines the amount of funding that it receives each year and whether or not the school can charge fees. Quintile 1 is the group of schools in each province catering for the poorest 20% of learners. Quintile 2 schools cater for the next poorest 20% of schools, and so on. Quintile 5 schools are those schools that cater for the least poor 20% of learners. Poorer quintiles have higher targets than the less poor quintiles.

School library is a library within a school where learners, staff, and often, parents of a public or private school have access to a variety of resources.

Teacher-librarian is defined as specialised librarians. If so, the basic training is that of an information specialist. The main role of teacher librarians is to provide the teachers and learners with relevant information and sources that are required for the teaching and learning.

Under-resourced schools- for this study, under resourced schools are schools categorized as quintile 1; quantile 2 and quantile 3. These schools are the 'poorest' schools because of poor communities surrounding them. These schools are classified according to the level of poverty in surrounding communities.

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1 Introduction

The Department of Basic Education (DBE) is responsible for the regulation of public education in primary and secondary schools in South Africa. The schools within this department are classified into various quintile levels, which arose from the educational system prior to democracy in South Africa. This schooling system was marked by the inequitable allocation of resources among schools belonging to different racial groups (van Dyk and White, 2019). The Amended National Norms and Standards for School Funding (ANNSSF) employs a ranking system for schools that considers the literacy rate and unemployment rate and of the surrounding community (van Dyk and White, 2019). A Quintile 1 ranking is assigned to schools located in the poorest areas, while a Quintile 5 ranking is assigned to schools located in the most affluent areas. School libraries are a scarce resource in many educational institutions situated within poor communities. This study was on selected under-resourced public high schools in KwaZulu-Natal. For this study under-resourced schools are categorized as quintile 1; quantile 2 and quantile 3. These schools are the 'poorest' schools because of poor communities surrounding them. These schools are classified according to the level of poverty in surrounding communities.

School libraries are designated library facilities located within schools, providing students and educators with access to a wide range of knowledge resources. One of the main objectives of school libraries is to facilitate equitable access to books and various information resources for all individuals within the school community, particularly in regard to educational preparation and engagement. According to Tyagi (2015), the primary objective of school libraries is to enhance learning opportunities for students. This is achieved by offering information resources and creating conducive learning environments for students to engage in independent scholarly work. Tyagi further (2015) indicates that school libraries play a crucial role in the field of education. Hence, it is important for school libraries to furnish pertinent information to the school community to facilitate effective teaching and learning. School libraries therefore play a crucial role in facilitating the successful implementation of education as both educators and students depend on access to informational resources for the purpose of teaching and learning.

1.2 Statement of the problem

Numerous scholarly investigations, such as the works of Hart and Zinn (2015), Paton-Ash and Wilmot (2015), and Mojapelo (2016), have revealed a scarcity of educational libraries within the educational landscape of South Africa. The scarcity of school libraries results in an insufficiency of accessible information resources for the school community. Furthermore, it should be noted that although certain school libraries possess information resources that are pertinent to the requirements of the school community, the entire school community may encounter challenges in finding opportunities to utilize the school library due to its limited operating hours, which coincide with the instructional periods attended by students and teachers. When students have free time after school, most school libraries are inaccessible due to their closure during after-hours. The inadequacy of convenient access to information can have a detrimental effect on the teaching and learning process, as it necessitates the school community to depend on alternative sources of information to adequately prepare for educational activities. Consequently, alternative methods must be implemented to guarantee that the school community can access trustworthy information resources.

According to Zha, Zhang, and Yang (2016), mobile libraries offer convenient access to digital library resources and services without being constrained by time and space. In addition, the capacity to digitally access library resources can serve as a solution in circumstances such as the COVID-19 pandemic, wherein individuals must engage in isolation or maintain social distancing measures. There is therefore a need for the development of a mobile digital library model that will support teaching in schools since under-resourced schools are “still worse off in terms of resources” (van Dyk and White, 2019 p.7). The authors further recommend that the Department of Education “establish resource equity” which means fair “allocation and use of resources to create student experiences that enable all learners to reach empowering and rigorous learning outcomes”. According to Ocran, Underwood, and Arthur (2020), the incorporation of mobile technology within libraries has the potential to enhance and reinforce the existing relationship between the library and its users. The implementation of the mobile digital library model would have a beneficial impact on the educational process by offering access to a wide range of digital information resources. The rise in mobile phone utilization and the significance of mobile technology in education have contributed to the effectiveness of teaching and learning in the 21st century (Onyema, 2019; O'Bannon and Thomas, 2015).

The insufficient allocation of funds to disadvantaged schools has led to a situation where school libraries are unable to fulfil their intended purpose of facilitating and enhancing the provision of high-quality education in South Africa (Paton-Ash and Wilmot, 2015). Furthermore, it is important to note that the lack of resources has significant implications for the effectiveness of teaching and learning (du Plessis and Mestry, 2019). The study by Nkambule (2022) uncovered the challenges faced by educators in impoverished schools, particularly those located in rural areas. These difficulties primarily stem from the deteriorating state of school facilities, such as dilapidated infrastructure, as well as the scarcity of essential resources like libraries and inadequate availability of textbooks. These factors significantly impede the working conditions of teachers and restrict their ability to effectively deliver instruction (Nkambule, 2022). Mojapelo (2018) reached the conclusion in the study on educational resources for underprivileged schools in the Limpopo Province that the standard of education provided to students in rural provinces is a cause for concern. This is mostly due to the insufficient availability of equipped libraries and qualified staff in disadvantaged rural communities.

There remains a considerable amount of uncharted territory and knowledge to be gained regarding the possible influence of mobile digital libraries within educational environments. A potential area of research that warrants attention is the development of a mobile digital library model that is specifically tailored for teaching purposes in under-resourced public high schools. Although previous studies have examined the advantages of digital libraries and mobile learning in the field of education (Hahn, 2008), further research is required to specifically investigate the implications of these technologies in underprivileged schools. In order to fill this void in the existing research, this study was undertaken to investigate the efficacy of a mobile digital library model in enhancing educational outcomes within underprivileged public high schools. This study classifies under-resourced schools as those falling within quintiles 1, quantile 2, and quantile 3. The classification of these schools is based on the socioeconomic status of the communities in their vicinity and are officially designated as no-fee schools and are legally restricted from imposing any charges or fees.

1.3 Aim and objectives of the study

Aim

The aim of the study was to develop a mobile digital library model suitable for teaching at selected under-resourced public high schools in KwaZulu-Natal (KZN).

Objectives

In order to achieve the above aim, the following objectives were examined:

a) To identify the factors that would contribute to the successful development and the use of mobile digital library model for teaching and learning support at selected under-resourced public high schools in KwaZulu-Natal.

b) To establish the feasibility of using a mobile digital library model for teaching in under-resourced high schools in KwaZulu-Natal.

c) To ascertain the technological competences of teachers to use mobile technology; and

d) To develop a mobile digital library model suitable for teaching in under-resourced schools.

Research questions

To achieve the above-mentioned objectives, the following research questions were generated:

a) What are the factors that contribute to the successful development and the use of mobile digital library model?

b) What is the feasibility of using a mobile digital library model for teaching in under-resourced high schools in KZN.

c) What are the technological competences of teachers to use mobile technology?

d) What mobile digital library model can be developed for teaching in selected under-resourced public high schools?

1.4 Contribution of the study

The significance of this study lies in its potential to determine the preparedness of under-resourced public high schools in KwaZulu-Natal for incorporating mobile digital libraries. The research would additionally aim to construct a mobile digital library framework tailored to facilitate educational assistance in underprivileged schools in the province. The advancement of mobile digital libraries holds promise in enhancing the accessibility of scientific and academic publications for educational purposes in schools lacking functional libraries. In

addition, the utilization of mobile devices for accessing digital libraries holds the potential to extend its reach to a wider community of educators and students, thus serving to bridge the gap in digital access. The mobile digital library model would further facilitate users in conveniently accessing digital library resources and services, without being constrained by limitations of time and space. Therefore, the mobile digital library model has emerged as a potential solution in times of crisis, such as the ongoing COVID-19 pandemic, where individuals are mandated to maintain social distancing measures. The findings of this study could potentially address the issue of inadequate operational school libraries within South African educational institutions. The research would also contribute to the creation of a digital library that would enhance the accessibility to information by teachers and students, consequently enhancing the effectiveness of the teaching and learning experience. The challenges, such as the insufficiency of fully operational school libraries, could potentially be mitigated by implementing the mobile digital library model (Hart and Zinn, 2015; Department of Arts and Culture and National Council for Library and Information Services, 2014; Paton-Ash and Wilmot, 2015; Mojapelo, 2016). Multiple learners and educators would have the ability to concurrently access online books and other resources, as everyone possessing a mobile device would be granted remote access to the library materials.

1.5 Scope and delimitations of study

The research primarily concentrated on educators and teacher librarians within financially disadvantaged public high schools located in the province of KwaZulu-Natal. The schools represent quintile level 1 to quintile level 3 schools located in various districts within the province of KwaZulu-Natal. This study deliberately excluded private schools, well-resourced schools, primary schools, intermediate schools, and special schools, as its primary objective was to examine the financial challenges faced by specific secondary schools.

1.6 Limitation of the Study

The first challenge was that the sampling frame (list of schools from Department of Basic education) was not up to date. As the results all contact numbers for principals had changed. I had to physically visit schools to make appointments. The major challenge was that two principals and one deputy principal were not willing to allow me to survey their schools. Schools that did not participate in the study were from Amajuba, Ugu and Umlazi districts.

1.7 Overview of research the methodology

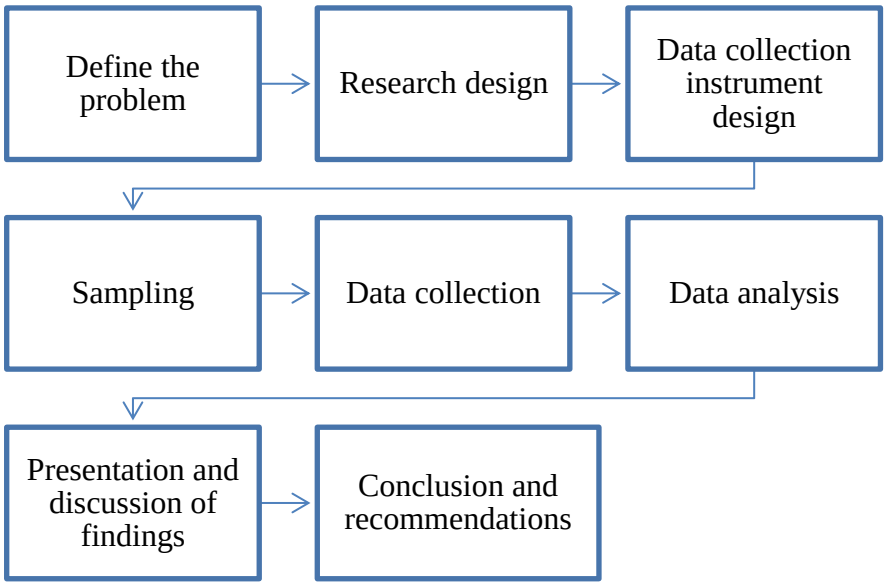


Figure 1. 1: Research methodology process

The research methodology employed in this study is illustrated in Figure 1.1. Following the establishment and conceptualization of the research problem, a research design was developed in order to align with the study's specific aims and objectives. Subsequently, the instruments for data collection were formulated. The population and samples were then identified. The data collection process was conducted using questionnaire and interviews. After the data collection process was concluded, an analysis was carried out on both the qualitative and quantitative data. Subsequently, discussions ensued to examine and interpret the research findings. Conclusions were then presented, and recommendations were proposed.

1.8 Research Output

Below are details of the article on this project that has been published and more journal articles are going to be published.

Khomo, M.P.; Naicker, N.; Chisita, C.T. and Rajkoomar, M. 2023. Factors contributing to the successful development and use of mobile digital libraries: a systematic literature review. *Digital library perspectives*, 39(3), 353-370.

1.9 Structure of the thesis

This study is presented in eight chapters, which are arranged in the following manner:

Chapter One: Introduction and background to the thesis

The research problem together with the aim and objectives are discussed in chapter one.

Chapter Two: Theoretical framework

This chapter discusses Constructivism and Connectivism theories and explain how these theories relate to this study.

Chapter Three: Literature review

An in-depth literature review relevant to the study is conducted in chapter two.

Chapter Four: Research Methodology

The methodology used in carrying out the study is presented. This includes the research design, the data collection instruments, the sampling methods, and data analysis tools.

Chapter Five: Presentation of qualitative results and discussion.

Presentation of the major findings of the qualitative study.

Chapter Six: Presentation of quantitative results

This chapter presents, interprets and discusses the quantitative results.

Chapter Seven: Discussion

Triangulates the qualitative and quantitative study.

Chapter Eight: Conclusion and recommendations

This chapter provides the conclusions for the key research findings and makes important recommendations based on the findings.

1.10 Chapter summary

An introductory overview and problem statement, emphasizing the necessity of mobile digital libraries in underprivileged public high schools in South Africa is presented. The discussion revolved around the categorization of educational institutions into quintiles, considering socioeconomic indicators, with particular emphasis placed on the lack of school libraries within economically disadvantaged communities. The significance of school libraries in enhancing educational opportunities and the obstacles encountered by schools with limited resources in obtaining information resources were emphasized. The discussion revolved around the potential of mobile digital libraries in effectively addressing these challenges, considering the increasing prevalence of mobile phone usage and the ease of accessing digital resources. The chapter additionally provided an overview of the aim, objectives, research questions, and

importance of the study. In addition, the study identified the scope and limits of the research and presented a synopsis of the research approach. The thesis structure was ultimately outlined, thereby indicating the arrangement of the ensuing chapters. The next chapter discusses the theoretical framework of a study.

CHAPTER TWO: THEORETICAL FRAMEWORK

2.1 Introduction

The theoretical framework of a study provides the conceptual foundation for understanding and analysing the research outcomes. Within the scope of this study, the theoretical framework revolves around two prominent educational theories, namely constructivism and connectivism. These theories provide valuable perspectives on the most effective approaches to facilitating the educational process, specifically in regard to instructional and learning strategies. This section provides a thorough examination of the theories of constructivism and connectivism and their relevance to the current study. The educational framework known as constructivism claims that the process of learning is an active cognitive attempt in which the learner actively develops knowledge. The focal point lies in the incorporation of novel information with pre-existing knowledge via firsthand experiences and subsequent reflection. From this theoretical standpoint, learners are perceived as active agents who actively construct their own understanding of the world. Constructivism exceeds the conventional method of knowledge transmission employed by teachers, emphasizing the significance of students' active involvement in the process of discovering and reshaping information. Imenda (2014) defines a theoretical framework as the application of a theory, or a set of concepts drawn from one and the same theory, to explain an event, or share some light on a research problem.

According to Varpio et al. (2020) and Kivunja (2018):

> *"The theoretical framework offers a structure for what a researcher looks for in the data, for how a researcher think of how what he/she sees in the data fits together, and helps them to discuss their findings more clearly, in light of what existing theories say. The theorical framework assists the researcher in making connections between the abstract and concrete elements they notice in their data. The theoretical framework supports the researcher in justifying what you say about the findings and recommendations".*

Varpio et al. (2020) and Kivunja (2018) also state that a conceptual framework is a:

> "*logical orientation and associations of anything and everything that forms the underlying thinking, structures, plans and practices and implementation of your entire research project. So, the conceptual framework comprises your thoughts on identification of the research topic, the problem to be investigated, the questions to be asked, the literature to be reviewed, the theories to be applied, the methodology you will use, the methods, procedures and instruments, the data analysis and interpretation of findings, recommendations and conclusions you will make".*

According to Kivunja (2018) and Ngulube, Mathipa & Gumbo (2015) the difference between a conceptual framework and theoretical framework is that the conceptual framework is relates to all the concepts and ideas that are on the researcher's mind as he/she anticipate, plan, implement and conclude his/her research project. Whereas the theoretical framework comprises other people's theoretical perspectives that the researcher interprets as applicable to his/her research, and in particular, helpful in data analysis and interpretation.

The significance of school libraries in facilitating effective teaching and learning encounters is widely acknowledged, as they offer valuable resources tailored to the specific requirements of learners. Nevertheless, the lack of adequate school libraries and the growing ubiquity of digital devices emphasize the need for the creation of technologically advanced libraries. The objective of this study is to develop a mobile digital library model that seeks to improve the accessibility of information resources. This model enables learners to access and cross-reference new information with their pre-existing knowledge from any location and at any given time. The significance of incorporating constructivism and connectivism theories into this study lies in their capacity to improve pedagogical and learning methodologies, reduce discrepancies in educational resource availability, and empower learners to actively construct their own comprehension. Constructivism places emphasis on the engagement of learners in active learning processes, the application of critical evaluation skills, and the recognition of the significant role that school libraries play in facilitating educational endeavors. Connectivism emphasizes the interconnected nature of learning, the necessity of having access to up-to-date information, and the use of technology to enhance the process of acquiring knowledge. The objective of this study is to develop a mobile digital library model that combines elements from multiple theories. This model seeks to address the issue of limited access to educational materials, promote active engagement among learners, and create an ideal learning environment. The significance of this matter is especially apparent in under-resourced public high schools located in the KwaZulu-Natal province. In those schools, the presence and ease of access to a wide range of information resources can have a substantial influence on the efficacy of both teaching and learning endeavors.

2.2 Theoretical framework of the study

The theories of constructivism and connectivism relate to the optimal methods by which the educational process should be facilitated. The following section presents an analysis of two theories and their applicability to the present study.

2.2.1 Constructivism theory

Constructivism is an educational framework that is grounded in the concept that learning is a cognitive process involving the active construction of knowledge by the learner. According to Bada and Olusegun (2015), the process of student learning involves integrating new information with their existing knowledge. According to this theoretical perspective, individuals engage in the active process of constructing their own understanding and knowledge of the world by means of direct experiences and subsequent reflection upon these experiences. Constructivists posit that the role of teachers extends beyond the mere transmission of knowledge to students. Instead, they argue that students must actively engage in the process of discovering and transforming information, as well as critically evaluating new information in relation to their existing knowledge. According to Tyagi (2015), supporters of the constructivist approach argue that school libraries can enhance teaching and learning experiences within the school community by offering valuable resources that cater to the needs of scholars. The presence of insufficient school libraries (Mojapelo, 2016) and the proliferation of digital devices (Ocran, Underwood, and Arthur, 2020) necessitate the establishment of a technologically advanced library. The mobile digital library has been designed to enhance the accessibility of library and information resources. The availability of this resource from any location is designed to facilitate learners in accessing and cross-referencing new information with their existing knowledge.

Constructivism is a theoretical framework rooted in empirical observation and scientific inquiry, which seeks to understand the processes through which individuals acquire knowledge and learn, (Bada and Olusegun, 2015). According to scholarly discourse, it is widely acknowledged that individuals, particularly learners, tend to integrate novel information with their pre-existing knowledge and personal experiences. This may lead to a modification of their beliefs or a disregard of the new information if it is deemed irrelevant. Learners actively engage in the process of knowledge creation. To accomplish this, learners must engage in the process of questioning, exploration, and self-assessment to enhance their understanding. Within the educational setting, the constructivist perspective posits that the process of learning entails

fostering students' utilization of active methodologies, such as engaging in experiments and real-world problem-solving, to generate additional knowledge. Subsequently, students are encouraged to engage in reflection and discourse regarding their actions and the evolution of their comprehension. The teacher ensures a sound understanding of the students' pre-existing conceptions and subsequently directs the activity to acknowledge and further develop these conceptions (Oliver, 2000). The mobile digital library has been designed to facilitate access to a diverse range of informational resources, including videos, for both educators and students. By doing so, it facilitates the teaching process. Enhancing the accessibility of diverse information resources has the potential to enhance comprehension of the subject matter, thereby fostering active debate among students. The implementation of such measures would enhance the effectiveness of the learning process.

According to Tam (2000), it is emphasized that to facilitate learning, it is imperative to establish learning environments that directly involve learners in the subject matter, assuming constructivist theory is acknowledged as the most effective approach to conceptualize learning. The aim was to develop a mobile digital library model that would facilitate teaching by establishing an optimal learning environment, wherein learners can access information resources at any time and from any location. According to Tam (2000), one of the fundamental attributes of constructivist learning environments is the sharing of knowledge between teachers and students. This component should be considered when incorporating constructivist instructional strategies. The mobile digital library model was envisioned as a platform for teachers to upload information, with the aim of providing learners with access to this content.

2.2.1.1 Criticism of constructivism theory

As much as constructivism theory has been seen as embraced by many educators, researchers like Kirschner, Sweller, and Clark (2006), believe that constructivism promotes a “teaching style with unguided or minimally guided instructions for students”. The same sentiment was echoed by Moreno (2004) and Tuovinen and Sweller (1999) who are of the opinion that when students learn with minimal instructions, they become “lost and frustrated”. These researchers believe that having minimally-guided instruction “ignores the importance and structure of working memory during learning”. Kirschner, Sweller, and Clark (2006) concludes that unguided instruction is usually less effective and it may yield negative results when students or learners acquire misconceptions or incomplete disorganized knowledge.

Another concern held by critics of constructivism is that learners need to connect their knowledge to tangible objects in order to ensure that they have acquired the knowledge, and constructivist approaches do not support this learning-related need (Alanazi, 2016).

Alanazi (2016) further states that:

> *"Other critics of constructivist approaches argue that constructivism promotes group thinking and ignores the individuality of students even though learning should promote individual rights. The researcher further explain that the dominant group drives the whole class towards their thinking while leaving other students behind. That is, these critics contend constructivist teaching overlooks the development of many students' skills because the activity is led by a few. Additionally, opponents of constructivism believe it to be unsound from an economic perspective, as it is costly to train instructors in how to teach in constructivist methods, especially with school budgets often in precarious circumstance"s.*

2.2.1.2 Relevance of constructivism theory to this study

According to Bada and Olusegun (2015), the process of knowledge creation involves learners encountering new information and integrating it with their existing ideas and experiences. Considering this, the presence of school libraries becomes crucial for educational institutions. According to Abdoli-Sejzi and Aris (2012), it is their belief that learning occurs when individuals engage in reflection upon their experiences and actively construct their own understanding of the world around them. The prevailing belief posits that the primary objective of education is for individuals to actively construct their own understanding, rather than merely memorizing correct responses and regurgitating the interpretations of others. The theory of constructivism centers around the concept of active learning, wherein the role of students assumes greater significance compared to that of the teacher. The attainment of a high standard of education is heavily reliant on the availability of relevant resources, which learners can depend on to acquire new knowledge. This new knowledge is then integrated with their existing knowledge and current understanding, facilitating the creation of further knowledge (Abdoli-Sejzi and Aris, 2012).

To adequately support students' educational needs, it is crucial to create school libraries that align with the curriculum and provide essential information resources. These libraries foster an educational environment conducive to effective learning and teaching. However, the distribution of resources across different types of schools remains unequal, as pointed out by van Dyk and White (2019). In light of the constructivist perspective, learners engage in knowledge acquisition by utilizing libraries as a resource to access new information and

compare it with their existing knowledge. Therefore, it is vital for learners to have the ability to access information resources and generate new knowledge. To address the issue of inadequate school libraries, implementing a mobile digital library framework in high schools in the KwaZulu-Natal province can be a viable solution. The mobile digital library model relies on cutting-edge technology to enhance the accessibility of information resources. Abdoli-Sejzi and Aris (2012) suggest that integrating new technologies in education presents valuable opportunities for implementing constructivist methodologies.

According to Oliver (2000), constructivist learning environments, such as problem-based learning, offer numerous advantages. One such advantage is that students acquire retrievable and usable knowledge and skills. These knowledge and skills are learned in a contextualized manner, enhancing their potential for long-term transfer. The mobile digital library facilitates the retrieval of relevant information resources, the development of problem-solving and reasoning abilities, and the acquisition of lifelong learning skills. The presence and convenient availability of information resources significantly contribute to this process. The model for a mobile digital library was developed by incorporating teachers' information-seeking skills and their perspectives on the availability of relevant information resources.

2.2.2 Connectivism

According to Goldie (2016), advocates of connectivism theory perceive learning as a phenomenon that takes place within a network, which is shaped by the impact of technology and social interactions. The concept stated is that the initiation of the learning process takes place when individuals establish connections with and actively engage in a community dedicated to learning. The learning community is characterized as a point of convergence, invariably embedded within a broader network. Intersections can encompass a variety of entities, such as organizations, journals, libraries, websites, databases, or any other sources of information. An important objective of this research study was to create a model for a digital mobile library, which represents a convergence point for facilitating the sharing of information. Networks consist of a minimum of two intersections that are interconnected with the purpose of facilitating the sharing of resources.

According to Goldie (2016), proponents of connectivism contend that effective networks exhibit a diverse range of perspectives, participant independence, and interconnectedness among their intersections. According to advocates of connectivism theory, knowledge, and the

process of acquiring knowledge are not confined to a specific location. Instead, they are characterized by networks of connections that are established through experiences and communications among individuals, organizations, societies, and the technologies that facilitate these connections (Goldie, 2016).

Goldie (2016) claims that knowledge is situated within networks, free of any requirement for individual being in possession, and can be stored in diverse digital formats. According to Goldie (2016), learning can also be present in "non-human appliances," wherein it can be stored and manipulated by technological means. The perception is held that knowledge arises because of the interconnections established during network-based activities. According to Goldie (2016), modern technology aids learners in managing the rapid expansion of accessible knowledge.

Goldie (2016, p.1066) believes that:

> *"Since information is constantly changing, its relevance will be affected by new contributions made to the field. Learners need to be able to access new information, evaluate its' relevance and make decisions based on the information acquired. The ability to seek out current information and filter secondary and extraneous information are considered important skills that contribute to learning. The learning process is cyclical, learners connect to a network to find and share new information, modify their beliefs in terms of their new learning then reconnect to share their new understandings and find further information".*

The present study used the connectivism theory as its theoretical framework, as the primary objective was to construct a digital library model that facilitates the integration of digital technologies and resources to support teaching and learning processes. The study developed a mobile digital library model, which serves as a platform to facilitate teachers' digital access to information resources. The availability and ease of access to a mobile digital library, along with its diverse range of informational resources, are crucial for effective teaching. Such accessibility empowers learners to engage actively in the construction of knowledge, inquire about concepts, explore new ideas, and evaluate their existing understanding. The mobile digital library model was developed based on the understanding that learning can also be present in "non-human appliances," where it can be stored and manipulated through technology, as suggested by connectivism theorists.

2.2.2.1 Criticism of connectivism theory

Corbett and Spinello, (2020 p. 8) conclude that:

> *"Connectivism has lacked a lengthy history of testing, retesting, and revision to arrive at a definitive framework for understanding how people learn differently and most effectively, in the digital world. Anchored in chaos theory, networking, complexity, and self-organization theories, connectivism was ground-breaking when it was first introduced in 2004. It has not been updated and enhanced significantly at a theoretical level. Given Moore's Law of computing which predicts the doubling of processing power every two years ("Moore's Law," n.d.) and the rapid advances in technology, it is pertinent to ask whether connectivism will remain applicable as a framework to explain and set guidelines for learning in an ever-changing environment. From an empirical perspective, connectivism needs more academic research to establish it firmly as a learning theory, especially as technology and learning continue to make rapid advances".*

This extract raises significant concerns about how well connectivism works as a learning theory in today's changing education and technology world. The fact that connectivism hasn't been tested and updated much since it was first introduced in 2004 makes people doubt if it's still good for understanding how we learn now. The mention of Moore's Law, which says technology gets better very quickly, makes people question if connectivism, created in a different time for technology, is still useful for guiding how we learn. The passage emphasizes that we really need more research to be sure connectivism is a good learning theory, especially with how quickly technology and learning are changing. If there isn't strong evidence, people might not trust and use connectivism as much, and this suggests we should carefully examine, update, and test connectivism to make sure it stays useful in the ever-changing mix of technology, learning, and educational ideas.

2.2.2.2 Relevance of connectivism theory to this study

Summarizing some of the guidelines of connectivism for designing learning materials, Al-Shehri (2011) stated that:

> "*Students of the digital age should be independent and be allowed to access information. However, the appropriate use of the Internet should ideally be maintained in a networked learning environment. Information is rapidly changing. Thus, students should have the skill to abandon old or unimportant information and learn current or important information. Updating of knowledge requires active networked participation. Students should be allowed to connect with others and to express and share different opinions. Networked learning can successfully be improved by mobile learning. Information should be obtained from different sources to maintain the diversity of the network, and learning should be delivered via different technology interfaces. Students should be able to locate and research new information on a continual basis to promote authentic and experiential learning".*

This statement highlights the evolving role of students in the digital age, emphasizing the need for independence in accessing information within the parameters of appropriate internet use in a networked learning environment. The dynamic nature of information calls for the development of skills in discernment and prioritization, encouraging students to distinguish between current, pertinent information and outdated or less relevant content. The process of knowledge updating is seen as a participatory endeavor, requiring active engagement in networks, enabling students to connect, express opinions, and share diverse perspectives. The integration of mobile learning is identified as a means to enhance networked learning experiences. Emphasizing the importance of diverse information sources, the statement encourages learning through various technology interfaces to maintain a multifaceted approach. The continuous pursuit of new information is highlighted as a driver for authentic and experiential learning. The implications of these ideas extend to the cultivation of critical information literacy skills, the promotion of collaborative learning environments, and the development of adaptability among students in the face of a continually changing digital landscape. Overall, this perspective advocates for an active, networked, and dynamic approach to learning in the digital era.The guidelines were used in the establishment of a mobile digital library model that guarantees the presence and convenient accessibility of current and relevant resources, thereby potentially enhancing the educational process. The mobile digital library model was designed to encompass a wide range of information resources.

Guder (2010) found out that libraries somehow practice connectivism by:

> *"Providing training sessions with their users. Connectivism theorists believe that a user-controlled network is where the real learning takes place. Library users search for information through many networks and library databases. Connectivism theorists are of the opinion that learners should make their own networks of information and make connections where they see fit. Librarians are well connected to the network of users. Connectivism theorists believe that the more connections, the more diverse the knowledge. Library resources are catalogued and easy to find. Theorists think knowledge in a database needs to be connected to the right people in the right context. Libraries use social networking technologies to help users obtain information. Connectivism theorists feel nurturing and maintaining connections is needed to facilitate continual learning. Library catalogues and searching strategies enable users to discover relevant materials. Connectivism theorists are of the opinion that the capacity to know more is more critical than what is currently known".*

He above extract emphasizes the importance of training sessions that empower users to control their networks and make connections within the vast array of information available through

library databases. Connectivism theorists argue that real learning occurs when users create their networks of information, suggesting that learners should be encouraged to form connections based on their own needs and preferences. Librarians play a crucial role in facilitating these connections as they are well-connected to the network of users. The belief that more connections lead to more diverse knowledge aligns with the connectivist perspective. The mention of social networking technologies in libraries highlights the evolving role of technology in knowledge dissemination. Connectivism theorists stress the need for continual learning, emphasizing that nurturing and maintaining connections are essential for this purpose. Knowledge in a database should be linked to the right people in the right context, suggesting that the context in which information is shared and connected is critical. Moreover, the focus on the capacity to know more as being more critical than what is currently known resonates with the connectivist emphasis on adaptability and the ability to access and integrate information effectively.

Implications of this perspective include a shift towards user-centric learning, the leveraging of social networking technologies in educational settings, and an emphasis on continuous learning through dynamic, interconnected networks. This implies that libraries, as knowledge hubs, should not only provide access to information but also actively support users in creating and navigating their networks, fostering a connectivist approach to learning.The mobile digital library that the study intended to develop could provide all the above services, thus, aligning it to connectivism theory.

2.3 Chapter summary

This chapter has presented an in-depth review of the theoretical framework employed in this study, with particular emphasis on the constructivism and connectivism theories. Constructivism places a strong emphasis on the active engagement of students in the learning process, wherein they actively construct their own understanding by integrating new information with their pre-existing knowledge. The inclusion of school libraries and the availability of informational resources play a vital role in facilitating effective pedagogy and knowledge acquisition within this educational context. In contrast, connectivism claims that the process of learning is facilitated by a networked framework, wherein individuals engage in connections and interactions with technology and social networks. The concept of knowledge is understood to be situated within networks, with an emphasis on the capacity to access and

selectively process information. The mobile digital library model formulated in this research study is in accordance with the principles of constructivism and connectivism. This is achieved through the provision of diverse information resources, the facilitation of active learning, and the utilization of technology for networked learning. The significance of these theories in relation to the field of study lies in their capacity to augment educational methodologies, aid both teachers and students, and address the disparity in accessing educational materials within schools that lack sufficient resources. The mobile digital library model seeks to enhance educational outcomes in under-resourced public high schools in KwaZulu-Natal by integrating constructivist and connectivist principles. The next chapter will review literature that is relevant to the study.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

Chapter two reviewed the theoretical framework employed in this study, with particular emphasis on the constructivism and connectivism theories. This chapter reviews literature that is relevant to this project. A literature review is a focused and purposeful synthesis of existing literature that is essential to a specific research inquiry, (dos Santos *et al.* 2021). The review of relevant literature is crucial in research as it provides the researcher with essential background information pertaining to their current study. Prior research has demonstrated the significance of conducting a comprehensive literature search, as it serves to prevent duplication in research efforts and enables researchers to avoid challenges encountered by their peers. A comprehensive review of the existing literature related to the present study, which focuses on the factors that contribute to the successful development and utilization of a mobile digital library model is provided in this chapter. The literature review examines various components that contribute to the development and utilization of mobile digital libraries. It also explores the information-seeking behavior of teachers in schools, their technological competencies, and the viability of employing a mobile digital library model for educational purpose.

3.2 Factors contributing to the successful development and the use of mobile digital library model

According to the findings of Nalluri and Gaddam (2016), it was determined that the use of mobile applications has the potential to enhance the learning experience by facilitating convenient access to library resources for users. According to various authors like Nalluri and Gaddam (2016: 65), Shih; Hwang; Chu; and Chuang (2011: 502), Yip, Lo, Ho, & Chiu (2021: 390) etc., mobile libraries offer a novel means of strengthening the relationship between patrons and libraries. This is achieved through the provision of services such as Open Access Catalogue accessible via mobile-optimized websites, as well as audio books, streaming music, e-books, audio language courses, films, images, and other multimedia resources that can be conveniently used on mobile devices. Libraries have the capability to provide library instructional materials and resources through mobile platforms as well. For instance, a notable example is the "Research First Aid" series of podcasts, which caters to library researchers who are frequently on the move (Nalluri and Gaddam, 2016). Certain libraries are currently providing a service known as "text a librarian," which is particularly suitable for addressing straightforward inquiries that can be resolved with a concise reply.

According to Rahman et al. (2020), several factors impact the usage of digital libraries, including the quality of the digital library, user experience with e-resources, the educational level of users, and the aptness of information resources available in the digital library. The authors also stated that these factors can enhance the quality of education delivered. Soltani-Nejad et al. (2020) were of the belief, the authors agree that user satisfaction and use of the digital library are influenced by several significant factors, including the presence of digital information resources, the user friendliness of the digital library system, and the quality of system and service information.

The factors that influence the use of digital libraries consist of system quality, user friendliness, service quality and information quality (Xu and Du, 2019; Xu and Du, 2018), user-friendliness (Wang *et al.,* 2018), and digital literacy and retrieval skills (Rafique *et al.*, 2021). According to Shih, Hwang, Chu, and Chuang (2011), their research demonstrated that the implementation of a mobile learning approach resulted in a notable improvement in students' positive attitudes towards learning and facilitated a greater scope for the application of exploratory and critical thinking skills. Yip, Lo, Ho, and Chiu (2021) examined the perceptions surrounding the adoption of mobile library apps as a mobile learning tool in higher education. According to Yip, Lo, Ho, and Chiu (2021), the findings indicate that students exhibited favorable attitudes towards the utilization of mobile library applications. Nevertheless, it is imperative to consider the socio-cultural variables and the cultural backgrounds of students during the development of mobile library applications intended for educational purposes. According to Ocran, Underwood, and Arthur (2020: 6), there is agreement with the findings of Yip, Lo, Ho, and Chiu (2021) that students are exhibiting a keenness for utilizing mobile library applications. According to Hu and Zhang (2016), the perception of students towards their use of mobile library applications is influenced by various factors such as the app's ability to be user-friendly in terms of stability and dependability, as well as its provision of relevant information. Masenya and Ngulube (2020) conducted a study to examine the various factors that impact the sustainability of digital preservation in academic libraries. The researchers identified several key factors that can hinder the usage or long-term viability of digital libraries, including poor involvement and commitment from the institution, inadequate policy support, insufficient resources, a dearth of niche skills, limited funding, restricted collaboration efforts and partnerships, and technological knowledge.

Khomo, Naicker, Chisita, and Rajkoomar (2023) were also of the opinion that critical factors for a mobile digital library are:

- **Providing reliable internet connectivity**

  Uninterrupted access to digital content is of paramount importance, and this objective can be effectively accomplished through strategic collaborations with both internet service providers (ISPs). Non-commercial Internet Service Providers (ISPs) encompass National Research and Education Networks (NRENs), which offer internet connectivity at a comparatively affordable rate in contrast to commercial ISPs.
- **The mobile digital library platform should be user friendly**

  It is imperative for the library to ensure that the system is designed with a high degree of user-friendliness. Users will be motivated to utilize the mobile digital library if it offers a seamless and convenient experience in terms of navigation and access to library resources, owing to the system's user-friendly design (Khomo, Naicker, Chisita, and Rajkoomar (2023)
- **Proper marketing of mobile digital library services**

  Library orientation and other related services is crucial in ensuring that users of mobile digital libraries possess a comprehensive understanding of the various services provided by the library. If library patrons are not informed about these services, their utilization of the mobile digital library will likely be poor. The optimal application of mobile digital library services relies on the effective marketing strategies employed to promote their usage among users. Library orientation, information, and meta literacy programs aim to equip users of the mobile digital library with the necessary knowledge and skills to effectively utilize the library's services for their own benefit. The optimization of mobile digital library usage can be achieved if library users are knowledgeable about these services (Khomo, Naicker, Chisita, and Rajkoomar (2023).

The model proposed by Van Dijk (2008) relates to the digital divide and includes four key dimensions: material access, skills access, motivational access, and usage access.

- **Motivational access:** For an individual to adopt a technology, they must possess the necessary motivation to utilize it. Individuals who recognize the significance of information and communication technology (ICT) are more inclined to obtain and utilize this technology. There exists a body of literature suggesting that psychological factors play a significant role in influencing one's access to motivation. Several factors can contribute to

individuals' resistance towards technology, such as social influences, technophobia, and the psychological strain associated with encountering technological devices, as exemplified by computers (Spelman and Marongwe, 2018).

- **Material access:** Material access is the availability of both ICT infrastructure and the affordability of ICT devices. Therefore, the ability to obtain resources is strongly linked to an individual's socio-economic status. According to van Deursen and van Dijk (2018), there is a relationship between higher income levels and the ownership of several high-quality devices. Conversely, individuals with lower incomes are more likely to possess lower-quality ICT devices that are prone to malfunction. In addition, individuals with lower incomes tend to primarily rely on smartphone connectivity for internet access, while those with higher incomes are more inclined to utilize smartphones along with other ICT devices like computers and laptops (Tsetsi and Rains, 2017). According to DeBell and Chapman (2006), there exists a disparity in the access to and utilisation of ICT at home among students, with those residing in households with high-income parents being more inclined to possess such resources compared to their counterparts whose parents have a lower income or no income at all. The South African Department of Education created the Thutong portal in 2005 with the aim of reducing the disparity in material access. This online platform was designed to grant teachers, learners, school managers, and parents the opportunity to access educational resources (Isaacs, 2007). The portal facilitates the exchange of information between teachers and learners through the utilisation of discussion forums and blogs, as well as the ability to upload educational materials.
- **Skills access:** Making use of ICT requires a diverse range of skills, encompassing technological literacy. The expansion and enhancement of ICT knowledge is necessary, as educators have the ability to foster collaboration, knowledge generation, and problem-solving skills among students through the use of information and communication technology (ICT) (UNESCO, 2011). It is imperative for educators to receive continuous training in ICT. According to Hsu (2010), educators who have received extensive training in ICT are more inclined to incorporate it into their instructional practices and according to Chigona and Chigona (2010), educators who possess a high level of confidence are more likely to incorporate technology into their teaching practices. Benali et al. (2018) assert that there exists a cohort of educators who have not yet attained competence in employing technology-enhanced pedagogical strategies and it therefore imperative that educators receive comprehensive training in ICT and have access to adequate infrastructure.

- **The usage access:** The utilisation of ICT is influenced by both internal and external factors, as noted by Shan Fu (2013). External factors encompass various elements such as the presence and accessibility of information and ICT infrastructure, provision of technical assistance, and the allocation of sufficient time for instructional preparation. Usage is influenced by various factors, including frequency of use, as well as the quantity and variety of applications. Internal factors encompass individuals' beliefs and attitudes, their motivation to utilize ICT, their proficiency in ICT skills, and their self-assurance in employing ICT. For example, the research conducted by Palak and Walls (2009) demonstrated that the attitude of teachers towards ICT was a significant predictor of their utilisation of ICT in the context of teaching and learning. Consequently, this had an impact on the extent to which their students also engaged with ICT. There is a positive correlation between a teacher's attitude towards ICT and their likelihood of utilizing the technology. Furthermore, a study conducted by Seraji *et al.* (2017) demonstrated that younger educators exhibited a higher level of positivity towards the integration of ICT in instructional practices compared to their older counterparts. According to Inan and Lowther (2010), less experienced teachers exhibited a more favorable attitude compared to their more experienced counterparts. The research conducted by Semerci and Aydın (2018) indicated that there were no statistically significant variations in attitudes towards ICT based on age.

3.3 Information seeking behavior of schools' teachers

Nalluri and Gaddam (2016) found that the provision of remote access to information resources through mobile libraries can effectively enhance learners' educational experiences beyond the confines of the traditional classroom setting. According to Nalluri and Gaddam (2016), individuals can actively develop their own understanding and receive individualized support by utilizing mobile devices. Mobile digital libraries provide learners with the convenience of directly observing and identifying learning objects, as they can physically interact with these objects and access supplementary digital information. The learning experiences of individuals extend beyond the information presented in textbooks (Shih, Hwang, Chu, and Chuang, 2011). According to Zha, Zhang, Li, and Yang (2016), mobile libraries provide users with the convenience of accessing digital library resources and services without being constrained by time and space.

In their research on the information-seeking behaviors of engineers and scientists in the United Kingdom, Wellings and Casselden (2019) found that a significant proportion of individuals in

these professional groups do not utilize library resources for accessing information. Instead, they primarily rely on information obtained from their colleagues as well as search engines such as Google. The rationale behind their selection of these sources is based on factors such as convenience, accessibility, and user-friendliness. Both engineers and scientists exhibited a preference for electronic resources and sources as opposed to print materials.

According to the findings of Shipman, Bannon, and Nunes-Bufford (2015), it concluded that teachers who are currently employed utilize websites, supervisors, and colleagues as their primary sources when seeking information for professional purposes. Library-related information sources, including online databases, journals, and government publications, are not frequently used for work-related objectives due to the convenience of searching the web or seeking assistance from colleagues for information, rather than employing information literacy skills to explore research publications within databases. The individuals are in search of information to aid them in the creation of lesson plans, the formulation of exercises and projects, and the development of assessments for their students. In research conducted by Hindwa, Chawinga, and Dube (2019), it was discovered that most security studies students at Mzuzu University in Malawi exhibited a preference for utilizing the Internet as their primary information source. The research additionally reveals that the main purpose for which students require information is predominantly for academic pursuits, such as fulfilling assignments, studying for exams, and conducting research projects. Most students exhibit a preference for utilizing search engines as their initial point of reference when embarking on an information retrieval endeavor. It was additionally established that certain students encountered difficulties in effectively accessing information because of challenges related to the Internet. These challenges encompass a deficiency in Internet search skills, confusion arising from the overwhelming abundance of information, and the issue of inadequate internet connectivity.

The study conducted by Chisa (2017) on the information-seeking behavior of academic theologians in South Africa revealed several key findings. Firstly, it was observed that certain academic theologians heavily rely on an informal network of colleagues for the purpose of exchanging ideas. Additionally, these theologians exhibit consistent and frequent usage of libraries, although they tend to rely on their personal collections to a similar extent as institutional collections. Moreover, the theologians display a preference for seeking information independently through various channels, indicating a relatively low reliance on librarians for assistance. Additionally, it was determined that theologians predominantly

employ the method of perusing library collections and examining the contents of academic journals to access relevant information.

According to Katrodia (2019), there exist six factors that serve as the most effective approaches for information retrieval. The sources of information in academic research typically include correspondence via mail or visits to libraries, data collected from attending conferences or working with research supervisors, information obtained from journals, library resources, electronic and printed media, as well as information retrieved through search engines. According to Nsibirwa and Kankam (2018), their research on impediments to the online information behavior of high school students in Ghana revealed that inadequate internet infrastructure, such as slow internet connections and restrictions on internet access, significantly hampers internet accessibility and usage in numerous developing nations.

3.4 Technological competences of teachers

Like other professionals, it is anticipated that teachers will use technological advancements in ways that increase and improve their ability to teach. The belief that teachers' usage of technology at a basic level is sufficient to cater to the requirements of learners in the 21st century is no longer deemed suitable. The use of technology solely for the purpose of facilitating classroom instruction is regarded as inadequate according to established best practices (Lawless and Pellegrino, 2007; Zemelman, Daniels and Hyde, 2005). According to the self-efficacy perspective, the effective integration of ICT in education is largely dependent upon the self-efficacy of teachers (Guoyan *et al.,* 2021). This is because self-efficacy plays a crucial role in empowering teachers to effectively facilitate students' achievement of learning objectives. Given the significance of teachers' self-efficacy in facilitating successful integration of ICT, numerous studies have proposed the implementation of training programmes to enhance their pedagogical and technological abilities. The research conducted by Khan and Abid (2021) and Akram, Abdelrady, Al-Adwan and Ramzan (2022) demonstrated that the transition from traditional face-to-face instruction to online teaching and learning during the COVID-19 pandemic presented an opportunity for educators and students to develop competence in technology through their use of various digital tools and platforms. Moreover, the research undertaken by Aslam *et al.* (2021) demonstrated that the integration of information and communication technology (ICT) improves the overall quality of the teaching and learning process. Additionally, the researchers identified a significant association between teachers'

technological pedagogical and content knowledge (TPACK) and their ability in using technology.

According to Ocran, Underwood, and Arthur (2020), the incorporation of mobile technology within an academic library setting has the potential to impact and enhance the preexisting connection with library users and the library. The integration of mobile technology within educational settings has resulted in the emergence of mobile learning. Numerous studies have reached the consensus that addressing teachers' proficiency in utilizing digital tools and resources can mitigate the impact of limited availability of such tools and resources. According to the Department of Basic Education (2018), implementing a professional development framework for digital education would demonstrate that the utilization of various pedagogical approaches has the potential to enhance and support learning, even when faced with limited digital applications and resources. According to the Department of Basic Education (2018:13), a fundamental requirement for novice educators is the possession of advanced literacy, numeracy, and IT proficiencies. This enables them to effectively utilize digital tools and resources in their teaching practices.

According to Ocrana, Underwood, and Arthur (2020), their research findings indicate that several factors contribute to the successful usage of a mobile library. These factors include providing training to users on how to effectively utilize the mobile library, involving users in decision-making processes regarding available services and resources, ensuring adequate financial support, enabling users to access and utilize the latest technology, and implementing effective marketing strategies for the digital library. According to Hamad, Farajat, and Hamarsha (2018), many factors have been identified as potential influences on the use of digital libraries. These factors include the level of staff awareness regarding the potential applications of mobile technology in delivering library services to users, the accessibility of relevant information resources, the technological competencies of library staff, the availability of adequate technological infrastructure for accessing digital library resources, and the level of experience possessed by library employees.

The research conducted by Ocran, Underwood, and Arthur (2020) highlighted the significance of digital literacy in enhancing the use of mobile library devices for accessing library resources. According to Khomo et al. (2023), the provision of digital literacy training for both library staff and users holds considerable importance. The provision of training on the utilization of the

latest technology for accessing digital library resources has a beneficial effect on the utilization of mobile digital libraries, as it enables users to effectively locate the desired information. The absence of digital literacy training may result in users experiencing a lack of motivation towards utilizing the mobile digital library. Consistent training of library users would ensure their continuous knowledge and proficiency in using the mobile digital library system as it undergoes updates. Chisango, Marongwe, Mtsi, and Matyedi (2020) conducted a study examining teachers' perceptions regarding the integration of information and communication technologies (ICTs) in instructional practices. The researchers found that a lack of proficient digital skills acts as a barrier for teachers when it comes to effectively utilizing technology for teaching and learning purposes. It was additionally discovered that certain educators possess computer literacy skills yet lack the ability to effectively incorporate information and communication technology into their instructional materials. One of the objectives of this study was to uncover the technological competences possessed by teachers.

Based on the findings of Ndimbovu and Nsibirwa (2022), it can be inferred that a significant proportion of educators exhibit a favorable disposition towards the integration of information and communication technologies (ICTs) in their instructional practices. The study conducted by Abbasi et al. (2021) concluded that teachers exhibited favorable attitudes towards the integration of technology in their instructional methods. Furthermore, the study suggests that there exists a need for these teachers to enhance their competencies through the acquisition of updated training, particularly in relation to the knowledge and skills acquired during their tertiary education for professional qualification attainment. According to Dlamini (2022), the limited level of digital literacy among educators was impeding the integration of technology within educational settings. According to Dlamini and Rafiki (2022), a significant finding was that a considerable proportion of educators possess smart phones, laptops, and desktop computers. However, it is noteworthy that most teachers lacked proficiency in information and communication technology (ICT) prior to embarking on their teaching careers. This study aimed to assess the proficiency level of teachers in carrying out various technological activities. According to Filita and Jita (2021), educators made efforts to utilize the limited information and communication technology (ICT) resources at their disposal to mitigate reliance on conventional instructional approaches. Additionally, it was disclosed that educators exhibited a lack in technological expertise. The study objective was to determine whether the pattern is applicable to underprivileged high schools in the KwaZulu-Natal region.

3.5 The feasibility of using a digital library model for teaching

According to Khomo *et al.* (2023), the viability of implementing a mobile digital library relies on the level of financial backing obtained. The authors additionally elucidated that in the absence of financial backing from the organization, the task of creating and encouraging library users to utilize the mobile digital library becomes challenging. This is due to the ongoing need for maintenance and regular updates to the library system. The absence of financial resources poses a significant challenge to the creation and operation of a mobile digital library, thereby hindering its potential for success. The provision of financial support from the organization is of utmost importance to guarantee the long-term viability of service delivery. A sustainable budget encompasses provisions for the ongoing maintenance and regular updates of both hardware and software components.

In their study, Masenya and Ngulube (2020) assert that this issue gives rise to concern. The researchers argue that academic libraries have the potential to address digital preservation challenges effectively through the implementation of appropriate strategies. This study investigates the perceptions of teachers and teacher librarians regarding the viability of implementing a mobile digital library in under-resourced high schools in KwaZulu-Natal (KZN). In their study on the utilization of digitized library information resources by lecturers in Federal university libraries in Nigeria, Adedeji and Mabawonku (2021) found that most university lecturers do not effectively utilize the information resources available in the library. Furthermore, the limited usage observed among those who do utilize these resources stems from the inadequate availability and accessibility of digitized information resources within the library. The research findings revealed that university lecturers face various challenges when utilizing library electronic resources, including power outages and limited access to desired and necessary information. The main challenges encountered were a lack of mobile-accessible resources and insufficient technical support for mobile devices.

3.6 Challenges facing the usage of mobile digital libraries

The emergence of digital libraries, driven by technological advancements and the widespread usage of mobile digital devices, has transformed the landscape of libraries and their operations. Electronic library services have been introduced, leading to the evolution of normal libraries into digital libraries. This development is closely tied to the progress of information technologies, particularly Internet technologies (Lia, Jiaoa, Zhanga and Xub, 2019). Digital

libraries aim to store, access, and manage various information resources such as books, audio, audio-visual materials, and images. One of the key advantages of digital libraries is their ability to enhance information accessibility by providing remote access at any time of the day. However, digital libraries encounter several challenges that hinder their preservation and sustainability. Academic libraries, in particular, face complications in preserving their digital resources due to the absence of established policies, as well as inadequate resources and a lack of training (Masenya and Ngulube, 2019). Despite being positioned as a solution for information retrieval and accessibility, digital libraries face additional hurdles such as limited funding and poor technological infrastructure (Masenya and Ngulube, 2019).

The issue of digital divide remains prevalent, as evidenced by the exclusion of South African rural communities from digital communication platforms, leading to digital inequality (Seadira and Heuva, 2021). The lack of digital literacy among users negatively impacts the usage of mobile libraries, as individuals lack the skills to effectively search for information using digital devices. Efforts are being made to address this issue by upgrading digital technology infrastructure, such as Internet and Wi-Fi, in remote rural areas to align with national standards (Matolong, 2020). While information and communication technology advancements have introduced positive changes in the day-to-day functioning of libraries, challenges persist. Limited funding, constant changes in software and hardware, and a lack of ICT skills and knowledge hinder the usage of digital libraries (Ocks and Gabriel, 2021). To ensure successful utilization and management of mobile digital libraries, both library workers and users need to be digitally literate. Additionally, financial support is essential for the maintenance and hosting of digital libraries.

3.7 Access to technology in disadvantaged schools in South Africa

A significant proportion of learners face socio-economic disadvantages as schools in their areas are in impoverished townships that lack essential amenities. Despite the implementation of modern curricula after the initial democratic elections in 1994, disadvantaged schools continue to face resource disparities in comparison to more advantaged schools located in affluent areas. Furthermore, despite the prevalence of mobile phone usage among many learners, they still lack access to computers. Nevertheless, it is imperative according to the national government regulations that children acquire computer literacy skills, and schools are required to incorporate ICT throughout the curriculum (Department of Education, 2004).

As the integration of ICT has become increasingly prevalent within the field of education, the digital divide has become more apparent in disadvantaged schools (Chen, 2015). This situation has been exacerbated by the emergence of the COVID-19 pandemic. The population that experiences the greatest marginalization in terms of accessing the benefits of advancements in ICT consists of individuals residing in rural regions within developing nations. The digital divide can be observed in South Africa, specifically between schools located in affluent suburbs and those situated in economically disadvantaged areas (Department of Education, 2004). While certain schools in disadvantaged communities in South Africa have implemented ICT infrastructure, including internet access, tablets, smartboards, computers, and laptops, van Dijk (2005) argued that the digital divide is not only widening but also becoming more profound. Zhong, (2011) stated that the digital divide has evolved beyond mere access to information and communication technologies (ICTs) to encompass broader concerns related to the acquisition of necessary skills and capabilities for active participation. The digital divide in schools can be categorised into three levels: "ICT infrastructure, ICT usage by teachers and learners within the classroom, and the empowerment of individual learners" (Hohlfeld *et al.*, 2008). "Factors, such as the attitudes of teachers towards technologies and their resistance to new ICT, act as barriers to the integration of technologies in educational settings" (Chisango and Marongwe, 2018; Du Plessis and Webb, 2012).

Merkofer and Murphy (2009) reveals that there is a prevailing shortage in the development of e-skills within South Africa. According to Merkofer and Murphy (2009), it is maintained by the researchers that effective collaboration among key stakeholders, namely the government, industry, and educators, is imperative in order to tackle the shortage of e-skills in South Africa and facilitate the country's transition into a prominent player in the field of ICT. The lack of infrastructure for developing e-skills at educational and community levels poses a significant challenge in South Africa. The nation is additionally defined by disparities, including a privileged and educated minority that possesses technological access, juxtaposed with a disadvantaged majority, leading to an expanding digital divide. These disparities can be attributed to factors such as inadequate funding for schools and the mismatch between higher education and the demands of the job market.

Chisango and Marongwe (2021) conducted a study aimed at evaluating the extent of the digital divide within three economically-disadvantaged (Quintile 1) secondary schools located in Gauteng, South Africa amidst the COVID-19 pandemic. The study revealed that a significant

proportion of learners exhibited a lack in ICT skills, lacked the necessary resources to effectively use ICT platforms, encountered limited availability of Wi-fi connectivity, faced financial constraints hindering their ability to purchase data, and experienced difficulties with network connectivity. Consequently, they are not adequately prepared to begin remote learning in comparison to certain urban schools. Educators and students lacked the necessary technological tools to facilitate distance learning yet were still expected to effectively execute online teaching methodologies. The research additionally revealed that internet connectivity was limited to the administration block within schools, with a significant majority of teachers and students lacking access to the internet in their own homes. Therefore, the combination of restricted internet access and inadequate digital literacy hindered certain educators from using ICT during the period of lockdown imposed due to the COVID-19 pandemic. The inadequate ICT skills of teachers posed an additional obstacle to the implementation and utilisation of instructional technology. Some teachers expressed their dependence on students when utilizing technology due to their own limited ICT skills.

3.8 Gaps in the literature

The mention of various studies conducted by Nalluri and Gaddam (2016), Yip, Lo, Ho & Chiu (2021), Ocran, Underwood & Arthur (2020), Hamad, Farajat & Hamarsha (2018), among others, suggests a body of research that has explored factors influencing the usage of mobile libraries. However, it is highlighted that none of these studies have specifically delved into the factors contributing to the development and utilization of mobile libraries, the feasibility of implementing digital libraries for teaching, and the technological competencies of teachers to use mobile technology in under-resourced public high schools in South Africa.

The gap in existing research points to a need for a focused investigation into the unique challenges and opportunities related to mobile library development and usage in the specific context of under-resourced public high schools in South Africa. Understanding the factors that contribute to the establishment and utilization of mobile libraries is crucial for improving access to educational resources in settings with limited resources. Additionally, exploring the feasibility of implementing digital libraries for teaching in these schools is vital, considering the potential benefits and challenges associated with integrating technology into the learning environment.

The mention of technological competencies of teachers suggests an awareness of the importance of educators' proficiency in using mobile technology. This aspect is critical for the successful integration of digital resources in the teaching and learning process, especially in under-resourced schools where teacher training and support may be limited. There is therefore the the need for targeted research to address the identified gaps, offering insights into factors influencing the development and usage of mobile libraries, the feasibility of digital libraries for teaching, and the technological competencies of teachers in under-resourced public high schools in South Africa. Such research could inform strategies to enhance educational resources and technology integration in contexts facing resource constraints.

3.9 Chapter summary

In summary, the literature review demonstrates the significance of conducting a thorough examination of extant scholarly works in the field of academic research, specifically within the framework of constructing and employing a mobile digital library model. The review defines various factors that contribute to the effective development and usage of mobile digital libraries, encompassing convenient resource accessibility, user satisfaction, information integrity, and user-friendliness. The study also investigates the information-seeking patterns exhibited by teachers, who predominantly depend on their colleagues and online resources for acquiring information. Additionally, it delves into the technological competencies of teachers, highlighting the necessity for training in digital literacy. Moreover, the review examines the viability of adopting a digital library framework for educational purposes, placing emphasis on the significance of financial backing and the possible obstacles associated with maintenance and enhancements. In general, this literature review highlights the importance of a mobile digital library model in improving learning experiences, facilitating convenient resource accessibility, and responding to the information requirements of users. Additionally, it emphasizes the importance of considering variables such as user satisfaction, information quality, and user-friendliness during the development and implementation of said model. Furthermore, the review highlights the significance of addressing the technological competencies of educators and offering digital literacy training to facilitate the successful integration of technology in educational environments. The results of this review offer significant insights and considerations for researchers, educators, and policymakers who are interested in the development and implementation of mobile digital libraries within educational settings. The next chapter outlines the methodology that was followed in conducting this study.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

While the previous chapter reviewed literature relevant to the study, this chapter sets out the methodological processes followed in carrying out the study. The significance of research methodology cannot be overstated as it constitutes a fundamental component of research. The research methodology refers to the systematic approach employed to gather and analyze data. The current chapter outlines the methodological procedures employed to conduct the study. The purpose of this study was to identify the factors that contribute to the successful development and use of a mobile digital library model. Additionally, the study aimed to determine the feasibility of using a mobile digital library model for purposes of learning, assess the technological competences of educators in utilizing mobile technology, and develop a mobile digital library model that is suitable for teaching in schools with limited resources. The researcher was guided by the following objectives in the collection of information for this study.

4.2 The philosophical underpinnings

According to Guba (1990), philosophical foundations can be understood as "worldviews," which encompass a collection of beliefs that provide guidance for one's actions. Worldviews encompass an individual's perspective and cognitive framework through which they perceive and approach research, as well as the manner in which it is executed (Cresswell, 2009). Scientific paradigms encompass a comprehensive framework of thought that comprises fundamental beliefs or assumptions, which serve as guiding principles for research inquiries. Kuhn's (1970) concept of 'paradigm', as referenced by Neuman (2011), refers to a fundamental framework guiding theoretical and research endeavors. Hence, given the significant impact of philosophical underpinnings on the research investigation, it is imperative for the research to establish a solid foundation for its inquiry, which can be achieved through the incorporation of worldviews and scientific paradigms. Paradigms play a fundamental role in research methodologies and methods as they embody a philosophical or metaphysical framework of beliefs, worldviews, or values that serve to justify and advocate for research priorities and decisions (Cibangu, 2010; Cresswell, 1998; Guba, 1990; Lincoln, 2009).

The selection of a research paradigm has a significant impact on how a study is conducted, as it shapes the way social phenomena are framed and understood. The researcher's inquiries are

guided by a fundamental set of beliefs or assumptions that pertain to ontology, which concerns the nature of reality, and epistemology, which pertains to the acquisition of knowledge and the researcher's relationship to the subject of research (Terre Blanche and Durrheim, 2006). In addition to the aforementioned primary philosophies, axiology pertains to the examination of values within the study, while methodology refers to the research process (Wahyuni, 2012). These fundamental principles, in relation to research paradigms, are further expounded upon in the discussions concerning research paradigms.

The selection of a paradigm is important in shaping the purpose, motivation, and anticipated outcomes of a research study. Additionally, it establishes a foundation for making subsequent decisions related to methodology, methods, and research design (Mackenzie and Knipe, 2006). The literature explores various theoretical paradigms, including interpretivism and pragmatism (Mackenzie and Knipe 2006). This section will provide a brief discussion of the two most prevalent orientations in research, namely positivism and post positivism, as well as critical paradigms. The purpose of this discussion is to emphasize the researcher's selection of a specific paradigm. Subsequently, the ensuing discourse will centre on the interpretative paradigm and pragmatism, evaluating their suitability for the present study.

4.2.1 Interpretivism

Social science positivism and interpretivism disagree. Positivism views reality through objectivism and empiricism. Interpretivism's ontology, epistemology, and methodology are socially produced. Interpretive researchers believe that shared meaning is the only way to determine social reality (Aliyu *et al*, 2014: 84). Chipindi, Serenje-Chipindi, and Daka (2020) agree that interpretivism views reality as socially created and fluid. Interpretivist researchers also rely on participants' views (Creswell 2020). Thus, unlike positivism, interpretivism emphasizes how people feel about lived events. The researcher found positivism and interpretivism attractive and important to study. These paradigms allowed the researcher to determine the best ontological, epistemological, and axiological worldview for the investigation. Thus, the researcher examined interpretivist paradigm. Kumatongo and Muzata (2021) state that interpretivists are subjective. This is essential to understanding interpretivism. Subjectivism holds that everyone creates their own reality from their experiences. Academic librarians who teach at universities have diverse pedagogical skills. Academic librarians from diverse pedagogy backgrounds describe designing student learning activities and resources. The interpretivism paradigm relies on "academic librarians" to grasp pedagogical abilities

related to learning activities and resources. The interpretivist paradigm conceptualizes the social reality of academic librarians and pedagogy using interpretive data, while positivism uses objectivity and empirical methods (Al-Ababneh, 2020).

Subjectivism underpins interpretivism as a research paradigm (Alharahsheh and Pius, 2020). Interpretivism connects inquiry, uniqueness, and social reality for each person. Saunders (2021) agrees that the interpretivist paradigm is linked to each participant's life experiences. It lets participants share their experiences to understand a phenomenon. Neuman (2014) adds that interpretivists investigate the intrinsic knowledge people identify with in a topic by extrinsically interpreting feelings, conduct, and beliefs throughout study. A person's social reality affects their interpretive paradigm. Thus, interpretivism is limited by intrinsic knowledge constructions. Thus, the interpretivist ontological perspective varies from positivism since it explores reality by direct involvement as others experience it rather than neutrality like objectivism.

Qualitative methods can unpack interpretivism (Frechette *et al.,* 2020). Interpretivism encourages qualitative methods like interviews and focus groups to study human experience (Heotis, 2020). The interpretative paradigm narrows the researcher's focus to rich lived experiences and phenomenon descriptions when using these data collection methods. Qualitative techniques allow people to interpret their experiences and reflect on their social reality, according to Prosek and Gibson (2021). The researcher must make sense and reflect when interpreting an individual's social reality in respect to the phenomenon.

Interpretivist social scientists acknowledge that personal values might affect a researcher's axiological perspective and neutrality (Gillani, 2021). Accept that interpretivism is social. It develops field knowledge through qualitative and naturalistic research (Denzin and Lincoln 2018). Interpretivism shares meaning and experiences with humans. It is not determined by statistical models like positivism. Thus, shared experience can lead to good or negative conclusions depending on the context and how it affects an individual. Interpretivism employs inductive reasoning to explain and theorize science (Gunbayi and Sorm, 2018). Inductive reasoning in interpretivism lets scholars navigate a phenomenon through observation, experience, and reflection. Empirical research reveals global mechanics. This encompasses daily human activities. Robert *et al.* (2021) suggest interpretivism guides inductive reasoning researchers. Inductive reasoning begins slowly with hazy notions. This gradually refines

notions and finishes with personified perfection. Inductive reasoning uses observations to draw a general premise. Inductive reasoning answers issues by observing (Cramer-Peterson, Christenson and Ahmed-Kristensen, 2019).

In addition, interpretivist methodology is more adaptable (Thompson, Thorne and Sandhu 2021). It does not follow a positivist method. Thus, interpretivist researchers avoid methodological functions linked to generalizability, dependability, and replication (Jacobs, 2021). Interpretivism develops theory about a thing. The literature supports interpretivism based on the researcher's standpoint, participants' shared meanings, and lived experiences. Thus, interpretivism requires the researcher and participants to provide useful discoveries and advance a field's knowledge.

4.2.2 Pragmatism

Pragmatism is a philosophical perspective that emerges from the interplay of situations, actions and their corresponding outcomes. Pragmatism does not adhere to a specific philosophical or ontological framework. Pragmatism places its emphasis on the research problem and employs various approaches to comprehend and address said problem. The pragmatist places emphasis on the identification and implementation of effective strategies to address the research problem (Creswell, 2009). Pragmatism, as a philosophical perspective, challenges the binary nature of paradigm selection and instead seeks pragmatic solutions to research inquiries, prioritizing the effectiveness of understanding and addressing the research problem. The pragmatist researcher initiates the inquiry by formulating a research question and shows the importance of perceiving the research philosophy as a spectrum, encompassing various positions along the quantitative, qualitative, and mixed methods continuum (Teddlie and Tashakkori, 2009). According to Creswell (2013), pragmatism offers the potential for incorporating various methodologies, diverse perspectives, contrasting assumptions, and distinct approaches to collecting and analysing data. According to Teddlie and Tashakkori (2009), the pragmatic stance supports the integration of qualitative and quantitative methods in research studies that require diverse data types to address the research inquiries. Hence, “pragmatism acknowledges the incorporation of ontology, epistemology, axiology, and methodology as a means to approach and comprehend social phenomena” (Wahyuni, 2012).

4.2.3 Paradigm selection

The positivist and interpretive paradigms share a common focus on comprehending phenomena, albeit through distinct epistemological perspectives. Positivism aims to achieve objectivity, whereas the interpretive paradigm aims to comprehend and interpret the world based on the perspectives and experiences of its participants (Cohen, Manion, and Morrison, 2007). According to the information provided in Section 4.2.2, the critical paradigm views social reality as being shaped by historical factors, wherein power dynamics, control mechanisms, and epistemological frameworks are regarded as social constructs that yield advantages for certain individuals or groups while disadvantaging others. The study's scope does not encompass the examination of power dynamics, control mechanisms, and social constructions in relation to the disparities in educational provision. As a result, the critical paradigm was not chosen as the preferred theoretical framework for this study. On the contrary, pragmatism facilitates the exploration of diverse worldviews or paradigms. According to Creswell (2014), pragmatism allows for the utilisation of various methodologies, diverse perspectives, distinct assumptions, as well as different approaches to collecting and analysing data. The selection of pragmatism and interpretivism as epistemological frameworks for this study was determined by the study's objectives, research questions, and research context.

4.3 Research design

This study examined teacher librarians' views and teachers views regarding the implementation and usage of the mobile digital library model for teaching. The mobile digital library model is hoped to contribute positively to teaching and learning in under-resourced schools at a minimum cost to the schools. The choice of a mixed-method research design for this study examining teacher librarians' and teachers' views on the implementation and usage of a mobile digital library model is justified based on several key factors outlined in the provided text. The research aims to explore the potential positive contributions of the mobile digital library model to teaching and learning in under-resourced schools while minimizing costs. The mixed-method approach is deemed effective in achieving a comprehensive understanding of trends, personal perspectives, relationships among variables, theory testing, and the development of new measurement instruments, as indicated by Ivankova, Creswell, and Clark (2019).

The study's two-phase design, starting with qualitative data collection to gain in-depth insights and inform the formulation of the mobile digital library model, aligns with the exploratory sequential mixed method approach. This approach, according to Maree (2016), is appropriate

when the initial objective is to explore a subject matter through qualitative data analysis, followed by the collection of quantitative data. In this case, qualitative data is used to inform the development of the mobile digital library model, and then quantitative data is collected to assess the perceived usefulness of the model among teachers and teacher librarians.

The mixed-method design proves advantageous in addressing the tangible problem of enhancing teaching and learning in under-resourced schools through the implementation of a cost-effective digital library model. It allows for a holistic investigation that combines the strengths of qualitative and quantitative research methods, providing a nuanced understanding of the phenomenon under study. Therefore, the mixed-method approach is justified in this research due to its ability to effectively address the study's objectives, combining qualitative and quantitative data collection in a sequential manner to gain a comprehensive understanding of the implementation and usage of the mobile digital library model in under-resourced schools.

4.4 Population

According to Trochim, Donnelly, and Arora (2016), the concept of population refers to the specific group that a researcher aims to generalize about, as well as the group from which the researcher selects a sample for the study. Based on the Department of Basic Education (2019) and the Department of Basic Education (2020), it has been established that there exists a total of twelve (12) education districts within the province of KwaZulu-Natal. The study's sample consisted of 24,671 teachers, which included teacher librarians, from a total of 1,309 under-resourced public high schools in KwaZulu-Natal, as reported by the Department of Basic Education in 2019. Table 4.1 displays the number of under-resourced public high schools within each educational district in the province of KwaZulu-Natal.

Table 4. 1: Number of under-resourced public high schools in each educational district in KwaZulu-Natal

District	Quintile level of school			
	1	2	3	Total
Amajuba	2	17	27	46
Harry Gwala	21	45	10	76
Ilembe	52	31	25	108
King Cetshwayo	48	80	46	174
Pinetown	0	15	65	80
Ugu	44	54	15	113
Umgungundlovu	5	44	56	105
Umkhanyakude	78	63	13	154
Umlazi	1	8	48	57
Umzinyathi	76	22	10	108
Uthukela	30	35	47	112
Zululand	84	58	32	174
TOTAL	**441**	**472**	**394**	**1307**

4.5 Sampling

Conducting a comprehensive survey of the entire population would enhance the validity of generalizing the results. However, due to limitations such as financial and geographical constraints, it was unattainable to examine every individual within the specific population under investigation (Altinay; Paraskevas and Jang, 2016). Consequently, the researcher was required to carefully choose a sample from the larger population to be included in the study. Sampling refers to the systematic procedure employed by researchers to choose a subset of the research population for the purpose of drawing inferences about the entire population (Gliner, Morgan, and Leech, 2017; Altinay, Paraskevas, and Jang, 2016). There exist two primary categories of sampling techniques, namely probability sampling and non-probability sampling. The present research employed a probability sampling technique to ensure the selection of participants was unbiased. In a probability sample, each individual or element within the population possesses a known, non-zero likelihood of being selected as a member of the sample (Gliner; Morgan and Leech, 2017). The cluster-sampling method was chosen as the preferred probability sampling method for this study.

According to Gliner, Morgan, and Leech (2017), the use of the cluster sampling method proves advantageous in cases where the target population is dispersed across a wide geographical area.

The study's population was situated within the KwaZulu-Natal province and encompassed 12 educational districts. Hence, the cluster-sampling technique emerged as the most suitable method for sampling a target population of interest. According to Trochim, Donnelly, and Arora (2016), Sekaran and Bougie (2016), and Altinay, Paraskevas, and Jang (2016), the utilization of a cluster sampling technique involves the geographical division of the population into clusters, from which a sample of said clusters is drawn by the researcher. In a multi-stage design, the initial step involves employing simple random sampling to select clusters. Subsequently, a random sampling technique is implemented to select smaller clusters, followed by the selection of individual houses within those clusters. Finally, a sampling approach is used to select individuals residing in the selected houses.

KwaZulu-Natal consists of twelve educational districts, namely “Amajuba, Harry Gwala, Ilembe, King Cetshwayo, Pinetown, Ugu, Umgungundlovu, Umkhanyakude, Umlazi, Umzinyathi, Uthukela, and Zululand”. This information is derived from the Department of Basic Education's school master list data, which was last modified on July 28, 2020. The population for this study was pre-existing stratified geographically into 12 educational districts. According to Altinay, Paraskevas, and Jang (2016), it is recommended that once educational districts have been identified, the researcher should proceed to geographically divide the population. Subsequently, the researcher randomly selected districts to form a sample for the study. Further elaboration regarding the parameters and the way clusters were chosen at random is elaborated on in the section titled "sample size."

The researcher can proceed by classifying institutions into clusters based on shared characteristics. Subsequently, one institution can be randomly chosen from each category within each cluster, provided that the institutions within each category exhibit similarity Kumar, (2011) and Altinay, Paraskevas, and Jang (2016). The schools in each chosen district were classified based on quintile levels, specifically Quintile level 1, Quintile level 2, and Quintile level 3. To ensure comparability, the researcher employed a random selection method to choose one school from each quintile level category within each selected district. According to Connaway and Radford (2017), it is also argued that elements within a specific natural cluster in a population exhibit greater homogeneity compared to all the elements in the entire population. For this reason, the researcher employed a random selection method to choose one school from each category within the designated district. Further elaboration regarding the

random selection process employed for each school can be found in the section titled 'sample size'.

The research study utilized a focus group interview as a method of data collection. To adhere to the recommendation of Connaway and Radford (2017), the researcher invited twelve (12) teachers from each randomly selected school that had more than 12 teachers to participate in the focus group interviews. This was done to ensure that the acceptable maximum number of 10 focus group participants was met, and an additional two to four participants were "over-recruited" to guarantee a minimum of eight individuals would attend the focus group interview. There were schools wherein the number of employed teachers was fewer than eight (8). The researcher encountered difficulty in recruiting the suggested minimum number of eight (8) staff members to partake in the focus group interview. In the context of those schools, the researcher made the decision to extend an invitation to all available teachers to partake in focus group interviews. The interview was extended to teacher librarians affiliated with schools that possessed school libraries. Further information regarding the participation of teachers and teacher librarians in focus group and individual interviews is elaborated upon in the section titled 'sample size'.

4.5.1 Sample size

The academic literature provides various guidelines regarding the determination of sample sizes for estimating sample sizes. However, Altinay, Paraskevas, and Jang (2016) argue that each study should be evaluated independently, considering its unique characteristics, and that the researcher and their supervisor should collaboratively decide in this regard. The researcher must ensure that the population is adequately sampled. The researcher used an online sample size calculator known as Survey Software-The Survey System. Based on the findings of Survey Software - The Survey System (2012), the sample size for a set of 12 items is determined to be five (5). The study used a methodology of simple random sampling to determine the districts that would be included in the research. A total of five districts were selected in a random manner. The researcher systematically selected district names and placed them within a container. The researcher subsequently selected the first five (5) district names from the container. The initial five selected district names were included in the study.

The schools within each selected district were classified into three quintile levels, namely Quintile level 1, Quintile level 2, and Quintile level 3 (Table 4.2). Subsequently, one school

was randomly chosen from each category within each selected district. Schools in each quintile level exhibit similarities in terms of their limited resources. The researcher extracted the names of schools belonging to each quantile category within each district and subsequently placed them into a container. The researcher subsequently selected the first name of the school from the container. The study involved the inclusion of schools from each quantile category within randomly selected districts.

According to Connaway and Radford (2017), it is suggested that an extra two to four participants should be "over-recruited" in order to guarantee a minimum of eight individuals attending the focus group interview. This study employed a purposive sampling technique to recruit a total of twelve (12) teachers from each randomly selected school that had a teacher population exceeding twelve. Nevertheless, it should be noted that in certain schools, the quantity of employed educators varied between four (4) and eight (8). Consequently, the researcher proceeded to conduct focus groups with the largest possible number of teachers accessible within these schools. The researcher extended invitations to teachers who are currently engaged in teaching at the further education and training (FET) phase. This phase is characterized by subject or stream specialization, making it a relevant group for the study. Teachers who instruct at this stage possess advanced knowledge and expertise in their respective academic disciplines. Additionally, they possess a comprehensive understanding of identifying pertinent information resources that should be accessible to students enrolled in a particular subject or Further Education and Training (FET) phase. A single focus group interview was conducted with teachers from each of the selected schools. Except for the Pinetown district, every district was allocated three selected schools. The Pinetown district was found to lack schools classified under quintile one (1). The survey was conducted exclusively in two schools, specifically those belonging to quintiles 2 and 3 within the district. A total of eleven (11) focus group interviews were conducted. A total of ninety-four (94) teachers took part in the focus group interview, with seventeen (17) teachers from Amajuba district, twenty (20) teachers from Pinetown, twenty-three (23) teachers from Ugu, eighteen (18) teachers from uMgungundlovu, and sixteen (16) teachers from Umlazi. One of the participants in this group is a teacher librarian who expressed a preference for participating in a focus group interview rather than an individual interview. The researcher discovered that a mere three schools possessed libraries on their premises. The original plan entailed conducting three separate interviews with teacher librarians. However, one of the three teacher librarians chose to participate in a focus group instead of an individual interview.

Table 4.2: Focus group participants

District	Participation	Quintile 1	Quintile 2	Quintile 3	Total
Amajuba	Number of teachers invited to participate	5	40	59	104
	Number of teachers who participated	5	0	12	17
Pinetown	Number of teachers invited to participate	N/A	26	20	46
	Number of teachers who participated	N/A	8	12	20
Ugu	Number of teachers invited to participate	14	14	16	42
	Number of teachers who participated	8	0	15	23
Umgungundlovu	Number of teachers invited to participate	4	5	34	43
	Number of teachers who participated	4	4	10	18
Umlazi	Number of teachers invited to participate	11	7	14	32
	Number of teachers who participated	8	8	0	16
Total	Number of teachers invited to participate	34	92	141	267
	Number of teachers who participated	25	20	49	94

Table 4.2. provides details on the number of teachers who participated in the focus group interviews. The table is inclusive of one teacher librarian who insisted on participating on focus group.

4.6 Data collection

Data collection encompasses a diverse range of instruments, including but not limited to questionnaires, interviews, and observations. Each of these tools holds both advantages and disadvantages, which vary depending on the specific characteristics of the study. The present study employed the utilization of focus group interviews, individual interviews, and survey questionnaires as the primary methods for data collection. The study consisted of two distinct phases.

4.6.1 Questionnaire design

A self-administered questionnaire is an instrument of data collection that the participant completes by themselves, and it consists of a "standardized series of questions about the research topic, to be answered in writing by participants" (Gliner; Morgan, and Leech, 2017). The researcher ensured that the questions on the questionnaire (refer to annexure A) were clear and unambiguous, to promote completion of questionnaires. This was to avoid the incompleteness and a low return rate that seems to be the one of the disadvantages of using this data collection instrument (Gliner; Morgan, and Leech, 2017). Key themes on the questionnaire were demographic; components contributing to the successful development and use of a mobile digital library; feasibility of using a digital library; and technology ability.

The researcher carefully designed the questionnaire to ensure teachers easily understood it. Fifteen (15) questionnaires were pre-tested to teachers from 3 different under-resourced school categorized according to their quintal levels. Five teachers from each school received five questionnaires to complete. This was done to find out if respondents would respond to questions as expected and, in this way, check the reliability of the questionnaire. Questions in the questionnaire were relevant to the objectives of the study. There were only closed ended questions except for one question. This encouraged teachers to complete the questionnaire.

4.6.2 Interview schedule

The interview is considered a valuable instrument for collecting data, wherein the researcher verbally poses questions to the participant, either in person or through telephone communication (Gliner, Morgan, and Leech, 2017). Qualitative data was gathered through the implementation of individual interviews as well as focus group interviews. An interview within the context of qualitative research refers to a dynamic and interactive form of communication involving two or more individuals. The primary purpose of this exchange is to elicit information pertaining to the research topic, which is subsequently documented or recorded for analysis (Altinay, Paraskevas, and Jang, 2016). Qualitative data for this study was collected through individual interviews with teacher librarians from schools that have school libraries, as well as focus group interviews with teachers. In both individual interviews and focus group interviews, the researcher utilized an interview schedule (Annexure C) to facilitate and structure the interview procedure. The schedule included a combination of open-ended and closed-ended inquiries. The schedule also covered potential probes and prompts designed to collect additional information from the respondents. The primary themes explored in this study

represented the various factors that contribute to the successful development and utilization of a mobile digital library, the feasibility of implementing a digital library, and the technological capabilities of teachers.

The primary objective of using open-ended questions was to give respondents with the opportunity to provide more comprehensive explanations regarding the subject matter. Subsequently, additional information was sought using probing questions. The schedule commenced with a concise introduction of the research project, wherein the researcher outlined the objective of the study and assured participants that all their responses were confidential and utilized solely for data collection for this specific project.

4.6.2.1 Individual interview

Various forms of individual interviews exist. The data collection process in this study involved the use of semi-structured interviews with the teacher librarians. The researcher aimed to gather the perspectives of teacher librarians regarding the potential contributions of the mobile digital library model in enhancing teaching practices within under-resourced high schools. Altinay, Paraskevas, and Jang (2016) assert that a semi-structured interview is employed as a means of ascertaining current occurrences, acquiring fresh perspectives, recognizing general trends, and understanding the relationship between variables. The researcher developed a structured interview guide specifically tailored for teacher librarians. The study focused on analyzing the various factors that contribute to the successful development and utilization of a mobile digital library. Additionally, it examined the feasibility of implementing a digital library and assessed the technological capabilities required for its effective functioning. This guide comprises a list of questions to be posed during the interview process (Annexure C).

4.6.2.2 Focus group interview and individual interview

To gather qualitative data, a total of eleven (11) focus group interviews were conducted with teachers, along with two individual interviews specifically with teacher librarians. This study was conducted in two distinct phases. The researchers utilized focus group interviews as a means of gathering qualitative data from teachers. This method was chosen due to its ability to allow the researchers to observe and gain a comprehensive understanding of the participants' experiences and interpretations (Connaway and Radford, 2017). Focus groups typically comprise a purposively or voluntarily selected group of individuals, ranging in number from eight to twelve, who are collectively interviewed. These individuals are chosen based on

common experiences, similar backgrounds, or specific expertise in a particular field (Altinay, Paraskevas, and Jang, 2016; Connaway and Radford, 2017). The teachers who took part in the focus group interviews shared a similar background, as they were selected from each school in a random manner. The participants in the focus group interviews comprised senior teachers, junior teachers, and teachers from school management teams. The researcher developed a focus group interview guide specifically tailored for teacher librarians. The guide included a list of questions to be posed during the interview process, as outlined in Annexure B.

4.6.3 Interviews

Data from teacher librarians was collected through interviews conducted between a researcher and teacher librarians from selected schools. There was a total of three librarians representing various schools across multiple districts. Two teacher librarians took part in the individual interviews. One teacher librarian expressed discomfort with engaging in the individual interview and requested to participate in the focus group interview instead. Subsequently, she engaged in the focus group interview. The data collection period commenced in August 2022 and concluded in February 2023. A focus group interview was conducted, involving all participating teachers. With the participants' consent, the discussions were recorded in audio format. The study employed focus group interviews that were conducted during designated break times and in the early hours before office starting up. The researcher scheduled appointments and conducted focus group interviews with teachers at their respective schools. The focus group interviews were conducted between the months of August 2022 and February 2023. Following multiple school visits and phone conversations, it was revealed that three principals from the chosen schools expressed their reluctance to allow their staff members to participate in the study. One individual asserted that their employees would be disinclined to partake in the study, as they would not derive any personal benefit from assisting another individual in attaining the qualification. Three schools, consisting of two quintile two schools and one quintile 3 school, declined to participate in the study. Each of the three schools belonged to different districts. The researcher successfully conducted a total of eleven focus group interviews with teachers coming from eleven distinct schools located in five different districts. Teachers within the same district share a common background in terms of reporting to the same district. However, their backgrounds differ in relation to quintile level categories. Hence, it was imperative for the researcher to undertake a focus group interview with three distinct schools representing varying quintile levels in each designated district.

After collecting qualitative data, the mobile digital library model was developed (http://digital-library.whythorse.co.za). The mobile digital library model includes various resources such as e-books, e-journals, and videos. The remote accessibility of the system is observable.

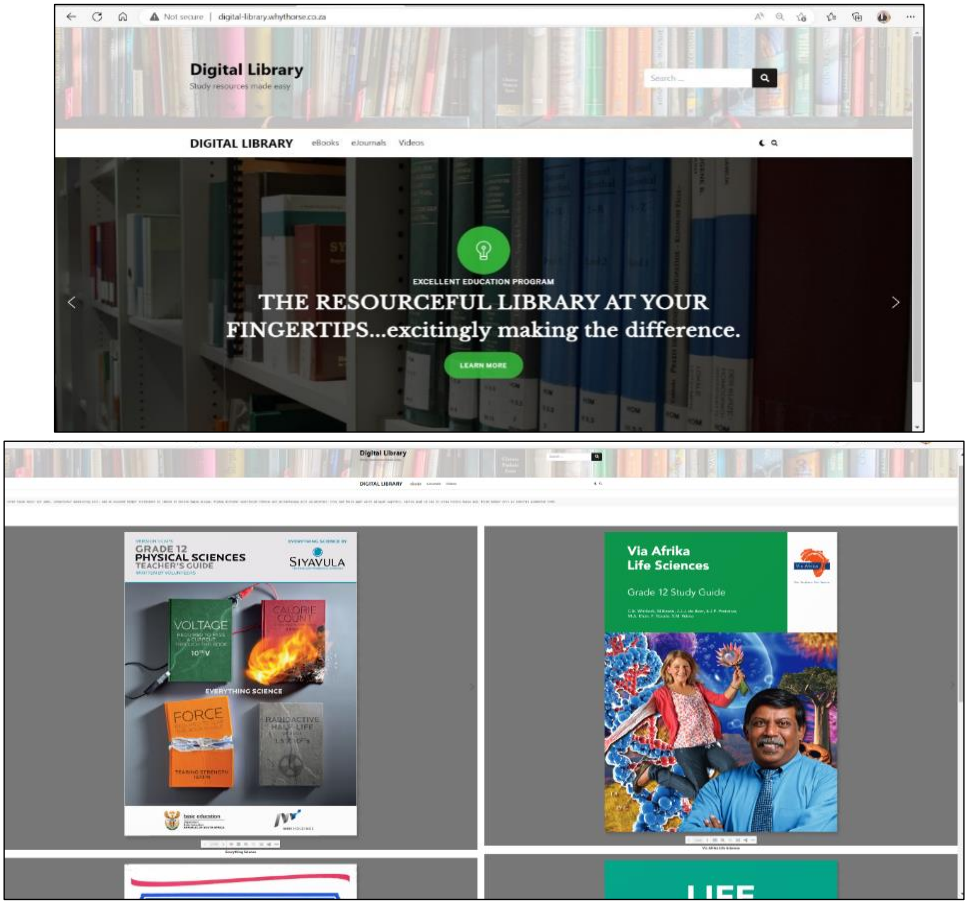


Figure 4.1: Mobile digital library model

The teachers and teacher librarians from the schools that were part of the study were mobile digital library model has been developed to provide accessibility on mobile devices for both teachers and teacher librarians. These groups were tasked with assessing the mobile digital library. Subsequently, both educators and teacher librarians were requested to fill out the questionnaires.

4.6.4 Administering questionnaires

Questionnaires were distributed to teachers and teacher librarians involved in the study. The participants were asked to complete the questionnaires on their own. Sekaran and Bougie (2016) posit that self-administered questionnaires possess the capacity to motivate respondents to engage in a study, while also ensuring a high level of anonymity. The use of group-

administered questionnaires has been found to yield a substantial response rate, thereby demonstrating its effectiveness in terms of time and cost savings (Sekaran and Bougie, 2016; Maree and Pietersen, 2019). A group-administered questionnaire refers to a research method in which a selected group of participants is gathered to collectively respond to a predetermined set of questions in a structured manner. Every participant is required to fill out a questionnaire. According to Maree and Pietersen (2019), the use of group administered questionnaires has been found to enhance response rates. The researcher conducted visits to each of the participating schools and administered questionnaires to both teachers and teacher librarians. This approach was undertaken due to the following justifications. Questionnaires were collected on the day of the visit from each school that was visited. The researcher successfully administered a total of 93 questionnaires to teachers, as well as three (3) questionnaires to teacher librarians from various schools who had previously taken part in both focus group discussions and individual interviews.

4.7 Data analysis

The data analysis process typically comprises two primary stages: firstly, the reduction and management of collected data, and secondly, the identification of themes within the data. The present study employed a mixed methods approach for data analysis. The analysis of qualitative data typically involves the application of content analysis, wherein the responses' content is carefully examined and reduced into common themes. Both individual interviews and focus group interviews were transcribed and subsequently edited, with the audio recordings serving as the primary source of data. The researcher subsequently engaged in a comprehensive review of all the transcripts to get acquainted with the material.

4.7.1 Qualitative data analysis

The process of analyzing qualitative data involves thoroughly examining a substantial number of transcripts to identify commonalities or discrepancies, followed by the identification of general themes and the development of categories (Connaway and Radford, 2017). Following the completion of data preparation and processing, the researcher proceeds to analyze the qualitative data obtained from participants via interviews. The themes were formulated by the researcher, and the findings were subsequently synthesized and organized within these thematic categories. The interpretation of the findings was conducted within the framework of the literature that was reviewed, resulting in the formulation of conclusions and recommendations. The use of qualitative data played a crucial part in the formulation of the

mobile digital library model, subsequently subjecting it to evaluation by educators. The collection of quantitative data occurred during the later stage, after the mobile digital library model was evaluated by teachers and teacher librarians.

4.7.2 Quantitative data analysis

The researcher employed multivariate analysis, a statistical technique aimed at investigating relationships among multiple variables (Bryman and Cramer, 2009). The objective of this study was to investigate the correlation between the feasibility of utilizing a mobile digital library by teachers and teacher librarians in schools, their assessments of their technological competencies, and teachers' perspectives on the factors that facilitate the effective implementation and usage of a mobile digital library. The dependent variable in this study pertains to the technological abilities of teachers and the feasibility of schools hosting a mobile digital library. The independent variables include the quintile level, experience (measured by the number of years as a teacher or teacher librarian), and designation of the teachers. To investigate the relationship between these variables, the researcher employed the use of SPSS and the Microsoft Access software package to collect and analyze quantitative data obtained from teachers and teacher librarians. The variables were encoded, and the captured data was verified. The findings were visually presented using Microsoft Word, utilizing graphs and tables whenever applicable.

4.8 Piloting the study

According to Connaway and Radford (2017), piloting is a crucial procedure that involves gathering data from a sample that closely resembles the intended research study's population before the actual data collection takes place. This step is particularly significant as it helps establish the reliability and validity of the outcome measures.

4.8.1 Questionnaire

According to Altinay, Paraskevas, and Jang (2016), it is argued that a research questionnaire should undergo testing with a small, comparable population before it can be considered suitable for fieldwork. Pretesting refers to the preliminary phase of a research project wherein surveys and questionnaires are administered to individuals belonging to the target population or study population. The purpose of this stage is to assess the dependability and accuracy of the survey instruments before their ultimate dissemination. Additionally, it provides the chance to identify potential weaknesses in design or content that require enhancement (Altinay, Paraskevas, and

Jang, 2016). The questionnaire for this study was tested on three high schools that were identified as being under-resourced. The schools in question were not included in the primary investigation. The participants were instructed to fill out the questionnaire in a manner consistent with their hypothetical involvement in the intended survey. The study recorded specific information, including the duration required to complete the questionnaire. The researcher obtained feedback from the participants regarding the clarity of the instructions and questions. The researcher requested participants to identify any difficulties they encountered in understanding or providing responses to the posed questions. The researcher modified the questionnaire based on their observations and feedback from the respondents.

4.8.2 Validity and reliability

Validity refers to the degree to which the chosen method of data collection effectively and accurately measures the specific construct it is designed to assess. The measurement of validity can be assessed by considering the dimensions of internal and external validity (Koonin, 2014). The researcher assessed the reliability of the data collection methodology by posing a sequence of questions, commencing with the research query. The researcher investigated the effectiveness of responding to research questions through interviews and questionnaires. During the pretesting phase of data collection instruments, the researcher inquired with the respondents regarding the clarity and understanding of the questions. Furthermore, the researcher conducted a thorough evaluation to determine whether there was a necessity to incorporate additional questions to achieve the study's objective. The purpose of the exercise was to verify the reliability and accuracy of the data collection instrument. Upon conducting an evaluation of the data collection instrument, the researcher arrived at the conclusion that the research instruments exhibited a notable degree of internal validity.

The study's validity is contingent upon the characteristics and participation of the respondents. The researcher ensured that the sampling methodology employed for sample selection was representative of the intended population. The use of cluster sampling was deemed the most appropriate approach for the current study's population due to its geographical distribution across the vast province of KwaZulu-Natal. The researcher took measures to ensure that the sample was not subject to any form of selection bias that would exclude a specific category of the target population. In doing so, the researcher was ensuring that the research method possessed the requisite external validity. This measure was implemented to ensure the generalizability of the findings to a broader population.

To assess the soundness of the study, it is imperative for the researcher to ascertain whether the conclusions drawn from the study accurately correspond to the occurrences observed within the specified context (Koonin 2014). The researcher assessed the study's validity by ensuring that the cluster-sampling method accurately represented the population and that the questionnaire employed was appropriately designed to measure the intended content. The researcher also assessed the appropriateness of the questionnaire as a reliable instrument for data collection. Regarding internal validity, the researcher took measures to ensure that the research design adequately addressed the research questions posed in this study. The utilization of the cluster sampling method facilitated the determination of the potential generalizability of the findings obtained in the present study. All these actions were carried out by conducting a pilot study.

Reliability refers to the extent to which the methods employed for data collection produce consistent findings. In essence, this inquiry pertains to the efficacy of measurement and the potential replicability of study findings when employing a comparable methodology (Altinay; Paraskevas, and Jang 2016). The researcher took measures to ensure the clarity of the questions in both the questionnaire and the interview guide, to minimize the potential for misinterpretation by the respondents. Respondents are more likely to provide easy answers to questions that are clear and concise. The findings indicate that the questionnaire or interview exhibits a high level of reliability. The researcher assessed the reliability of responses to a question by conducting a pre-retesting procedure. In the administered questionnaire, the researcher employed varying formulations of the same question across different sections of the instrument. The provision of similar responses indicates that the questionnaire exhibited a high level of reliability.

4.9 Anonymity and confidentiality

Anonymity in research pertains to the protection of a research participant's identity, ensuring that their personal information, including their name and other identifying details like social security or school ID number, remains undisclosed and cannot be linked to their responses or data by the researcher or anyone else involved in the study (Gliner, Morgan, and Leech, 2017). In order to ensure anonymity and confidentiality in this study, a number of strategies were employed. In the process of publishing the outcomes of the study, it was essential to consolidate the data and present it in a manner that guarantees the anonymity of individual participants. This process entailed the exclusion of particular details that could potentially

disclose personal information. In addition, the researchers implemented effective safety measures, such as password protection, in order to safeguard the stored data and alleviate the risk of unauthorized intrusion. Confidentiality was also upheld through the acquisition of informed consent from participants, wherein a detailed explanation was provided regarding the utilisation of their data, coupled with an assurance that their information will be protected and exclusively employed for research objectives. In general, these measures served to uphold the principles of anonymity and confidentiality, thereby safeguarding the privacy of participants and promoting trust and transparency in the research activities.

4.9.1 Anonymity

The researcher ensured that the questionnaire did not necessitate the inclusion of respondents' names or any form of personal identification. A similar phenomenon occurred in the context of interviews. The researcher was unaware of the identities and names of the respondents. All requisite measures were implemented to ensure the preservation of anonymity, and the extent of anonymity pledged is solely contingent upon the researcher's provision.

4.9.2 Confidentiality

According to Gliner, Morgan, and Leech (2017), confidentiality refers to the requirement that any private information pertaining to research participants should be kept confidential by the researcher. This entails ensuring that the participant's identity remains undisclosed in research reports and during discussions with individuals external to the research team. Confidentiality pertains to safeguarding the integrity and privacy of the collected data. The researcher will maintain strict confidentiality and refrain from disclosing any information provided by respondents to individuals outside the research team. The participants were assured that any information they provided would be handled with maximum confidentiality.

4.10 Chapter summary

In the fourth chapter of this study, a comprehensive review was conducted to outline and discuss the rationale behind the selection of the research methodology. Various research methods were employed in this study to address the research questions. The data collection employed the cluster sampling method due to the dispersion of under-resourced high schools across a vast geographical area in KwaZulu-Natal (KZN). Conducting a comprehensive survey of all under-resourced schools in KwaZulu-Natal (KZN) was not feasible in practice. The subsequent chapter provides an exposition of the findings derived from the study.

CHAPTER FIVE: QUALITATIVE DATA PRESENTATION

5.1 Introduction

The preceding chapter discussed the methodology and data collection methods used in this research project. This chapter presents the findings of qualitative data collection. This study needed to identify factors that would contribute to the successful development and the use of mobile digital library model; establish the feasibility of using a digital library model for teaching; and ascertain technological competences of teachers to use mobile technology. The data was collected through interviews and focus group discussion with teachers and teacher librarians. The interview guide and focus group discussion guide (see annexure B and annexure C) was used as a basis for the interviews and focus group discussions. The data were grouped into themes; presented and interpreted as such. Themes were aligned with the objectives of the study. This chapter also discussed how information collected and theories underpinning this study were used as guidance in the development of a mobile digital library model. The objectives of the study were to identify factors that would contribute to the successful development and the use of mobile digital library model; establish the feasibility of using a digital library model for teaching; and ascertain technological competences of teachers to use mobile technology.

5.2 Exploratory sequential mixed method design

The study adopted the exploratory sequential mixed method (Figure 5.1) design which is used when the researcher first needs to explore a topic using qualitative data then later collect quantitative data.

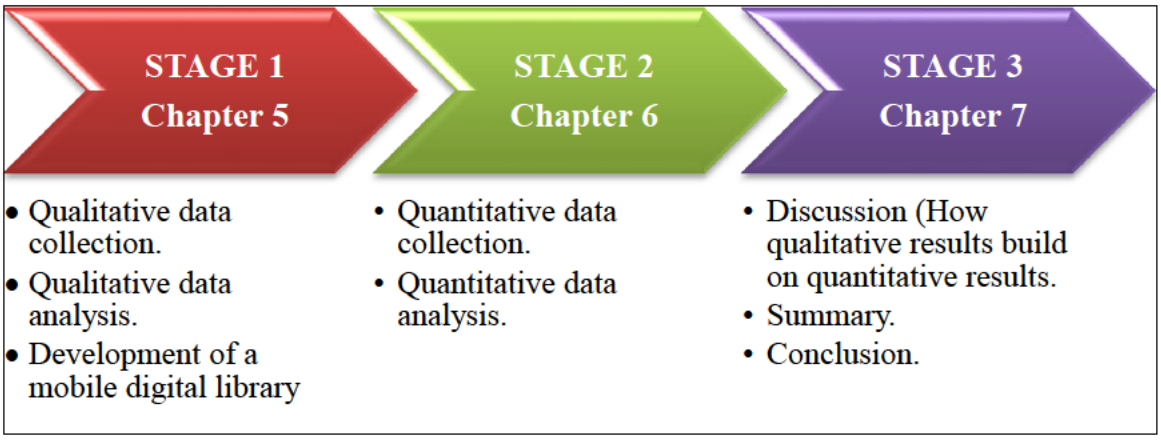


Figure 5.1: Exploratory sequential mixed method design
Source: Adapted from Maree (2016)

5.3 Qualitative findings

Findings are presented, where possible, in the form of themes, presented and interpreted as such. The objective and themes of the study of the study remain the same even though the study surveyed both teachers and teacher librarians. The presentation is based on data collected by both focus group interview and individual interview which were used to survey all randomly selected school categories (quintile 1; quintile 2; and quintile 3) from five randomly selected Department of Basic Educational districts in KwaZulu-Natal. A total of eleven (11) out of fourteen (14) schools participated in the study. One district (Pinetown) does not have quintile 1 category schools. As the results only two school categories (quintile 2 and quintile 3) were surveyed in this area. The effective participation rate of eleven (11) out of fourteen (14) targeted schools (79%) was achieved.

5.3.1 Participation rate

Some items/questions from both interview guide and focus group discussion guide were similar and findings collected from similar items are presented together.

Table 5.1: Districts and school categories surveyed

Districts	Quintile 1	Quintile 2	Quintile 3	Percentage
Amajuba	Participated	Did **not** participate	Participated	**66.6%**
Pinetown	**No Q1** school	Participated	Participated	**66.6%**
Ugu	Participated	Did **not** participate	Participated	**66.6%**
Umgungundlovu	Participated	Participated	Participated	**100%**
Umlazi	Participated	Participated	Did **not** participate	**66.6%**
Percentage	**100%**	**60%**	**80%**	**79%**

5.3.2 The teacher librarian and school library involvement in school curriculum

This section presents findings collected through individual interview with two teacher librarians. Only three under-resourced high schools that participated in the study have school libraries. One of the three teacher librarians did not want to participate in individual interview, but in focus group discussion. As the result, only two teacher librarians from different schools were interviewed.

5.3.2.1 District, quintile level of schools with school libraries and experience of teacher librarians

The teacher librarians were from Ugu district and uMgungundlovu district. These schools are categorized as quintile three schools. One teacher librarian has 1 to 3 years of experience while the other one has more than 10 years of experience.

5.3.2.2 Fully functional school library and involvement of teachers in collection development

Only two librarians participated in individual interview. When asked if their school libraries are fully functional, one teacher librarian indicated that his school library "is fully functional because even though it does not have variety of resources, it has textbooks and is used by learners and some of the teachers" and while the other school librarian said his school "has a library that is not fully functional". This study concurs with Mojapelo (2018) who concluded that the vast majority public schools in disadvantaged rural communities have poor resourced libraries even though school libraries are essential assets for teachers and learners to execute their curriculum-related activities and tasks. Interestingly the school librarian from school with a school library that is not fully functional involves the teacher in collection development. When follow up was made on why then the school library is not fully functional, the librarian stated that there are no funds. As the result their plans are not put into action. It was stated that the school library that is fully functional does not involve the teachers in collection development. It was stated that the library is used by teachers when they are teaching. Learners use the library to read their notes and their own textbooks. Seemingly these school libraries are not fully functional, but they are used as space for teaching or used as extra study area for learners.

5.3.2.3 The duties of teacher librarians when there is a mobile digital library

When asked what they think would be the duties of teacher librarians when there is a mobile digital library, one librarian stated that the teacher librarians' duties would be to equip both teachers and learners with necessary skills to interact with the interface of the digital library and the use of the mobile digital library. On the other hand, Mabunda and Du Plessis (2022) encourage librarians in academic libraries to use technologies such as social media in their day-to-day work to sustain the library's relevance in the digital age. The teacher librarian from the school with the "fully functional school library" felt a mobile digital library would make life easy for the school community which would result in teacher librarians having fewer duties to perform when the mobile digital library was up and running. This will enable teacher librarians

to upskill their technological skills and thereby train teachers with the latest technological skills.

5.3.2.4 The contribution of the teacher librarian to teaching when there is a mobile digital library

One teacher librarian believes that teacher librarians "can contribute to teaching by helping learners and teachers to easily access information they need and keep them updated on new uploads in their respective subjects". The other librarian thinks "teaching and learning would be easy because teacher librarian would assist other teachers with training on how to use the digital library". In addition to library duties the role of the teacher librarians will be to ensure that the users of the digital library have information retrieval skills and technological skills.

5.3.2.5 The current school library supports teaching

The librarians believe that their current school libraries provide space for extra classes and individual studying. It also "provides necessary books for them to be able to complete their research". When asked how their school libraries help users (learners and educators) if they do not find information resources they are looking for, the teacher librarians stated that their "school libraries have limited resources, any assistance beyond these resources, learners are referred to public libraries". Due to lack of functional school libraries that support teaching, Mojapelo (2015 p51) recommends that the Minister of the national DBE, relevant organisations such as the Library and Information Association of South Africa (LIASA), School Libraries and Youth Services Interest Group (SLYSIG) and the relevant stakeholders should formulate, finalise and implement a legislated and approved school library policy that will be clear on school library models, staffing, roles and responsibilities, funding or budget, collection development and resource-sharing.

5.3.2.6 Improvement of school library involvement in teaching

In response to the question of whether a mobile digital library can enhance school involvement, the teacher librarians expressed their strong belief that it can indeed improve the involvement of the school library in teaching. One teacher librarian stated, "A mobile digital library can improve the involvement of the school library in teaching by providing a wide range of books and other forms of media such as videos which are much easier to understand for learners." This sentiment was echoed by another teacher librarian who emphasized that the easy accessibility of information resources anytime will enhance access to information for both learners and teachers. Overall, the teacher librarians share the opinion that a mobile digital

library has the potential to enhance the involvement of the school library in teaching. Nalluri and Gaddam (2016: 65) are also share the same sentiments as they believe that mobile libraries create a new way to enhance connections between patrons and libraries by providing services like Open Access Catalogue via mobile optimized websites, audio books, e-books, audio language courses, streaming music, films, images, and other multimedia that can be used on mobile devices.

5.3.2.7 Identification of factors that contribute to the successful development and use of a mobile digital library

The teacher librarians identified three factors that they believe would contribute to the successful development and use of a mobile digital library: financial support, user friendliness, and internet connectivity. These factors were discussed in detail in section 5.3.3.4. When questioned about the impact of easy accessibility of information resources on teaching and learning in financially challenged schools, both teacher librarians agreed that it would be beneficial. Further discussion on this topic can be found in section 5.3.3.5. Additionally, the teacher librarians expressed their belief that a mobile digital library has the potential to enhance collaboration between teachers and teacher librarians, improve school library services, and increase learning opportunities for learners. They also emphasized the importance of knowledge sharing between teachers and learners and how a mobile digital library can facilitate learner-centered learning, thinking, and understanding. Detailed findings from both individual interviews and focus group discussions are further elaborated in section 5.3.3. Findings on information seeking behavior is presented under section 5.3.4.5 and presentation of information on technological competences of teachers are presented under section 5.3.5.

5.3.3 Factors that contribute positively to usage of a digital mobile library for teaching in high schools

This study aimed to identify factors that contribute positively to the use of a mobile digital library. This section presents data collected from both teacher librarians and teachers. Data was collected though individual interviews with teacher librarians and focus group discussion with teachers.

5.3.3.1 Mobile technologies and improvement of library services

Teachers were asked about their awareness and understanding of the potential of mobile technologies to enhance school library services, as well as how their level of understanding

would impact the development and usage of a digital mobile library. All teachers from various surveyed schools across different quintile categories in KwaZulu-Natal confirmed that they are "aware and understand that mobile technologies have the potential to improve the provision of school library services." Their awareness motivates them to contribute to the development of the mobile digital library through active participation in focus group discussions. They acknowledged that the mobile digital library would be easily accessible for learners and teachers. Their awareness and understanding of the potential of mobile technology in improving school library services would lead to encouraging learners to utilize the mobile digital library. Recognizing that the mobile digital library can enhance library services, teachers see the need for improved school library services facilitated by the digital mobile library, thus actively contributing to its development. They believe that "the usage of the mobile digital library would increase. However, if the level of understanding is low, the usage of the library will decrease." Teachers expressed awareness that the accessibility of the library is a key aspect of school library services that can be improved by the mobile digital library, as it allows for remote access at any time. Libraries can also offer library instructional materials and resources via mobile platforms e.g. “Research First Aid” is a series of podcasts for library researchers on the go (Nalluri & Gaddam, 2016: 61).

The teacher librarians were specifically asked about their views on whether a mobile digital library can enhance the school library environment for teaching and learning. Both teacher librarians concurred that they believe the mobile digital library "can improve the school library environment for teaching and learning." They justified their stance by emphasizing that the mobile digital library would provide a wide range of books and other media formats such as videos, which offer enhanced learning experiences for students. They expressed that the mobile digital library would ensure that every learner has access to information resources at any time. Additionally, they highlighted the advantage of multiple teachers and learners being able to access copies of the same information resource simultaneously.

The responses from both teachers and teacher librarians indicate a recognition of the potential of mobile technologies to improve school library services and create an enriched learning environment. Their awareness and understanding serve as driving factors for their active participation in the development and utilization of a mobile digital library.

5.3.3.2 Digital literacy training and usage of a mobile digital library in schools

The present study reveals that teachers, including teacher librarians, from all quintile levels recognize the significance of digital literacy training for teachers to effectively use mobile platforms for accessing a wide range of information resources. It is believed that such training would enhance the usage of a mobile digital library in schools. Given the rapid advancement of technology, both teacher librarians and teachers need to stay updated on the latest technologies to efficiently utilize mobile devices for accessing, maintaining, and utilizing mobile digital libraries.

Guder (2010) identified the practice of connectivism in libraries through training sessions provided to library users. The current study further supports this notion by highlighting the need for training teachers who would utilize the mobile digital library. Teachers expressed that digital training would improve the usage of the mobile digital library, stating, "Once the school community knows how to search and find information using their phones and laptops, they would use the mobile digital library more." Teachers also recognized the relevance of digital literacy training in the context of the ongoing shift towards the fourth industrial revolution. They acknowledged that teachers' level of digital and information literacy plays a significant role in the utilization of a digital mobile library. When teachers possess the skills to effectively use digital devices and locate information, they are more inclined to engage with the mobile digital library. The findings emphasize the necessity of providing digital literacy training to teachers in order to optimize the usage of mobile digital libraries. By equipping teachers with the necessary skills and knowledge, they can effectively navigate and leverage digital platforms for enhanced teaching and learning experiences.

5.3.3.3 Relevant digital content and user friendliness of digital library platforms

The findings of Hu and Zhang (2016) regarding the importance of user-friendliness and provision of relevant information in mobile library apps are consistent with the results of this study. All surveyed under-resourced high schools in KZN expressed the belief that the user-friendliness of a mobile digital library encompasses the accessibility of relevant information sources. Some teachers even emphasized the clear correlation between having the right books in a school library and its usage, stating, "There is no doubt that a school library with the right books would be visited by teachers and students. The same would apply to a mobile digital library that contains the information we need." This aligns with the findings of Hamad, Farajat, and Hamarsha's (2018) study, which identified the availability of relevant resources as one of

the factors influencing the usage of a digital library. In the present study, both teachers and teacher librarians affirmed that they would certainly utilize a user-friendly mobile digital library that provides access to relevant resources. The recognition of the importance of user-friendliness and the availability of relevant information in a mobile digital library highlights the significance of designing such platforms to meet the needs and preferences of users. Ensuring a seamless and intuitive user experience, coupled with the provision of pertinent resources, can enhance the adoption and utilization of mobile digital libraries in educational settings.

5.3.3.4 Financial support to access mobile digital libraries

Teacher librarians and teachers were asked how they think financial support would affect the usage of a mobile digital library in under-resourced high schools in KwaZulu-Natal. They pointed out that their schools are from areas dominated by financially struggling communities and the schools also facing financial challenges. As the results the usage of data to access the mobile digital library would be the disadvantage to most of the learners who are struggling financially. The usage of the mobile digital library would decrease if there were no financial support. Khomo, Naicker, Chisita and Rajkoomar (2023) stated that without financial support, it will be "difficult to develop and motivate library users to use the mobile digital library". These authors believe that the library system needs to be maintained and be up to date all the time. They are of the opinion that with financial support, there will be a successful mobile digital library. The current study too revealed that teachers believe financial support would make it easy for schools to have and use the mobile digital library. Some teachers felt that financial support must include data as the according to teachers from surveyed quintile one and two their schools do not have Wi-Fi. The mobile digital library needs financial support in terms of hosting, maintaining and accessibility. Teachers from surveyed quintile one category schools stated that "people in general do not like to pay, but communities from our areas cannot afford to buy data and pay for mobile digital library collection". One teacher from quintal one indicated that they "find it difficult to even pay for electricity which is a necessity. Buying computers for learners to access a mobile digital library is impossible". All teachers and teacher librarians felt that it is essential to get financial support from somewhere as failing to get such financial support would affect the usage of the mobile digital library negatively.

5.3.3.5 Power supply and Internet connectivity support to access mobile digital libraries

Chisango, Marongwe, Mtsi, and Matyedi (2020) concluded that "some schools face challenges of electricity supply and internet connection that make it difficult for teachers to use Information and communication technologies (ICTs) always in teaching and learning". This study also revealed that the teachers and teacher librarians stated that the teachers and learners would not be able to use the mobile digital library if there is no power supply and no connectivity. They said "no power no usage of electronic devices like computers. No usage of these devices means there will be no access to the mobile digital library". They added that "if the mobile digital library cannot be accessed, it cannot be used". The teacher librarians believe that if the connectivity is poor, it will result in low usage of the mobile digital library. Teachers and teacher librarians from surveyed under-resourced high schools in KZN are of the opinion that if the connectivity is weak, more data will be lost due to slowness of the network.

There was a loud outcry from teachers who are from quintile one and two category schools that are in a in low-lying areas that "in our rural and isolated schools, we have a serious problem with network coverage. Unfortunately, this situation would affect the usage of a mobile digital library badly". They undoubtedly indicated that they would not be able to use the mobile digital library at all in their schools. They added that "we cannot even receive or make calls using our cell phones". They also added that if there are power supply disturbances like load shedding, they cannot get signals even when they have moved to the top of the mountain. They seem to think this situation would impact negatively on the usage of the mobile digital library.

5.3.3.6 Easy accessibility of information resources and teaching support

Teachers and teacher librarians were asked if they thought easy accessibility of information resources would support teaching and learning in financially challenged schools. A study by Nalluri and Gaddam (2016) concluded that mobile applications could support learning by making library resources more easily accessible to library users. The current study too revealed that all teachers and teacher librarians think "easy accessibility of information resources would support teaching and learning in financially challenged schools". To support their stance, they revealed that some quintile one and two schools are "struggling to get teaching aids. They cannot even find latest information". The teacher librarians stated that "It is not easy to access information even in schools with school libraries because libraries are open during the day while learners and teachers are in class. School libraries are closed when teachers and learners have time after school". Teachers added that teachers and learners need information for

preparation for classes and assessments. So, if a mobile digital library would provide easy access to information as it sounds, that library would be appreciated. One teacher from quintile one school stated that their "schools have few teachers". As the result it is difficult to cover in detail all the sections of the syllabus. The digital library could help with easily accessible information resources like videos that would support teaching and learning. One of the teachers sounded a warning that "learners might visit undesirable web sites. Some teachers from different schools reminded the researcher that "schools do not allow learners to bring their cell phones to school". As the result, learners will still not be able to access the mobile digital library when they are at school.

The teacher librarians also felt easy accessibility of information resources would support teaching and learning in financially challenged schools. They also believe "School community need information to teach. They must not rely only on prescribed textbooks". Learners need information for preparation for classes and assessments. The teachers and teacher librarians seem to believe that "mobile digital library would provide easy access to information".

5.3.3.7 Improvement of collaboration between teacher librarians and teachers

Teachers and teacher librarians expressed the belief that collaboration between them could be enhanced through the implementation of a mobile digital library. They emphasized the importance of both departments acquiring books that are relevant to the school curriculum. This aligns with the findings of Minakaro's (2020) study, which emphasized the significance of academic staff and librarians collaborating in the selection of academic materials for purchase. As teachers deliver content on various subjects, they possess valuable insights into the curriculum's content requirements. The teacher librarian would assume responsibility for managing the mobile digital library, necessitating collaboration between the two groups. Furthermore, collaboration would extend to planning training sessions for learners on accessing information in the mobile digital library. Additionally, teacher librarians would provide training to teachers. Interestingly, Kankam and Nsibirwa's (2018) study revealed that internet information literacy instruction was integrated into the school curriculum and was the responsibility of the teachers in the information and communication technology departments, highlighting the absence of collaboration between teachers and teacher librarians.

The present study confirmed that teacher librarians also recognized the need to improve collaboration between teachers and themselves through the use of a mobile digital library. This

finding suggests a consensus between teachers and teacher librarians regarding the potential benefits of enhanced collaboration. The alignment of perspectives from both teachers and teacher librarians emphasizes the shared understanding of the importance of collaboration and the potential of a mobile digital library to facilitate such collaboration. This highlights the potential for improved cooperation, resource sharing, and the alignment of educational goals between teachers and teacher librarians through the integration of a mobile digital library.

5.3.3.8 Improvement of school library service by a mobile digital library

Teacher librarians and teachers expressed their belief that a mobile digital library has the potential to enhance school library services. One teacher highlighted the advantage of accessibility, stating, "Unlike the traditional school library that closes after school, the mobile digital library would be accessible all the time from anywhere." This viewpoint aligns with the findings of Zha, Zhang, Li, and Yang's (2016) study, which suggests that mobile libraries provide convenient access to digital library resources and services without the limitations of time and space. Teacher librarians emphasized that a mobile digital library would improve the retrieval of information resources. They and the teachers noted that unlike in a physical school library where only one learner can use a book at a time, a mobile digital library allows simultaneous usage of the same information resource by multiple learners. This observation supports the findings of Olaewe, Akinoso, and Achanso's (2019) study, which concluded that electronic and digital libraries serve as valuable and reliable academic resources worldwide. The authors assert that electronic libraries have become indispensable commodities in the 21st century that no one can afford to overlook. Teachers and teacher librarians share the belief that a mobile digital library can enhance school library services.

5.3.3.9 Facilitation of learning opportunities

Nalluri and Gaddam (2016) concluded that mobile applications could support learning by making library resources more easily accessible to library users. This study too revealed that teachers think a mobile digital library can facilitate learning opportunities for learners. Their justification was that easy accessibility of the mobile digital library and the fact it would have resources like videos meant it would facilitate learning opportunities for learners. Teachers believe that learners can be excited by accessing books online. Availability of videos can interest learners. Resources like videos can improve learning opportunities because uploaded videos can explain further what was covered in class. The mobile digital library would have the content relevant to the school curriculum. The teacher librarians also indicated that they

feel that a mobile digital library can increase learning opportunities for learners. Teachers and teacher librarians appear to agree that a mobile digital library can facilitate learning opportunities.

5.3.3.10 Knowledge sharing between teachers and learners

When queried about the importance of knowledge sharing between teachers and learners, both teacher librarians and teachers affirmed its significance. They emphasized that teachers have a responsibility to provide information to learners, and they recognized the potential of a mobile digital library in facilitating this process. Regarding the promotion of student-centered learning, teacher librarians and teachers shared a consensus that a mobile digital library would indeed support this approach. They highlighted the convenience and accessibility it offers, enabling learners to retrieve information at any time and from any location. The availability of additional resources such as explanatory videos was highlighted as beneficial for learners to delve deeper into subjects taught at school. The study also revealed teachers' belief that a mobile digital library empowers learners to construct knowledge independently, reducing their reliance on teachers.

Teachers expressed their conviction that a mobile digital library would foster critical thinking and understanding, surpassing mere memorization. They explained that the library's diverse range of resources, including different books with varied explanations on covered topics, would enhance comprehension. They further highlighted the significance of videos available in the mobile digital library, as they can provide a better understanding of classroom content. This sentiment was shared by the teacher librarians, affirming the perception that a mobile digital library encourages thinking and understanding.

Regarding whether a mobile digital library can provide a favorable learning environment, the majority of respondents, except for one teacher librarian, expressed agreement. They critiqued traditional school libraries, deeming them unfavorable due to outdated and disorganized collections. In contrast, they believed that a mobile digital library offers advantages such as accessibility from anywhere, immediate access to information, and heightened learner interest. However, the librarian who expressed a contrary opinion noted the absence of reading spaces comparable to those found in traditional libraries. Nonetheless, the teacher librarians emphasized the potential of a mobile digital library to enhance the overall service provided by school libraries. With mobile digital libraries, learners easily observe and identify the learning

objects since they are able to see those learning objects in person along with extended digital information. Their learning experiences are not confined to the textbook information (Shih; Hwang; Chu; & Chuang 2011:502).

5.3.4.11 Other factors would affect the usage of a mobile digital library

Teachers were queried about additional factors that would positively contribute to the utilization of a mobile digital library. Only two factors were identified by the teachers. Firstly, they suggested that mobile devices used to access the mobile digital library should be restricted to educational usage only. This recommendation aims to ensure that learners focus on educational content and prevent distractions. Secondly, the teachers emphasized the importance of schools providing devices such as laptops or iPads to cater to learners who do not have smartphones. This measure would enable equitable access to the mobile digital library for all students. Furthermore, the teachers highlighted the necessity for the mobile digital library to be accessible for free, ensuring that financial barriers do not impede learners' engagement with the library.

It is worth noting that despite the request for positive factors, a recurring hindering factor was consistently mentioned by teachers from various surveyed schools: "Learners are not allowed to bring cell phones to school." This restriction poses a significant obstacle as it prevents learners from accessing the mobile digital library while at school. This limitation significantly impacts the potential utilization of the mobile digital library in the school setting. (Onyema 2019) also discovered that the use of cell phones is typically seen as a problem in the classroom as some of the educational institutions in Nigeria do not allow the use of mobile phones in classrooms. Some schools have policies that forbid students from bringing mobile phones to school.

5.3.4 Feasibility of using a digital mobile library model

This section of chapter four presents the findings on the feasibility a mobile digital library model.

5.3.4.1 Affordability of a mobile digital library in under-resourced high schools

Faloye and Ajayi (2022) conducted a study exploring the impact of the digital divide on South African students in higher educational institutions, finding that many schools in South Africa still face challenges in obtaining basic technological infrastructure due to financial constraints.

However, teachers from quintile three schools expressed confidence in their schools' ability to afford and maintain a mobile digital library. One teacher specifically mentioned that their school has the necessary facilities such as computer LAN, Wi-Fi, and a functioning school library, with connectivity being the only potential issue during power outages. In contrast, the other two schools from quintile three expressed doubts about their capacity to maintain a mobile digital library. One underlying concern pertained to the accessibility of the library for learners, as they are not permitted to bring cell phones to school and may face challenges with data connectivity since they are not allowed to connect to the school's Wi-Fi. Furthermore, a school from the quintile three category stated that financial challenges prevent them from affording a mobile digital library.

Similarly, Khomo et al. (2023) found in their study that the feasibility of implementing a mobile digital library is contingent upon the financial support received. The present study corroborates these findings, with some teachers from quintile one and one teacher from a quintile two school stating that their schools cannot afford to maintain a mobile digital library. They cited various reasons, including financial constraints, isolation in low-lying rural areas, poor network coverage, and electricity cuts. As one teacher candidly expressed, "Our school is very poor. We do not even have electricity and the latest technology for teaching. So, it is not feasible to have a mobile digital library." However, one teacher from quintile two cautiously indicated that their school could afford to maintain a mobile digital library provided that teachers receive training on its usage and parental involvement is ensured. It appears that schools from the quintile three category and the two poorest school categories have reservations about their ability to afford a mobile digital library.

5.3.4.2 Encouragement of learners to use a mobile digital library

In their study examining teachers and students' perspectives on utilizing mobile devices and social media in teaching and learning, Dintwa and Sithole (2021) offer recommendations based on their findings. They suggest that fostering collaboration among students through various communication channels and adapting teaching activities to align with students' learning styles in the digital era are crucial steps for educators to embrace. These strategies aim to facilitate effective teaching and learning in the context of evolving technological advancements.

Regarding the encouragement of learners to utilize a mobile digital library if it were available in their schools, teachers provided insights on their approaches. They expressed their intention

to assign activities and assignments that incorporate resources from the mobile digital library. Furthermore, they emphasized the significance of marketing the mobile digital library to learners, as this strategy would serve as an incentive for them to engage with the library. One teacher highlighted the importance of teaching learners how to retrieve information from a mobile digital library, as this skill development would likely foster increased usage of the library. As the teacher stated, "teaching them how to retrieve information on a mobile digital library will encourage them to use this library more."

These responses confirmed the teachers' recognition of the potential benefits of integrating a mobile digital library into their instructional practices. They emphasize the importance of designing learning activities that leverage the resources provided by the library and promoting its usage among learners through effective marketing strategies. Furthermore, the idea of teaching learners' information retrieval skills aligns with the goal of empowering them to navigate and effectively utilize digital resources, thus fostering a more meaningful engagement with the mobile digital library.

5.3.4.3 Usage a mobile digital library to support teaching and learning

Teachers were surveyed to ascertain how they would utilize a mobile digital library to support teaching and learning in their schools. In response, teachers expressed their intention to assign learners the task of watching videos and reading books at their own pace. They envisioned the mobile digital library as a valuable resource for accessing information during lesson preparation. The findings of Nalluri and Gaddam's (2016) study support the notion that mobile applications can enhance teaching and learning by improving the accessibility of library resources for users.

In line with these findings, some teachers in the present study mentioned that they would assign projects to learners, who would then rely on the mobile digital library to gather the necessary information. Additionally, teachers perceived the idea of utilizing the mobile digital library to watch videos during lessons as beneficial for enhancing clarity and understanding of the topics being taught. Furthermore, teachers suggested that a mobile digital library should offer the functionality to upload materials such as tests and study guides, enabling them to share instructional resources with learners.

These responses highlight teachers' recognition of the potential benefits of a mobile digital library in supporting teaching and learning. They emphasized the importance of allowing learners to access supplementary materials at their own pace, utilizing videos during lessons for improved comprehension, and facilitating the sharing of instructional resources. The incorporation of a mobile digital library in educational settings has the potential to enhance the learning experience and provide teachers with additional tools for effective instruction.

5.3.5 Facilitation of information retrieval for both teachers and learners by a mobile digital library

When asked how they think a mobile digital library would facilitate information retrieval, the teachers expressed that they think it would. They supported their view by saying unlike a traditional school library that closes after hours and on weekends, a mobile digital library would be easily accessible anytime of the day and from anywhere. Teacher also stated that information resources in mobile digital library can be used by different learners at the same time without being physically in the library. Teacher librarians and teachers believe that a mobile digital library can conveniently facilitate information retrieval. The teachers and teacher librarians seem to be agreeing that a mobile digital library would facilitate information retrieval. Matolong (2020) too concluded that ICT and digital technology enhance the access to information. The author further indicated that the digital access provided has enhanced the culture of reading at public libraries.

5.3.6 Importance of mobile digital library in an underdeveloped school

Teachers were surveyed to gauge their perspectives on the importance of having a digital mobile library in their schools. All teachers unanimously expressed the significance of having a mobile digital library. Their rationale centered around the notion that a mobile digital library would address the issue of learners misplacing physical copies of prescribed books borrowed from schools at the beginning of the academic year. They emphasized that the resources in a mobile digital library would not be physically taken away from the library. By providing remote access to information resources, mobile libraries have the potential to extend learners' educational experiences beyond the confines of the classroom. Nalluri and Gaddam (2016) assert that learners can construct their own knowledge and receive personalized assistance through their mobile devices.

Furthermore, teachers recognized that the implementation of a mobile digital library would alleviate concerns regarding lost school copies, sparing learners from incurring costs for misplaced books. Some teachers also highlighted the benefit of equipping learners with information searching skills from an early age, which would prove advantageous as they progress to higher education institutions. However, teachers' perspectives on the importance of a mobile digital library appeared to be contingent upon whether their schools possessed the necessary facilities and skilled teacher librarians. The study conducted by Kankam and Nsibirwa (2018) discovered that the school libraries surveyed in Ghana lacked the essential information communication technology infrastructure and internet facilities required for library users to access the vast array of information available online. The researchers also found that the librarians themselves lacked internet information literacy skills. Consequently, some teachers were hesitant to assert the need for a mobile digital library, citing factors such as school isolation and financial constraints that hindered their ability to host such a library. Others cited challenges such as electricity availability and poor connectivity as barriers to successfully implementing a mobile library.

5.3.7 Current traditional school library support for teaching and learning

The research findings revealed that only three of the surveyed under-resourced schools had functioning school libraries, all of which were classified as quintile three schools. Teachers from these specific schools acknowledged the presence of school libraries on their premises. Conversely, teachers from other schools reported the absence of school libraries altogether. Some respondents mentioned that their schools had previously possessed libraries, but financial constraints had led to their closure.

When asked about how the current school libraries support teaching and learning, teachers from schools with functioning libraries highlighted several key aspects. They noted that the libraries provided dedicated spaces for teaching and reading, making prescribed books available for loan. Some teachers also emphasized that the libraries assisted learners with projects assigned by teachers. As one teacher expressed, their school library supports teaching and learning by "helping learners with projects given by teachers." Another teacher mentioned that their library supports teaching and learning by "making prescribed books available for learners." Additionally, the third school library was described as providing both teaching and reading spaces, allowing learners and teachers to borrow materials. Teacher librarians were also asked about the role of their school libraries in supporting teaching and learning. They specified that

their libraries contribute to teaching and learning by lending books to learners for assignments and projects. However, it was also acknowledged that these libraries often face limitations in terms of resources. As one librarian stated, "These libraries do not have enough relevant resources." Furthermore, the presence of an overhead projector in some libraries allows them to serve as spaces for extra classes. Additionally, it was mentioned that learners and teachers utilize the school libraries for activities such as story reading and individual studying.

5.3.7.1 Information seeking behavior of schoolteachers

The teacher librarians were queried about the frequency of usage and purposes of the school library by teachers and learners. In response, they revealed that teachers utilize the library on a daily basis for teaching, benefiting from the presence of projectors and air-conditioning. Furthermore, it was disclosed that school libraries occasionally serve as meeting venues. Regarding learners, the teacher librarians noted that they primarily use the library for personal reading materials. When asked about teachers' methods of accessing information resources for teaching, the librarians indicated that teachers typically browse the shelves for books. This aligns with Chisa's (2017) study on information-seeking behavior among academic theologians in South Africa, which found that theologians frequently engage in browsing within their institution's library and often consult colleagues for information.

In addition to browsing the library, teachers mentioned their reliance on various external sources for information if it is not found within the school library. These include Google, the Department of Education website, and colleagues from other schools. The teacher librarians strongly expressed their belief that a mobile digital library could greatly facilitate information retrieval, offering 24/7 accessibility and remote availability. This notion aligns with Wellings and Casselden's (2019) study on information-seeking behaviors of engineers and scientists in the United Kingdom, which found that the majority of these professionals do not visit libraries for information and instead rely on colleagues and search engines like Google. The present study also discovered that teachers rely on information provided by the Department of Basic Education, share resources with colleagues from neighboring schools, utilize databases, and access public libraries.

When asked about the usefulness of scholarly information, all participants agreed that the latest scholarly information is valuable to them, despite some teachers relying on "old information." They emphasized the relevance of scholarly information for teaching purposes. In situations

where teachers and learners are unable to find the desired information resources within the school library, one teacher librarian mentioned that students are referred to state libraries due to the limited resources available in the school library. The other teacher librarian mentioned that learners utilize public libraries when the school library lacks the necessary resources. Both teacher librarians reiterated their strong belief that a mobile digital library would significantly enhance information retrieval by offering round-the-clock accessibility and remote access.

5.3.7.2 Technical infrastructure available and how a mobile digital library should support teaching

Nsibirwa and Kankam (2018) conducted a study that shed light on a significant obstacle to high school learners' online information behavior, namely the lack of adequate Internet infrastructure within schools. The present investigation similarly unveiled that only three schools in quintile three reported having Wi-Fi access along with computers or laptops, with two of these schools also possessing overhead projectors. Conversely, the remaining schools acknowledged the absence of any infrastructure enabling them to access information. Kankam and Nsibirwa (2018) also discovered that some of the surveyed schools in Ghana lacked computers and Internet connectivity in their libraries, consequently restricting learners' ability to utilize the Internet or computers for information retrieval.

Despite many teachers indicating a lack of infrastructure in their schools, they were still asked to express their perspectives on how a mobile digital library could support teaching and learning in their educational settings. Their suggestions encompassed several key aspects. Firstly, they emphasized the necessity for a mobile digital library to provide relevant and up-to-date information, ensuring its availability to users. Additionally, teachers advocated for the inclusion of features that would enable them to upload tasks, download videos and other informational resources, and ensure that the library remains unbiased toward certain "important subjects." Furthermore, teachers expressed the importance of user-friendly interfaces and the ability to facilitate communication between teachers and learners within the mobile digital library environment.

5.3.7.4 Electronic resources and content beneficial for teaching and learning

The question posed to the teachers was what electronic resources would be beneficial for teaching and learning? They listed Videos, eBooks, resources that cover all learning areas, E-journals, and past examination papers as the ones that would be beneficial for teaching and

learning. Teachers were also asked to identify electronic content that will be useful for teaching. They stated that content must be relevant to subjects offered in schools, dictionaries and encyclopedias, Mathematics, Physics, question papers for matric learners, languages, materials on technology, variety, but all for school learners and some novels for relaxation.

5.3.8 Technological competences of the teachers

Presented in this section of chapter five are findings on technological competences of the teachers.

5.3.8.1 Usage and importance of using the latest technology

The inquiry aimed to ascertain the extent to which teachers utilize cutting-edge technology for instructional purposes. The findings unveiled a disparity among teachers in quintile three schools, wherein some teachers reported using advanced tools such as overhead projectors, laptops, or computers. Conversely, other teachers within the same quintile three category revealed their inability to incorporate the latest technology into their teaching practices due to the absence of such resources in their schools. Chisango, Marongwe, Mtsi, and Matyedi (2020) posit that while certain teachers demonstrate a willingness to adopt technology for teaching and learning, inadequate information communication technology infrastructure in some schools hinders students from being exposed to these advancements. This investigation further revealed that teachers in quintile one and quintile two schools primarily fell into the category of non-users of the latest technology for teaching due to the unavailability of such resources in these school categories. The limited number of teachers employing technology were found to be utilizing their personal devices for this purpose.

The follow up question posed to teacher librarians and teachers was whether they think it is important for teacher to use the latest technology for teaching. They all confirmed that they think it is important for teachers to use the latest technology for teaching. Some teachers revealed that some learners need to see what is being explained. The latest technology would give learners the opportunity to see what is being taught. They also believe a lesson where latest technology is used is convincing and professional. It shows that a teacher has prepared for his/her lesson. Teachers believe that usage of the latest technology for teaching saves time and makes lessons clearer. Ndimbovu and Nsibirwa (2022) also discovered that the majority of the learners and teachers have a positive attitude towards using information communication

technologies. In this study teacher librarians indicated that they are very comfortable with using the latest technology.

5.3.8.2 Ability to search from the internet and use MS office

The research question focused on the proficiency of teachers in downloading and uploading files from and to the internet. Numerous teachers expressed a high level of competence in performing these tasks. They acknowledged that their ability depends on the specific content being downloaded or uploaded and stated that they simply follow provided instructions. The predominant method mentioned for file transfer was using smartphones.

In regard to searching for information across various search engines, a substantial number of teachers reported feeling very comfortable with this skill. However, many of them admitted to primarily relying on Google for their information retrieval needs. Some participants recognized the need for training in information retrieval as they often encountered difficulties during their search processes. Notably, a majority of those requesting training belonged to the two lower quintile categories. They expressed a moderate level of comfort but emphasized the importance of training, citing challenges in finding desired information due to inadequate search techniques and the use of incorrect keywords. One participant articulated their perspective, stating, "We are fairly comfortable but need some training though as we do not always find what we are looking for due to not knowing how to search for information. Sometimes we do not use the right keywords".

Additionally, teachers were asked to indicate their level of comfort in using Microsoft Office. Many respondents disclosed that they feel comfortable using the suite, despite acknowledging the need for training, particularly for staff members who struggle with certain programs. Microsoft Excel emerged as the program most frequently cited as posing difficulties among the respondents.

5.4 Extra comments on a proposed mobile digital library

When prompted to express their opinions regarding the proposed mobile digital library, several individuals chose to withhold their comments. However, those who did respond expressed their views on the matter. One participant stated, "A mobile digital library is advantageous in terms of providing easy access to information, and it is undeniably a commendable concept." Another individual exclaimed, "We are highly supportive of this idea!" Furthermore, it was suggested

that schools require a mobile digital library, provided that it is freely accessible. One respondent added, "The mobile digital library should accommodate a variety of activities, such as spelling bees, and allow teachers to create online puzzles and tasks. It is crucial that learners do not have access to the answers for these activities. Additionally, question papers should be uploaded as part of the available resources."

These quotes highlight the positive attitudes towards the proposed mobile digital library, emphasizing its convenience in terms of information accessibility and overall appeal. The comments also emphasize the need for the mobile library to cater to various educational activities and resources while ensuring that learners are appropriately engaged and challenged. The notion of offering the library's services free of charge is also highlighted, suggesting a desire for equal access to educational materials.

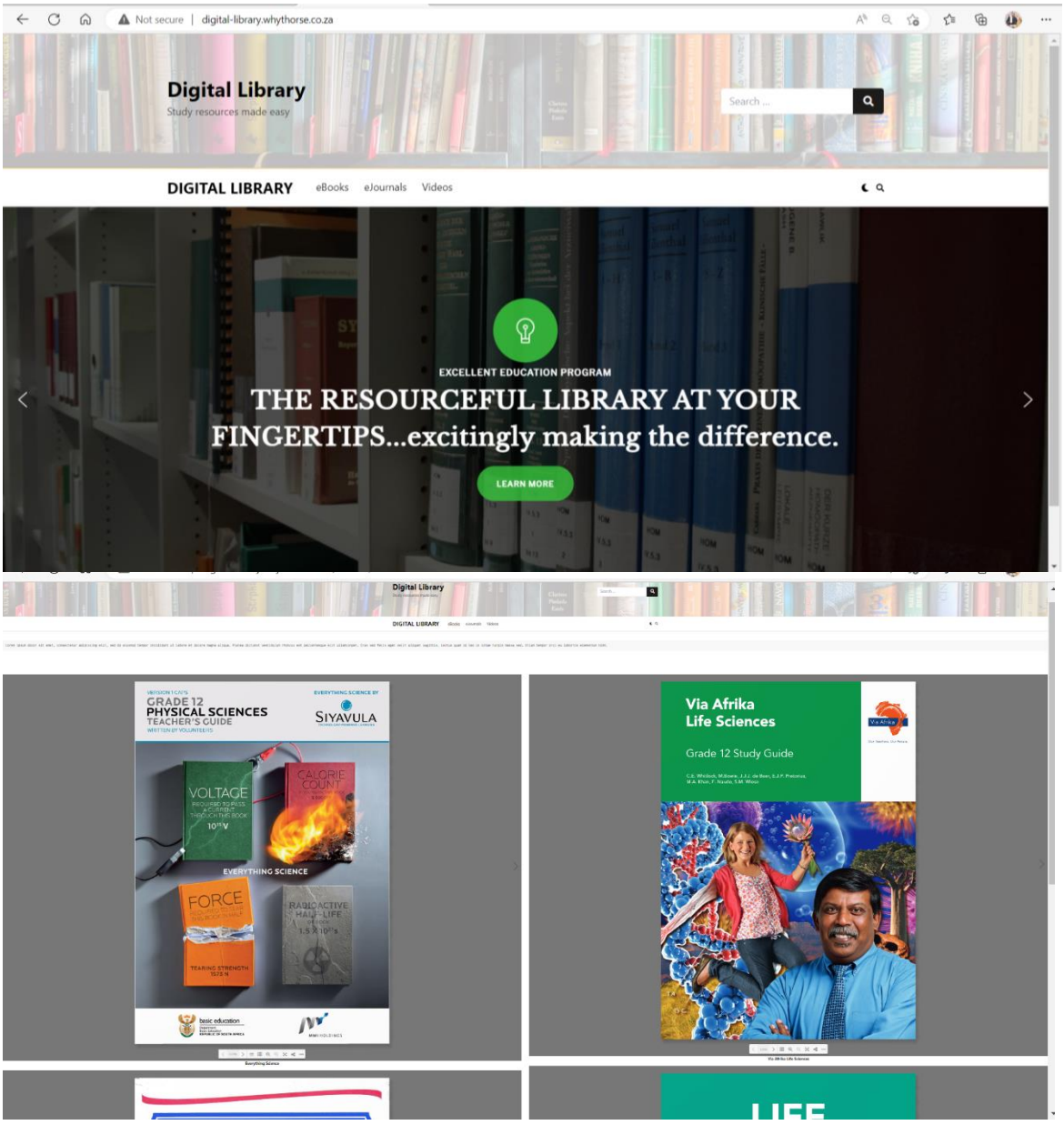
5.5 Development of a mobile digital library model

Constructivism emphasize that teaching and learning based on the “idea that learning is the result of "mental construction” which means students learn by fitting new information together with what they already know” (Bada and Olusegun 2015). They say that when learners encounter something new, they merge it with their previous ideas and experience. Tam (2000: 56) stresses that if it is accepted that constructivist theory is the best way to define learning, then to promote student learning it is necessary to create learning environments that directly expose the learner to the material being studied. A mobile digital library model was hoped to support teaching by ensuring that a conducive learning environment whereby a learner has access to information anytime and from anywhere is created.

Connectivism theorists view learning as a network occurrence influenced by technology and socialization” (Goldie 2016). They are of the idea that. “The starting point for learning occurs when learners connecting to and participating in a learning community. The learning community is described as an intersection, which is always part of a larger network. Intersections may be organizations, libraries, web sites, journals, databases or any other sources of information”. Goldie (2016) is also of the view that “learning may also reside in “non-human appliances” where it may be stored and manipulated by technology. They feel that knowledge emerges from the connections that are formed during network activity. Latest technology help teachers and learners to cope with the rapid expansion of available knowledge (Goldie 2016).

This digital mobile library model, which is one of the intersections that facilitates information sharing was developed.

After collection of qualitative data from teachers and teacher librarians, the mobile digital library model was developed.



http://digital-library.whythorse.co.za

The mobile digital library model has resource like e-books; e-journals and videos. It is accessible remotely. Thereafter, the same groups of teachers and teacher librarians that participated in the interviews were asked to test the mobile digital library model. Then the researcher collected quantitative data from participants using the self-administered questionnaire.

5.6 Chapter summary

This chapter has presented qualitative data collected through interviews and focus group discussion. Participants were teachers and teacher librarians. Presented, interpreted and discussed in this chapter are factors that contribute to the successful development and the use of mobile digital library model; the feasibility of using a digital library model for teaching; and technological competences of teachers to use mobile technology. The data were grouped into themes; presented and interpreted as such. Themes were aligned with the objectives of the study. This chapter also discussed how information collected and theories underpinning this study were used as guidance in the development of a mobile digital library model. The next chapter presents quantitative findings of the study.

CHAPTER SIX: PRESENTATION OF QUANTITATIVE DATA

6.1. Introduction

The present chapter presents the results and discusses the findings derived from the questionnaires that were used for this study. The questionnaire served as a primary instrument for data collection and was disseminated to educators and teacher librarians in selected disadvantaged schools located in KwaZulu-Natal (KZN). The statistical analysis of the collected data was conducted using version 28.0 of the Statistical Package for Social Sciences (SPSS). The study results present the descriptive statistics utilising graphical representations, cross tabulations, and other visual aids for the quantitative data that was gathered. Inferential techniques encompass the use of correlations and chi square test statistics, which are subject to interpretation via the p-values. Bivariate correlations were also undertaken and discussed, and Structural Equation Model is formulated and presented in this chapter.

A total of 96 questionnaires were distributed and subsequently returned, resulting in a response rate of 100%. The research instrument comprised 37 items, which were measured at either a nominal or ordinal level. The survey was divided into four separate sections that examined several topics, namely: biographical information, factors that contribute to successful establishment and use of a mobile digital library, the feasibility of using a digital library, and technological proficiencies. A sectional analysis was conducted to ascertain the scoring patterns of the participants with respect to each variable within each section. The findings are initially displayed through summarised percentages for the variables that comprise each section. Subsequently, the results are subjected to further examination based on the significance of the statements. A chi-square goodness-of-fit test was conducted to assess the statistical significance of the differences in scoring patterns per statement across each option. The null hypothesis posits that there is no significant difference in the number of respondents who scored across each option for each statement, looked at individually. A statistical analysis using the Chi square test of independence was conducted to ascertain the presence of a significant association between the variables categorised as rows and columns. The null hypothesis posits that there exists no apparent association between the two variables in question. The alternative hypothesis posits the presence of a correlation or relationship. The ordinal data was subjected to bivariate correlation analysis. The objectives of the study were to identify factors that would contribute to the successful development and the use of mobile digital library model; establish

the feasibility of using a digital library model for teaching; and ascertain technological competences of teachers to use mobile technology.

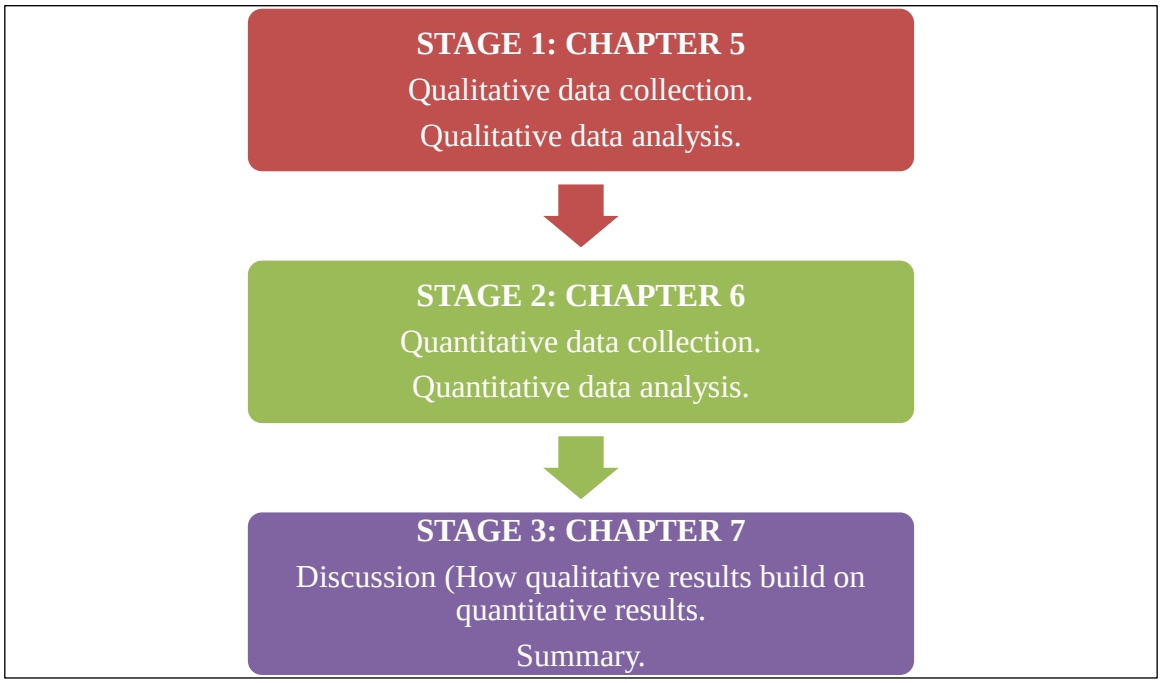


Figure 6.1: Exploratory sequential mixed method design
Source: Adapted from Maree (2016: 318)

A questionnaire was employed as the data collection tool for gathering quantitative data. The instrument was divided into four distinct sections, namely section A, which pertained to demographic data; section B, which focused on the factors that facilitated the successful development and utilization of a mobile digital library; section C, which examined the feasibility of employing a digital library; and section D, which assessed technological proficiency.

6.2. Reliability statistics

Reliability and validity are fundamental considerations in ensuring precision within research studies. Reliability refers to the consistency and stability of measurements obtained from the same subjects. It is evaluated by taking multiple measurements on the same individuals or using established measures of internal consistency such as Cronbach's alpha coefficient. In the present study, the reliability of the newly developed construct was assessed using Cronbach's alpha. A reliability coefficient of 0.60 or higher is commonly regarded as an acceptable threshold for ensuring reliability. Table 6.1 presents the Cronbach's alpha scores for all the

items included in the questionnaire, indicating the internal consistency of the measures employed in this study.

Table 6. 1: Reliability statistics

Section		Number of Items	Cronbach's Alpha
B	Factors contributing to the successful development and use of a mobile digital library	10	0.911
C	Feasibility of using a digital library	11	0.924
D	Technology activities	10	0.937
All items included		31	0.933

The reliability scores obtained for all sections of the research exceed the recommended threshold of Cronbach's alpha value, signifying an acceptable level of consistent scoring within these sections. Each individual section, as well as the overall score, surpasses the 0.9 threshold, aligning with the assessment of Pietersen and Maree (2019: 261) who consider such high values to indicate a substantial level of instrument reliability.

6.3 Factor Analysis

In order to establish the associations between the 31 factors and the three factors derived from the data, a factor analysis was conducted employing Principal Axis Factoring as the extraction method. A simple structure rotation was applied, along with the Oblimin rotation technique utilizing Kaiser Normalization. Factor analysis is a statistical technique widely employed for the purpose of data reduction. Its primary objective is to represent a set of variables or questions whose dimensionality is reduced. This approach is particularly useful in survey research, where a researcher seeks to capture a comprehensive measure of a construct by combining multiple related questions. Individually, each question may not sufficiently capture the underlying attitude or concept, but collectively, they provide a more robust representation. The application of factor analysis allows researchers to determine whether the measures indeed assess the same underlying construct. If they do, the factors can be amalgamated to create a new variable known as a factor score variable, which provides a score for each respondent on the factor of interest. Factor analysis techniques are applicable across a range of research scenarios and can be leveraged to enhance understanding and measurement in various fields of study.

The summary table preceding the matrix table(s) presents the outcomes of the KMO (Kaiser-Meyer-Olkin) and Bartlett's Test. These tests assess the appropriateness of the data for detecting underlying structure. The KMO measure evaluates the extent to which the variables account for the variance caused by latent factors. Higher values, approaching 1.0, suggest that the data may be suitable for conducting a factor analysis. Conversely, values below 0.50 indicate that the results of the factor analysis are likely to be less informative. On the other hand, Bartlett's test of sphericity examines the hypothesis that the correlation matrix represents an identity matrix, indicating that the variables are independent and unsuitable for structure detection. Significance levels below 0.05 indicate that a factor analysis may be valuable for the given dataset. It is worth noting that factor analysis is solely applied to the Likert scale items, while specific components are further divided into more detailed elements, as revealed in the rotated component matrix.

Table 6.2: KMO and Bartlett's Test

	"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"	**"Bartlett's Test of Sphericity"**		
All sections	0.801	Approx. Chi-Square	df	Sig.
		2225.773	465	< 0.001

As shown in Table 6.2, the necessary conditions for conducting factor analysis have been met. Specifically, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy exceeds the threshold of 0.500, indicating a satisfactory level of adequacy for factor analysis. Additionally, the Bartlett's Test of Sphericity significance value is below 0.05, signifying the presence of interrelationships among the variables and justifying the utilization of factor analysis.

Table 6.3: Rotated Component Matrix

Factors	Factor			
	1	2	3	
Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources	0.761	0.189	0.081	B1
User friendliness of a mobile digital library platform	0.740	0.328	0.206	B2
Financial support from the organization/Department to ensure sustainability of service provision	0.719	0.106	0.168	B3
Ability of educators, learners and school librarian to use the latest technology	0.634	0.197	-0.012	B4
As the mobile digital library system is updated, educators and learners must keep up with the latest technology	0.734	0.048	0.106	B5
Effective marketing of mobile digital library services	0.745	-0.046	0.148	B6
The provision of reliable internet connectivity	0.694	0.364	0.018	B7
Relevance of books/Information resources to the school curriculum	0.644	0.438	0.157	B8
Affordability of a mobile digital library	0.705	0.309	0.055	B9
Remote and convenient accessibility of Information for both educators and learners	0.684	0.381	0.175	B10
A mobile digital library would be suitable for teaching purposes	0.235	0.731	0.088	C1
A mobile digital library is appropriate for learning	0.182	0.735	0.178	C2
I would recommend that schools have a mobile digital library	0.154	0.790	0.121	C3
A mobile digital library would enable me and my learners to easily access library resources and services without time and space limitations	0.062	0.719	0.029	C4
A mobile digital library would make library resources easily accessible to educators and learners	0.159	0.839	0.102	C5
I would use a mobile digital library to support my teaching if it were available to me	0.075	0.698	0.018	C6
I would encourage my learners to use a mobile digital library if it were available	0.146	0.773	0.178	C7
My school can have a fully functional mobile digital library if there can be a person responsible for its maintenance	0.223	0.640	0.072	C8
My school can have a fully functional mobile digital library if it can be cheaper to maintain	0.214	0.718	0.091	C9
It is possible to have a functioning mobile digital library if there could be funding for hosting and maintenance	0.302	0.724	0.112	C10
Having a functional mobile digital library is feasible if educators and learners will have regular training on how to use it	0.154	0.615	0.011	C11
Uploading files on the internet	0.201	0.194	0.799	D1
Downloading files from the internet	0.307	0.049	0.790	D2
Searching for information using different search engines	0.127	0.138	0.838	D3
Working with Microsoft office (Word, Excel etc)	0.245	-0.010	0.811	D4
Using the latest technology for teaching	0.050	0.022	0.826	D5

Creating quiz and questions	0.026	0.056	0.772	D6
Social network	-0.020	0.035	0.667	D7
Emailing	0.048	0.334	0.713	D8
Printing/Scanning	0.083	0.259	0.831	D9
Creating videos		-0.019	0.806	D10

"Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization[a] a. Rotation converged in 5 iterations"

Factor analysis serves as a widely utilized statistical technique for data reduction, often employed in survey research to represent a set of questions through a reduced number of hypothetical factors. In this study, the extraction method employed was principal component analysis, as indicated in Table 6.3. The rotation method utilized was Varimax with Kaiser Normalization, which ensures an orthogonal rotation, thereby minimizing the number of variables with high loadings on each factor. This simplifies the interpretation of the resulting factors.

The factor analysis and loading outcomes provide valuable insights into the inter-correlations among the variables. Items exhibiting similar loadings suggest that they measure a common underlying factor. Through careful examination, it was found that items with loadings equal to or greater than 0.5 (and, in cases of cross-loading, selecting the highest loading) effectively measured the corresponding components. It is noteworthy that all statements within each section displayed perfect loadings on a single component, indicating an accurate measurement of the intended constructs. The distinct sub-themes, represented by different colors, aligned with specific sections of the questionnaire. Specifically, the color green represented factors contributing to the successful development of a mobile digital library, the color yellow represented the feasibility of using a digital library, and the color blue denoted technological ability.

Factor 1: Factors contributing to the successful development of a mobile digital library

According to Table 6.3, high factor loadings were noted in digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources (0.761), user friendliness of a mobile digital library platform (0.740), financial support from the organization/department to ensure sustainability of service provision (0.719), ability of educators, learners and school librarian to use the latest technology (0.634), as the mobile digital library system is updated, educators and learners must keep up with the latest

technology (0.734), effective marketing of mobile digital library services (0.745), provision of reliable internet connectivity (0.694), relevance of books/Information resources to the school curriculum (0.644), affordability of a mobile digital library (0.705), remote and convenient accessibility of Information for both educators and learners (0.684). The loading analysis revealed that the statements in each section exhibited perfect loadings on a singular component, indicating an accurate and precise measurement of the intended constructs. This result signifies that the statements within these sections successfully captured and assessed the desired variables, aligning with their intended conceptual representations.

Factor 2: Feasibility of using a digital library

From Table 6.3, the following high loadings have been identified: A mobile digital library would be suitable for teaching purposes (0.731), a mobile digital library is appropriate for learning (0.735), I would recommend that schools have a mobile digital library (0.790), a mobile digital library would enable me and my learners to easily access library resources and services without time and space limitations (0.719), a mobile digital library would make library resources easily accessible to educators and learners (0.839), I would use a mobile digital library to support my teaching if it were available to me (0.698), I would encourage my learners to use a mobile digital library if it were available (0.773), my school can have a fully functional mobile digital library if there can be a person responsible for its maintenance (0.640), my school can have a fully functional mobile digital library if it can be cheaper to maintain (0.718), it is possible to have a functioning mobile digital library if there could be funding for hosting and maintenance (0.724), and having a functional mobile digital library is feasible if educators and learners will have regular training on how to use it (0.615). The statements comprising each section exhibited perfect loadings on a singular component, indicating a precise measurement of the intended constructs. This suggests that the statements within these sections effectively captured and assessed the specific variables they were designed to measure.

Factor 3: The technological ability of educators

Table 6.3 confirms the high factors loadings as: the uploading files on the internet (0.799), downloading files from the internet (0.790), searching for information using different search engine (0.838), working with Microsoft office (0.811), using the latest technology for teaching (0.826), creating quiz and questions (0.772), social network (0.667), emailing (0.713), printing/Scanning (0.831), creating videos (0.806). All sections demonstrated successful

loading onto a single component, implying that the statements within these sections proficiently assessed the intended variables.

6.4 Section A: Biographical data

This section provides information regarding the location of schools according to districts, the quintile levels of schools, the years of experience of teachers, the designation of teachers, and the gender of teachers from the schools that were surveyed in this study.

Table 6. 4: Location and characteristics of schools

District	Circuit	Quintile level	Place
Amajuba	Madadeni	Quintile 3	Urban
Amajuba	Ndundulu	Quintile 1	Rural
Pinetown	Molweni	Quintile 3	Rural
Pinetown	Ndengezi	Quintile 2	Rural
Ugu	Mkhunya	Quintile 1	Rural
Ugu	Umkomazi	Quintile 2	Rural
Umgungundlovu	Edendale	Quintile 3	Urban
Umgungundlovu	Inhlazuka	Quintile 1	Rural
Umgungundlovu	Mid-illovo	Quintile 2	Rural
Umlazi	Mafa	Quintile 2	Urban
Umlazi	Umbumbulu central	Quintile 1	Rural

The characteristics of the schools included in the study are presented in Table 6.4. The study conducted data collection and analysis pertaining to the profiles of schools, specifically focusing on their district and quintile classification. The research incorporated the participation of a total of eleven secondary schools, consisting of two schools from the Amajuba district, two schools from the Pinetown district, two schools from the Ugu district, three schools from the uMgungundlovu district, and two schools from the Umlazi district.

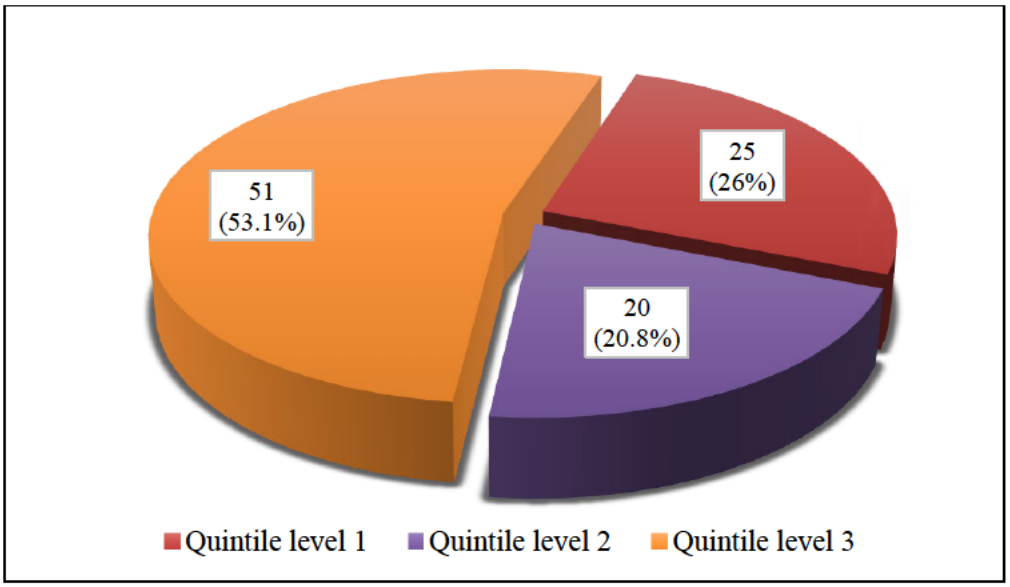


Figure 6.2: Quintile level of schools (N=96)

Schools falling within quintile one to quintile three are categorized as institutions with the lowest economic status. The first quintile is considered the most economically disadvantaged of the three categories, with the second quintile following closely behind. Figure 6.2 exhibits that more than half of the schools (53.1%) were within quintile level 3, with 26% from quintile level 1 and 20.8% from quintile level 2.

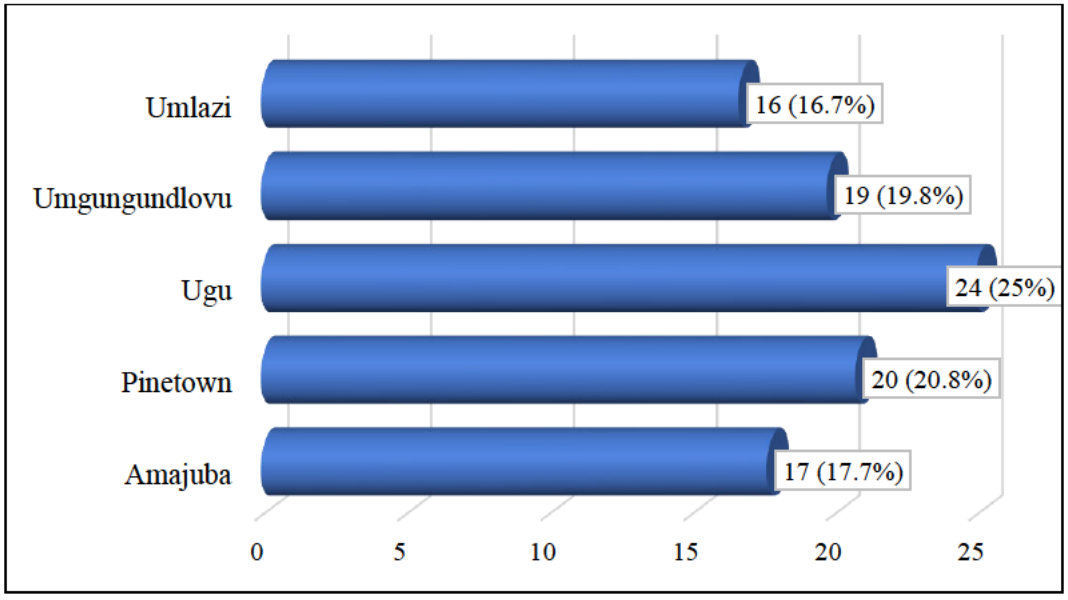


Figure 6.3: Location of schools (N=96)

According to Figure 6.3, the number of respondents per district is displayed. The study involved a total of 96 teachers, comprising 17 teachers from Amajuba district, 20 teachers from

Pinetown district, 24 teachers from Ugu district, 19 teachers from Umgungundlovu district, and 16 teachers from Umlazi district. There is no significant variance in the number of participants across the various districts.

Table 6.5: Crosstabulation: School district by quintile level

Quintile	School district					X^2
	Amajuba	Pinetown	Ugu	Umgungundlovu	Umlazi	
Quintile level 1	5 (20.0%)		8 (32.0%)	4 (16.0%)	8 (32.0%)	0.000
Quintile level 2	0.0%	8 (40.0%)	0.0%	4 (20.0%)	8 (40.0%)	
Quintile level 3	12 (23.5%)	12 (23.5%)	16 (31.4%)	11 (21.6%)	0.0%	

Table 6.5 captures the number of schools that participated in study from each district and quintile level. The study included quintile level 1 schools from Amajuba (20%), Ugu (32%), uMgungundlovu (16%) and Umlazi (32%). Quintile 2 schools that formed part of this research were from Pinetown (40%), uMgungundlovu (20%) and Umlazi (40%). Included in the study were quintile 3 schools from Amajuba (23.5%), Pinetown (23.5%), Ugu (314%), uMgungundlovu and (21.6%). There were no quintile level 1 schools in Pinetown, no quintile level 2 schools in Ugu and no quintile level 3 schools in Umlazi.

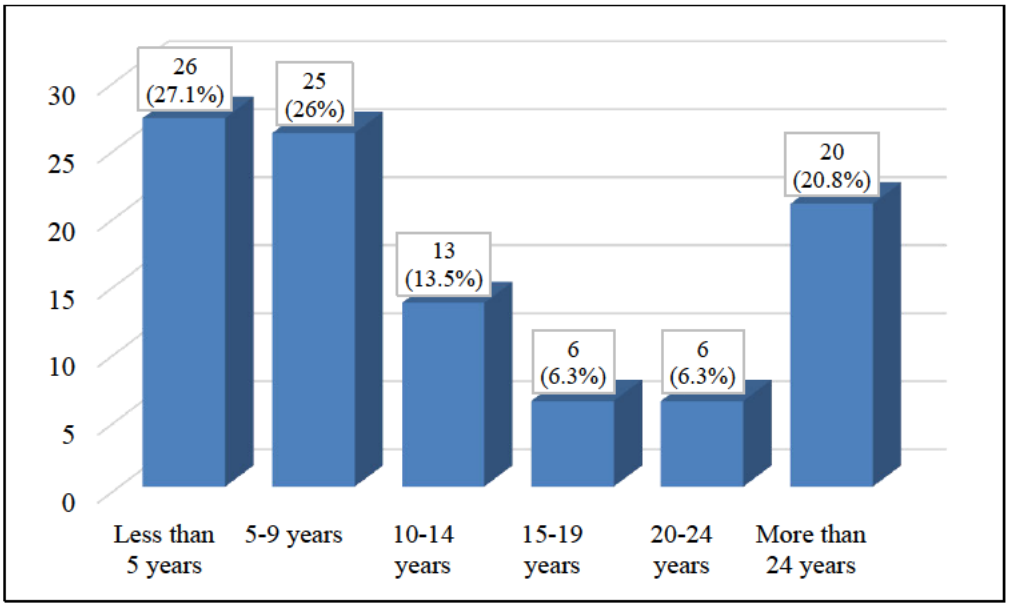


Figure 6.4:Years of service as a teacher (N=96)

The data pertaining to the years of service of teachers included in the study is presented in Figure 6.4. The largest proportion (27.1%) of the population is constituted by teachers with less than five (5) years of experience. Subsequently, a cohort of teachers possessing a tenure

ranging from five to ten years, comprising approximately 26% of the total population, can be observed. This implies that a considerable portion of teachers have less than ten years of professional experience, potentially suggesting that they are part of the group that received their education during the period when emerging technologies were prevalent. Teachers with more than 24 years of experience make up the third largest percentage, accounting for 20.8% of the total.

Table 6.6: Designation of teachers (N = 96)

Designation	Frequency	Percent
Teacher	74	77.1
Senior Teacher	19	19.8
School/Teacher Librarian	3	3.1
Total	**96**	**100.0**

Teachers in this study were characterized as teachers, senior teachers and school/teach librarians. Table 6.6 confirms that out of the entire population, 77% comprised teachers and 19% were senior teachers. There were only three (3) teacher librarians who comprised 3.1% of the population.

Table 6.7: Crosstabulation: Designation of teachers by quintile level of school

Designation	Quintile level of school			X^2
	Quintile level 1	Quintile level 2	Quintile level 3	
Teacher	21.6%	24.3%	54.1%	0.061
Senior Teacher	47.4%	10.5%	42.1%	
School/Teacher Librarian	0.0%	0.0%	100.0%	

Table 6.7 presents the data pertaining to the cross-tabulation analysis conducted to examine the relationship between the designation of teachers and the quintile level of schools. The teacher librarian profession is represented solely by the third quintile of the population, accounting for a meagre 3.1% of the overall population. Schools in the first quantile demonstrate the highest percentage (47.4%) of educators with significant experience compared to the overall population. The senior teacher population in schools belonging to the third quintile is 42%, whereas schools in the first quintile contribute 10.5% of senior teachers. A Chi-square (X^2) analysis was performed to examine the association between quintile level and educator designation. The results presented in Table 6.6 demonstrate that there is no statistically

significant relationship between the quintile level and the designation of school educator. This is supported by a p-value of .061.

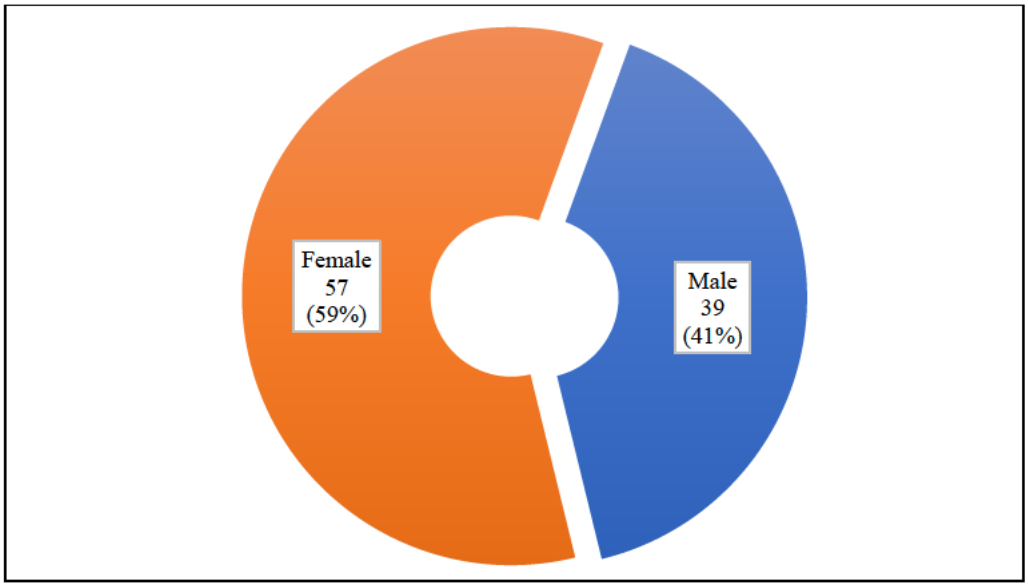


Figure 6.5: Gender of respondents (N=96)

The data reveals a higher representation of female teachers (59%) compared to male teachers (41%) in the study.

6.5 Section B: Factors contributing to the successful development and use of a mobile digital library

The present section of this chapter provides statistical data regarding the degree of agreement among participants with respect to the statements concerning the essential components that facilitate the effective establishment and utilization of a mobile digital library.

Mobile digital library

	Factors	1 SD	2 D	3 N	4 A	5 SA	Mean
1	Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources	1.0	-	4.2	49.0	45.8	4.39
2	User friendliness of a mobile digital library platform	1.1	1.1	5.3	49.5	43.2	4.33
3	Financial support from the organization/Department to ensure sustainability of service provision	5.3	4.2	6.3	38.9	45.3	4.15
4	Ability of educators, learners and school librarian to use the latest technology	-	1.1	9.5	42.1	47.4	4.36
5	As the mobile digital library system is updated, educators and learners must keep up with the latest technology	1.1	-	3.2	36.8	58.9	4.53
6	Effective marketing of mobile digital library services	1.1	1.1	5.4	54.8	37.6	4.27
7	The provision of reliable internet connectivity	-	3.2	5.3	42.1	49.5	4.38
8	Relevance of books/Information resources to the school curriculum	-	3.2	5.3	44.2	47.4	4.36
9	Affordability of a mobile digital library	2.2	4.3	11.8	44.1	37.6	4.11
10	Remote and convenient accessibility of Information for both educators and learners	-	3.2	4.2	46.3	46.3	4.36

SD= "Strongly Agree", D =" Disagree", N=" Neutral", A=" Agree", 5=" Strongly Agree"

The participants were requested to indicate their degree of agreement using a five-point Likert Scale, ranging from '1' representing "Strongly Disagree" to '5' denoting "Strongly Agree." Table 6.8 presents the data indicating that there was an agreement regarding all statements pertaining to the factors that facilitate the effective creation and usage of a mobile digital library. The results specifically denote that the highest level of agreement among participants was related to the necessity of keeping up with the latest technology as the mobile digital library system is updated (Mean=4.53). Additionally, digital literacy training for teacher librarians, educators, and learners on the use of mobile platforms to access information and resources (Mean=4.39), the provision of reliable internet connectivity (Mean=4.38), the ability of educators, learners, and school librarians to use the latest technology (Mean=4.36), the relevance of books/information resources to the school curriculum (Mean=4.36), and remote and convenient accessibility of information for both educators and learners (Mean=4.36) were also of great importance. The average agreement level for this section stands at 91%, with statement 5 receiving the highest level (95.8%) and statement 9 the lowest (81.7%).

Table 6.8: Crosstabulations: Factors contributing to the successful development and use of a mobile digital library by school district

Factors contributing to the successful development and use of a mobile digital library	Response	School District					X^2
		Amajuba	Pinetown	Ugu	uMgung.	Umlazi	
Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources	Strongly Disagree	5.9%	0.0%	0.0%	0.0%	0.0%	0.280
	Neutral	5.9%	10.0%	0.0%	5.3%	0.0%	
	Agree	23.5%	55.0%	58.3%	47.4%	56.3%	
	Strongly Agree	64.7%	35.0%	41.7%	47.4%	43.7%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
User friendliness of a mobile digital library platform	Strongly Disagree	5.9%	0.0%	0.0%	0.0%	0.0%	0.441
	Disagree	0.0%	0.0%	0.0%	0.0%	6.3%	
	Neutral	0.0%	10.5%	4.2%	0.0%	12.5%	
	Agree	35.3%	57.9%	50.0%	57.9%	43.8%	
	Strongly Agree	58.8%	31.6%	45.8%	42.1%	37.5%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
Financial support from the organization/department to ensure sustainability of service provision	Strongly Disagree	5.9%	5.3%	4.2%	0.0%	12.5%	0.640
	Disagree	0.0%	5.3%	4.2%	0.0%	12.5%	
	Neutral	5.9%	5.3%	4.2%	0.0%	18.8%	
	Agree	41.2%	36.8%	37.5%	52.6%	25.0%	
	Strongly Agree	47.1%	47.4%	50.0%	47.4%	31.3%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
Ability of educators, learners and school librarian to use the latest technology	Disagree	0.0%	5.3%	0.0%	0.0%	0.0%	0.053
	Neutral	11.8%	10.5%	4.2%	0.0%	25.0%	
	Agree	23.5%	57.9%	33.3%	57.9%	37.5%	
	Strongly Agree	64.7%	26.3%	62.5%	42.1%	37.5%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
As the mobile digital library system is updated, educators and learners must keep up with the latest technology	Strongly Disagree	5.9%	0.0%	0.0%	0.0%	0.0%	**0.002***
	Neutral	5.9%	10.5%	0.0%	0.0%	0.0%	
	Agree	5.9%	63.2%	50.0%	36.8%	18.7%	
	Strongly Agree	82.4%	26.3%	50.0%	63.2%	81.3%	

	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
Effective marketing of mobile digital library services	Strongly Disagree	5.9%	0.0%	0.0%	0.0%	0.0%	0.427
	Disagree	0.0%	5.3%	0.0%	0.0%	0.0%	
	Neutral	5.9%	0.0%	4.2%	0.0%	21.4%	
	Agree	52.9%	63.2%	50.0%	63.2%	42.9%	
	Strongly Agree	35.%	31.6%	45.8%	36.8%	35.7%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
The provision of reliable internet connectivity	Disagree	0.0%	5.3%	4.2%	0.0%	6.3%	0.583
	Neutral	11.8%	0.0%	4.2%	0.0%	12.5%	
	Agree	29.4%	57.9%	41.7%	42.1%	37.5%	
	Strongly Agree	58.8%	36.8%	50.0%	57.9%	43.8%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
Relevance of books/Information resources to the school curriculum	Disagree	5.9%	0.0%	4.2%	0.0%	6.3%	0.448
	Neutral	0.0%	5.3%	0.0%	5.3%	18.8%	
	Agree	35.3%	47.4%	41.7%	57.9%	37.5%	
	Strongly Agree	58.8%	47.4%	54.2%	36.8%	37.5%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
Affordability of a mobile digital library	Strongly Disagree	0.0%	0.0%	0.0%	0.0%	14.3%	**0.001***
	Disagree	0.0%	5.3%	4.2%	0.0%	14.3%	
	Neutral	35.3%	10.5%	0.0%	0.0%	21.4%	
	Agree	17.6%	63.2%	54.2%	52.6%	21.4%	
	Strongly Agree	47.1%	21.1%	41.7%	47.4%	28.6%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	
Remote and convenient accessibility of Information for both educators and learners	Disagree	5.9%	0.0%	4.2%	0.0%	6.3%	**0.005***
	Neutral	5.9%	5.3%	0.0%	0.0%	12.5%	
	Agree	5.9%	63.2%	50.0%	57.9%	50.0%	
	Strongly Agree	82.4%	31.6%	45.8%	42.1%	31.3%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	

** Significant values (p<0.05) Chi-square analysis*

A crosstabulation analysis was conducted to understand the variables that are influential in the effective development and utilization of a mobile digital library across diverse educational districts. Table 6.9 displays the presented data. Overall, the responses to the statements reveal a predominance of agreement, with higher levels observed compared to levels of disagreement. It is worth noting that none of the statements exhibit a higher proportion of disagreement. The significance of these differences is rigorously examined and clarified in the provided table.

Overall, there was a higher level of consensus among all educational districts with respect to all factors. The data reveals a noteworthy agreement regarding the claim that it is essential for educational institutions to offer training in digital literacy to teacher librarians, educators, and learners, specifically focusing on the effective utilisation of mobile platforms for accessing information and resources. The above statement gained consensus from all educational institutions situated in the Ugu and Umlazi regions, exhibiting a rate of concurrence of 94.8% in Um, 90% in Pinetown, and 88.2% in Amajuba. The level of agreement regarding the user friendliness factor of a mobile digital library platform was found to be high across all districts. Specifically, a significant degree of agreement was noted in the following areas: Umung (100%), Ugu (95.8%), Amajuba (94.1%), Pinetown (89.5%), and Umlazi (81.3%).

The findings of the study indicate that a notable percentage of schools in Umung (100%), Amajuba (88.3%), Ugu (87.5%), and Pinetown (84.2%) recognize the importance of receiving financial assistance from the organization/department to ensure the continuity of service delivery. This financial support plays a crucial role in facilitating the successful establishment and utilisation of a mobile digital library, thereby contributing to its overall development and effectiveness. However, it should be noted that the aforementioned statement obtained agreement from a mere 56.3% of schools located in Umlazi. The findings suggest that there is a significant level of consensus among schools in Umung (100%), Ugu (95.8%), Amajuba (88.2%), Pinetown (84.2%), and to a lesser extent Umlazi (75%) regarding the ability of educators, learners, and school librarians in effectively utilizing the latest technology as a key factor in the successful implementation and utilisation of a mobile digital library. It is unanimously agreed upon by majority of schools in the Ugu, Umung, and Umlazi regions that in order to remain ahead of the advancements in technology, both educators and learners must adapt to the updated mobile digital library system. The findings indicate that a significant proportion of schools in Pinetown (89.5%) and Amajuba (88.3%) concur with the notion that this factor plays a role in facilitating the successful implementation and utilisation of a mobile

digital library. The findings demonstrate that a substantial percentage of schools in Umunga (100%), Ugu (95.8%), Pinetown (94.8%), Amajuba (85.2%), and Umlazi (78.6%) concur on the importance of effectively marketing mobile digital library services as a key factor in the establishment and utilisation of such a library.

The findings reveal that a substantial percentage of schools across different districts, including Umung (100%), Pinetown (94.7%), Ugu (91.7%), Amajuba (88.2%), and Umlazi (81.3%), recognize the importance of reliable access to the internet in enabling the creation and operation of a digital mobile library. With the exclusion of Umlazi, the majority of schools in all districts have recognized the significance of books and information resources in the school curriculum as a vital component in the establishment and utilisation of a mobile digital library. A comparatively smaller percentage of schools situated in Umlazi (75%) agreed with this statement.

The level of agreement varied among educational districts with regards to the importance of affordability in the establishment and operation of a mobile digital library. The aforementioned statement received consensus from all schools in uMung, 95.9% of those in Ugu, 84.3% of those in Pinetown, and 50% of those in Umlazi. A considerable number of educational institutions in various districts recognized the importance of remote and convenient information access for both educators and learners in the implementation and functioning of a mobile digital library. Specifically, the statement received agreement from all educational institutions in uMung, 95.8% of those in Ugu, 94.8% in Pinetown, 88.3% in Amajuba, and 81.3% in Umlazi. Schools situated in uMungu exhibited the greatest degree of consensus regarding all statements concerning the factors that enable the effective development and utilisation of a digital mobile library. In contrast, the schools located in Umlazi demonstrated the least amount of consensus on this issue.

A chi-square goodness-of-fit test was employed to examine whether there were significant differences in the scoring patterns across various options for each statement. The null hypothesis assumed an equal distribution of respondents' scores across each option for each statement, evaluated individually. Conversely, the alternative hypothesis proposed notable disparities in levels of agreement and disagreement. The identified significance values (p-values) below the predetermined level of 0.05 indicate that the observed distributions were significantly dissimilar. Therefore, it can be concluded that the variations in how respondents

scored (agree, neutral, disagree) were statistically significant. As displayed in Table 6.9, the Chi-square analysis showed a significant association between school districts and the statement ‘as the mobile digital library system is updated, educators and learners must keep up with the latest technology’ where $X^2(12, n=95) = 27.40$, $p = .002$. This means that the school district from which the respondent came did play a significant role in learners and educators keeping up to date with the latest technology. The Chi-square analysis found further significant associations between variables including the association between school districts and the affordability of a mobile digital library where $X^2(16, n=95) = 39.67$, $p = .001$) and the association between school districts and the statement ‘remote and convenient accessibility of Information for both educators and learners’ where $X^2(12, n=95) = 21.09$, $p = .005$). This implies that the district of the school played a significant role in the affordability of a mobile digital library and the accessibility of information for learners and educators.

Table 6.9: Crosstabulation: Factors contributing to the successful development and use of a mobile digital library by quintile level of schools

Factors contributing to the successful development and use of a mobile digital library	Response	Quintile level of school			X^2
		1	2	3	
Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources.	Strongly Disagree	4.0%	0.0%	0.0%	**0.033***
	Neutral	0.0%	15.0%	2.0%	
	Agree	40.0%	40.0%	56.9%	
	Strongly Agree	56.0%	45.0%	41.2%	
	Total	100.0%	100.0%	100.0%	
User friendliness of a mobile digital library platform	Strongly Disagree	4.0%	0.0%	0.0%	0.217
	Disagree	4.0%	0.0%	0.0%	
	Neutral	4.0%	10.5%	3.9%	
	Agree	32.0%	52.6%	56.9%	
	Strongly Agree	56.0%	36.8%	39.2%	
	Total	100.0%	100.0%	100.0%	
Financial support from the organization/Department to ensure sustainability of service provision.	Strongly Disagree	8.0%	5.3%	3.9%	0.376
	Disagree	4.0%	5.3%	3.9%	
	Neutral	16.0%	5.3%	2.0%	
	Agree	32.0%	26.3%	47.1%	
	Strongly Agree	40.0%	57.9%	43.1%	
	Total	100.0%	100.0%	100.0%	
Ability of educators, learners and school librarian to use the latest technology.	Disagree	0.0%	0.0%	2.0%	0.238
	Neutral	20.0%	10.5%	3.9%	
	Agree	28.0%	52.6%	45.1%	
	Strongly Agree	52.0%	36.8%	49.0%	
	Total	100.0%	100.0%	100.0%	
As the mobile digital library system is updated, educators and learners must keep up with the latest technology.	Strongly Disagree	4.0%	0.0%	0.0%	0.205
	Neutral	0.0%	0.0%	5.9%	
	Agree	24.0%	42.1%	41.2%	
	Strongly Agree	72.0%	57.9%	52.9%	

	Total	100.0%	100.0%	100.0%	
Effective marketing of mobile digital library services	Strongly Disagree	4.0%	0.0%	0.0%	0.243
	Disagree	0.0%	0.0%	2.0%	
	Neutra	12.0%	0.0%	3.9%	
	Agree	56.0%	41.2%	58.8%	
	Strongly Agree	28.0%	58.8%	35.3%	
	Total	100.0%	100.0%	100.0%	
The provision of reliable internet connectivity	Disagree	4.0%	0.0%	3.9%	0.938
	Neutral	8.0%	0.0%	5.9%	
	Agree	44.0%	47.4%	39.2%	
	Strongly Agree	44.0%	52.6%	51.0%	
	Tota	100.0%	100.0%	100.0%	
Relevance of books/Information resources to the school curriculum	Disagree	4.0%	0.0%	3.9%	0.429
	Neutral	4.0%	15.8%	2.0%	
	Agree	44.0%	42.1%	45.1%	
	Strongly Agree	48.0%	42.1%	49.0%	
	Total	100.0%	100.0%	100.0%	
Affordability of a mobile digital library	Strongly Disagree	8.0%	0.0%	0.0%	0.465
	Disagree	4.0%	5.9%	3.9%	
	Neutral	16.0%	11.8%	9.8%	
	Agree	32.0%	52.9%	47.1%	
	Strongly Agree	40.0%	29.4%	39.2%	
	Total	100.0%	100.0%	100.0%	
Remote and convenient accessibility of Information for both educators and learners	Disagree	8.0%	0.0%	2.0%	0.472
	Neutral	0.0%	10.5%	3.9%	
	Agree	44.0%	47.4%	47.1%	
	Strongly Agree	48.0%	42.1%	47.1%	
	Total	100.0%	100.0%	100.0%	

***** *Significant values (p<0.05) Chi-square analysis*

The data in Table 6.10 displays a crosstabulation analysis that examines the relationship between factors influencing the successful development and utilization of a mobile digital library and the quintile level of schools. In general, the statements exhibit a notable disparity in agreement levels, with higher levels of agreement prevailing, while lower levels of agreement, though still surpassing levels of disagreement, are observed. The lack of statements exhibiting a high degree of disagreement is observed, and the statistical significance of the disparities is assessed and presented in the tabular format. In general, school systems categorized under quintile level 1 demonstrated the greatest degree of concurrence with all statements, with quintile level 2 schools ranking second, and quintile level 3 schools ranking third.

The schools classified under quintile level 3 demonstrated the most significant level of agreement (98.1%) regarding the provision of digital literacy training to teacher librarians, educators, and learners. This training pertained to the utilization of mobile platforms to obtain information and resources, which was identified as a crucial element in the effective establishment and functioning of a mobile digital library. Subsequently, quintile level 1, which represents 96% and quintile level 2, which represents 85%, ensued. The study reveals that a significant proportion of schools falling under quintile level 1 (88.0%), quintile level 2 (89.4%), and quintile level 3 (96.1%) concur that the ease of use of the digital library platform is a crucial determinant for the effective implementation and utilization of a mobile digital library.

The study demonstrates that a substantial percentage of schools belonging to quintile levels 1, 2, and 3, specifically 72%, 84.2%, and 90.2%, respectively, acknowledge the significance of financial assistance from the organization or department in the establishment and maintenance of a mobile digital library, thereby ensuring the continuity of service delivery. Most schools in quintile levels 1, 2, and 3 (80%, 89.4%, and 94.1%, respectively) are at an agreement on the technological ability of educators and learners to utilize the latest technologies to facilitate the effective establishment of a mobile digital library. The study indicated a significant level of agreement among educators in schools categorized under quintile levels 1 (96%), 2 (100%), and 3 (94.1%) with regards to the utilization of the latest technology in learning, particularly in the context of the updated mobile digital library. This holds significant importance in the successful establishment and functioning of a mobile digital library.

The effective marketing of digital library services was identified as a crucial element in the advancement and utilization of a mobile digital library by educational institutions in quintiles 1 (84%), 2 (100%), and 3 (94.1%). It was found that schools categorized under quintile level 2 unanimously acknowledged the significance of ensuring reliable internet access in facilitating the establishment and functioning of a mobile digital library. The statement was agreed by a significant proportion of schools in quintile level 1 (88%) and quintile level 3 (90.2%). The study suggests that a substantial majority of schools in quintile levels 1, 2, and 3, specifically 92%, 84.2%, and 94.1%, respectively, concur that the provision of relevant books and information sources aligned with the school curriculum is a crucial aspect in the establishment and utilization of a mobile digital library. According to the findings, schools categorized under quintiles 1, 2, and 3 expressed consensuses that the accessibility of mobile digital libraries at affordable rates was a crucial factor in fostering their growth and utilization. The analysis discloses that a large percentage of schools in quintiles 1, 2, and 3, specifically 92%, 89.5%, and 94.2%, respectively, acknowledge the significance of remote and convenient access to information for both educators and learners in the advancement and utilisation of a mobile digital library.

A chi-square goodness-of-fit test was conducted to explore potential variations in scoring patterns across different options, specifically focusing on the factors associated with the successful development and use of a mobile digital library and the quintile level of schools. The null hypothesis posited an equal distribution of respondents' scores across each option for each statement, assessed individually. Conversely, the alternative hypothesis proposed a significant divergence in levels of agreement and disagreement. The p-values highlighted in the analysis, falling below the predetermined level of significance (0.05), indicate dissimilar distributions. Consequently, it can be inferred that the differences in scoring patterns among respondents were statistically significant. As displayed in Table 6.10, the Chi-square analysis showed a significant association between the quintile level of schools and the statement ‘as the mobile digital library system is updated, educators and learners must keep up with the latest technology’ where $X^2(6\ n=95) = 12.3$, $p = .033$. This implies that the quintile level of schools did play a significant role in keeping up to date with the latest technology.

Table 6.10: Crosstabulation: Factors contributing to the successful development and use of a mobile digital library by the designation of teachers

Factors contributing to the successful development and use of a mobile digital library		Designation			X^2
		Teacher	Senior Teacher	School/ Teacher Librarian	
Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources	Strongly Disagree	0.0%	5.3%	0.0%	0.057
	Neutral	4.1%	0.0%	33.3%	
	Agree	48.6%	47.4%	66.7%	
	Strongly Agree	47.3%	47.4%	0.0%	
	Total	100.0%	100.0%	100.0%	
User-friendliness of a mobile digital library platform	Strongly Disagree	0.0%	5.6%	0.0%	0.316
	Disagree	1.4%	0.0%	0.0%	
	Neutral	5.4%	5.6%	0.0%	
	Agree	48.6%	44.4%	100.0%	
	Strongly Agree	44.6%	44.4%	0.0%	
	Total	100.0%	100.0%	100.0%	
Financial support from the organization/department to ensure sustainability of service provision	Strongly Disagree	5.4%	5.6%	0.0%	0.619
	Disagree	5.4%	0.0%	0.0%	
	Neutral	6.8%	5.6%	0.0%	
	Agree	36.5%	38.9%	100.0%	
	Strongly Agree	45.9%	50.0%	0.0%	
	Total	100.0%	100.0%	100.0%	
Ability of educators, learners and school librarian to use the latest technology	Disagree	1.4%	0.0%	0.0%	0.362
	Neutral	8.1%	16.7%	0.0%	
	Agree	40.5%	38.9%	100.0%	
	Strongly Agree	50.0%	44.4%	0.0%	
	Total	100.0%	100.0%	100.0%	
As the mobile digital library system is updated, educators and learners must keep up with the latest technology.	Strongly Disagree	0.0%	5.6%	0.0%	**0.015***
	Neutral	2.7%	0.0%	33.3%	
	Agree	40.5%	22.2%	33.3%	
	Strongly Agree	56.8%	72.2%	33.3%	
	Total	100.0%	100.0%	100.0%	
Effective marketing of mobile digital library services	Strongly Disagree	0.0%	5.6%	0.0%	0.140
	Disagree	1.4%	0.0%	0.0%	
	Neutral	5.6%	0.0%	33.3%	
	Agree	55.6%	50.0%	66.7%	
	Strongly Agree	37.5%	44.4%	0.0%	
	Total	100.0%	100.0%	100.0%	
The provision of reliable internet connectivity	Disagree	4.1%	0.0%	0.0%	0.208
	Neutral	5.4%	0.0%	33.3%	
	Agree	41.9%	38.9%	66.7%	
	Strongly Agree	48.6%	61.1%	0.0%	
	Total	100.0%	100.0%	100.0%	
Relevance of books/Information resources to the school curriculum	Disagree	2.7%	0.0%	33.3%	0.083
	Neutral	6.8%	0.0%	0.0%	

	Agree	44.6%	44.4%	33.3%	
	Strongly Agree	45.9%	55.6%	33.3%	
	Total	100.0%	100.0%	100.0%	
Affordability of a mobile digital library	Strongly Disagree	1.4%	5.6%	0.0%	0.580
	Disagree	5.6%	0.0%	0.0%	
	Neutral	9.7%	16.7%	33.3%	
	Agree	48.6%	27.8%	33.3%	
	Strongly Agree	34.7%	50.0%	33.3%	
	Total	100.0%	100.0%	100.0%	
Remote and convenient accessibility of Information for both educators and learners	Disagree	2.7%	5.6%	0.0%	0.147
	Neutral	4.1%	0.0%	33.3%	
	Agree	47.3%	38.9%	66.7%	
	Strong agree	45.9%	55.6%	0.0%	
	Total	100.0%	100.0%	100.0%	

** Significant values (p<0.05) Chi-square analysis*

Table 6.11 presents data on a crosstabulation between factors contributing to the successful development and use of a mobile digital library and the designation of educators. Collectively, the statements exhibit notably higher levels of agreement, while the remaining levels of agreement are comparatively lower but still surpass levels of disagreement. None of the statements indicate higher levels of disagreement. The statistical significance of these differences is evaluated and presented in the provided table. The data indicates that a large majority of teachers (95.9%) and senior teachers (94.8%) agreed that digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources is vital to the development and operation of a mobile digital library. On the other hand, 66.7% of school/teacher librarians agreed with this statement. The importance of user-friendliness in the development and utilization of a mobile digital library platform was affirmed by school and teacher librarians. Furthermore, a significant proportion of teachers (93.2%) and senior teachers (88.8%) concurred with this assertion regarding the effective development and functioning of the system. The consensus among school and teacher librarians is that financial assistance is imperative for the successful advancement of a mobile digital library. The results indicate that a significant proportion of both regular teachers (82.4%) and senior teachers (88.9%) expressed agreement with this statement. The findings of the study indicate that a large percentage of school and teacher librarians, as well as teachers and senior teachers, recognize the crucial role of up-to-date technology in the effective development and functioning of a mobile digital library. Specifically, 90.5% of teachers and 83.3% of senior teachers expressed agreement with this viewpoint.

Regarding the significance of educators and learners staying apprised of the latest mobile digital library technology, a considerable proportion of teachers (97.3%) and senior teachers (94.2%) concurred that this is crucial for the advancement and utilization of a mobile digital library. A mere 66.6% of school or teacher librarians agreed with this statement. The study demonstrated that a significant disparity exists between the opinions of teachers and senior teachers, as opposed to school/teacher librarians, regarding the importance of efficient marketing strategies for mobile digital library services. Specifically, 93.1% of teachers and 94.4% of senior teachers expressed the view that effective marketing is crucial for the development and utilization of these services. However, only 66.6% of school/teacher librarians concurred with this perspective. According to the research results, all senior teachers and 90.5% of teachers expressed the view that the availability of reliable access to the internet was crucial for the advancement and utilisation of a mobile digital library. Conversely, 66.6% of school/teacher librarians concurred with this perspective. Based on the findings from the study, all senior teachers and 90.5% of teachers expressed the significance of incorporating books and information sources that align with the school curriculum in the development and utilisation of a mobile digital library. In contrast, 66.6% of school or teacher librarians agreed with this notion.

In accordance with the data, a significant proportion of teachers, senior teachers, and school/teacher librarians, specifically 83.3%, 77.8%, and 66.6%, respectively, expressed agreement with the statement that affordability plays a crucial role in the development and utilisation of a mobile digital library. The findings of the study show that an overwhelming majority of both regular and senior teachers, specifically 93.2% and 94.5% respectively, acknowledge the crucial role of remote and convenient access to information in facilitating the effective establishment and functioning of a mobile digital library for both learners and educators. A mere 66.7% of school or teacher librarians concurred with this.

In order to examine if there were significant variations in the scoring patterns per statement across different options, a chi-square goodness-of-fit test was conducted between factors associated with the successful development and use of a mobile digital library and the designation of educators. The null hypothesis posited that equal proportions of respondents scored across each option for each statement, assessed one statement at a time. Conversely, the alternative hypothesis suggested a significant difference in levels of agreement and disagreement. The p-values highlighted in the analysis, below the predetermined level of

significance (0.05), indicate that the observed distributions were dissimilar. Thus, it can be concluded that the differences in scoring patterns among respondents (agree, neutral, disagree) were statistically significant. As displayed in Table 6.11, the Chi-square analysis showed a significant association between the designation of educators and keeping educators and learners up to date with the latest technology of mobile digital library, where $X^2(6, n=95) = 15.80$, p =.015. This means that the designation oof educators played a significant role in keeping up to date with technology.

6.6 Section C: The feasibility of using a digital library

This section presented the data pertaining to the feasibility of using a digital mobile library at schools.

Table 6.11: The feasibility of using a digital library

Feasibility attributes	1 SD	2 D	3 N	4 A	5 SA	Mean
A mobile digital library would be suitable for teaching purposes	0.0%	0.0%	2.1%	37.5%	60.4%	4.58
A mobile digital library is appropriate for learning	1.1%	0.0%	5.3%	40.0%	53.7%	4.45
I would recommend that schools have a mobile digital library	0.0%	2.1%	2.1%	33.0%	62.8%	4.56
A mobile digital library would enable me and my learners to easily access library resources and services without time and space limitations	1.1%	1.1%	4.2%	35.8%	57.9%	4.48
A mobile digital library would make library resources easily accessible to educators and learners	0.0%	1.1%	2.1%	33.7%	63.2%	4.59
I would use a mobile digital library to support my teaching if it were available to me	0.0%	0.0%	1.1%	40.0%	58.9%	4.58
I would encourage my learners to use a mobile digital library if it were available	1.1%	0.0%	0.0%	34.7%	64.2%	4.61
My school can have a fully functional mobile digital library if there can be a person responsible for its maintenance	0.0%	3.2%	3.2%	45.3%	48.4%	4.39
My school can have a fully functional mobile digital library if it can be cheaper to maintain	2.1%	1.1%	7.4%	42.1%	47.4%	4.32
It is possible to have a functioning mobile digital library if there could be funding for hosting and maintenance	1.1%	2.1%	4.2%	40.0%	52.6%	4.41
Having a functional mobile digital library is feasible if educators and learners will have regular training on how to use it	1.1%	1.1%	2.1%	41.1%	54.7%	4.47

SD= Strongly Agree, D=Disagree, N=Neutral, A=Agree, 5=Strongly Agree

The respondents were requested to indicate their level of agreement by utilizing a Likert Scale comprising five points, where the numerical value '1' represents Strongly Disagree and '5' signifies Strongly Agree. The data in Table 6.12 illustrates the degree of consensus regarding various statements concerning the viability of an online digital library. Based on the mean scores, the highest level of agreement was observed in respondents' inclination to encourage their learners to utilize a mobile digital library, if one were accessible (Mean=4.61). This was closely followed by agreement regarding the facilitation of easy access to library resources for educators and learners through a mobile digital library (Mean=4.59). Additionally, respondents expressed agreement that a mobile digital library would be suitable for instructional purposes (Mean=4.58), and that they would employ a mobile digital library to support their teaching, if it were available (Mean=4.58). Lastly, respondents indicated a tendency to recommend the implementation of a mobile digital library in schools (Mean=4.56). Furthermore, most respondents expressed agreement with the notion that the implementation of a mobile digital library would provide educators and learners with convenient access to library resources and services, overcoming the constraints of time and space (Mean=4.48). It was also found that the development of a functional mobile digital library is feasible, contingent upon educators and learners receiving regular training on its utilisation (Mean=4.47). Additionally, respondents indicated that a mobile digital library is suitable for teaching purposes (Mean=4.45). The potential for a functioning mobile digital library was further supported by the suggestion that funding for hosting and maintenance could be secured (Mean=4.41). Moreover, it was suggested that the school could achieve a fully operational mobile digital library if an individual were assigned the responsibility of its maintenance (Mean=4.39). Lastly, the possibility of a fully functional mobile digital library was reliant upon the cost-effectiveness of its maintenance (Mean=4.32). In general, the mean level of agreement for this question is 95.2%.

Table 6.12: The feasibility of using a digital library by quintile level of school

Feasibility indicators	Response	Quintile level			X^2
		1	2	3	
A mobile digital library would be suitable for teaching purposes	Neutral	4.0%	5.0%	0.0%	0.313
	Agree	24.0%	40.0%	43.1%	
	Strongly agree	72.0%	55.0%	56.9%	
	Total	100.0%	100.0%	100.0%	
A mobile digital library is appropriate for learning	Strongly Disagree	4.0%	0.0%	0.0%	0.368
	Neutral	0.0%	5.3%	7.8%	
	Agree	32.0%	36.8%	45.1%	
	Strongly agree	64.0%	57.9%	47.1%	
	Total	100.0%	100.0%	100.0%	
I would recommend that schools have a mobile digital library	Disagree	8.0%	0.0%	0.0%	0.204
	Neutral	4.0%	0.0%	2.0%	
	Agree	24.0%	26.3%	40.0%	
	Strongly agree	64.0%	73.7%	58.0%	
	Total	100.0%	100.0%	100.0%	
A mobile digital library would enable me and my learners to easily access library resources and services without time and space limitations	Strongly Disagree	0.0%	0.0%	2.0%	0.843
	Disagree	4.0%	0.0%	0.0%	
	Neutral	4.0%	5.3%	3.9%	
	Agree	32.0%	42.1%	35.3%	
	Strongly agree	60.0%	52.6%	58.8%	
	Total	100.0%	100.0%	100.0%	
A mobile digital library would make library resources easily accessible to educators and learners	Disagree	4.0%	0.0%	0.0%	0.621
	Neutral	0.0%	5.3%	2.0%	
	Agree	32.0%	36.8%	33.3%	
	Strongly Agree	64.0%	57.9%	64.7%	
	Total	100.0%	100.0%	100.0%	
I would use a mobile digital library to support my teaching if it were available to me	Neutral	0.0%	0.0%	2.0%	0.754
	Agree	32.0%	42.1%	43.1%	
	Strongly agree	68.0%	57.9%	54.9%	
	Total	100.0%	100.0%	100.0%	
I would encourage my learners to use a mobile digital library if it were available	Strongly Disagree	4.0%	0.0%	0.0%	0.307
	Agree	24.0%	31.6%	41.2%	
	Strongly agree	72.0%	68.4%	58.8%	
	Total	100.0%	100.0%	100.0%	
My school can have a fully functional mobile digital library if there can be a person responsible for its maintenance	Disagree	8.0%	0.0%	2.0%	0.200
	Neutral	4.0%	5.3%	2.0%	
	Agree	32.0%	31.6%	56.9%	
	Strongly agree	56.0%	63.2%	39.2%	
	Total	100.0%	100.0%	100.0%	
My school can have a fully functional mobile digital library if it can be cheaper to maintain	Strongly Disagree	8.0%	0.0%	0.0%	0.346
	Disagree	0.0%	0.0%	2.0%	
	Neutral	12.0%	10.5%	3.9%	
	Agree	40.0%	36.8%	45.1%	
	Strongly agree	40.0%	52.6%	49.0%	

	Tota	100.0%	100.0%	100.0%	
It is possible to have a functioning mobile digital library if there could be funding for hosting and maintenance	Strongly Disagree	4.0%	0.0%	0.0%	0.182
	Disagree	8.0%	0.0%	0.0%	
	Neutra	8.0%	0.0%	3.9%	
	Agree	32.0%	36.8%	45.1%	
	Strongly agree	48.0%	63.2%	51.0%	
	Total	100.0%	100.0%	100.0%	
Having a functional mobile digital library is feasible if educators and learners will have regular training on how to use it	Strongly Disagree	4.0%	0.0%	0.0%	0.318
	Disagree	4.0%	0.0%	0.0%	
	Neutral	0.0%	0.0%	3.9%	
	Agree	28.0%	47.4%	45.1%	
	Strongly agree	64.0%	52.6%	51.0%	
	Total	100.0%	100.0%	100.0%	

** Significant values (p<0.05) Chi-square analysis*

The data pertaining to the feasibility of utilizing a digital library based on the quintile level of school is presented in Table 6.13 through a crosstabulation. In general, every statement exhibits notably higher levels of agreement. The lack of statements exhibiting elevated levels of disagreement can be seen in the table, and the statistical significance of the differences is computed and presented. The schools at quintile level 3 unanimously agreed that a mobile digital library would be an appropriate tool for teaching purposes. Most schools belonging to quintile level 1 (96%) and quintile level 2 (95%) expressed agreement with this statement. The findings indicate a significant level of consensus among educational institutions categorized within quintiles 1, 2, and 3, with percentages of 96%, 94.7%, and 92.2%, respectively, supporting the appropriateness of a mobile digital library for purposes of learning. According to all schools in quintile level 2, it is recommended that schools have a digital mobile library. Schools classified under quintile level 1 (88%) and quintile level 3 (98%) demonstrate a shared recommendation.

The data further indicates that a significant proportion of schools situated in quintile levels 1, 2, and 3, specifically 92%, 94.7%, and 94.1%, respectively, are of the opinion that the implementation of a mobile digital library would facilitate convenient access to library resources and services for learners as well as educators, without being constrained by time and spatial limitations. Furthermore, it has been found that a mobile digital library would enhance the accessibility of library resources to both educators and learners, as reported by over 95% of schools across all quintile levels. Most schools in quintile levels 1 and 2, as well as a significant proportion of schools in quintile level 3, express their willingness to utilize a mobile

digital library as a teaching tool, if it is made accessible to them. A substantial percentage of schools in quintile levels 1, 2, and 3 have expressed their willingness to encourage the use of a mobile digital library among their students, with 96% of schools in quintile level 1 indicating their agreement with this statement. A large percentage of schools situated in quintile levels 1 (88%), 2 (94.8%), and 3 (96.1%) concur that a mobile digital library can be fully functional provided that an individual is designated to oversee its maintenance. According to the data, most schools in quintile levels 1, 2, and 3, specifically 80%, 89.4%, and 94.1%, respectively, expressed agreement that the implementation of a fully functional mobile digital library would be feasible if the maintenance costs were lower. The consensus among schools categorized under quintile level 2 is that the establishment of a functional mobile digital library is feasible, provided that adequate financial resources are allocated towards its hosting and maintenance. The findings indicate that a significant proportion of schools in quintile level 1 (80%) and quintile level 3 (96.1%) agree with this statement. According to the schools in quintile level 2, the feasibility of a functional mobile digital library is dependent upon regular training for both educators and learners on how it should be used. The statement was in agreement by schools belonging to quintile level 1, with a percentage of 92%, and quintile level 3, with a percentage of 96.1%.

Overall, the level of agreement on all eleven statements pertaining to the feasibility of using a mobile digital library was the highest for schools in quintile level 3, followed by quintile level 2 and then quintile level 1. A chi-square goodness-of-fit test was performed to explore whether significant variations existed in the scoring patterns per statement across different options. Specifically, the analysis focused on examining the feasibility of using a digital library based on the quintile level of school. The null hypothesis asserted that an equal number of respondents scored across each option for each statement, assessed individually. Conversely, the alternative hypothesis proposed a significant distinction in levels of agreement and disagreement. The p-values, which were found to be below the predetermined level of significance (0.05), indicate dissimilar distributions. Consequently, it can be concluded that the differences in scoring patterns among respondents (agree, neutral, disagree) were statistically significant. As displayed in Table 6.13, the Chi-square analysis showed no significant association between variables.

Table 6.13: The feasibility of using a digital library by designation of educators

Feasibility indicators		Designation			X^2
		Teacher	Senior Teacher	School Librarian	
A mobile digital library would be suitable for teaching purposes.	Neutra	2.7%	0.0%	0.0%	0.204
	Agree	36.5%	31.6%	100.0%	
	Strongly agree	60.8%	68.4%	0.0%	
	Total	100.0%	100.0%	100.0%	
A mobile digital library is appropriate for learning	Strongly Disagree	1.4%	0.0%	0.0%	0.556
	Neutral	5.4%	5.6%	0.0%	
	Agre	37.8%	38.9%	100.0%	
	Strongly agree	55.4%	55.6%	0.0%	
	Total	100.0%	100.0%	100.0%	
I would recommend that schools have a mobile digital library	Disagree	2.7%	0.0%	0.0%	0.233
	Neutral	1.4%	5.6%	0.0%	
	Agree	31.5%	27.8%	100.0%	
	Strongly agree	64.4%	66.7%	0.0%	
	Total	100.0%	100.0%	100.0%	
A mobile digital library would enable me and my learners to easily access library resources and services without time and space limitations	Strongly Disagree	1.4%	0.0%	0.0%	0.349
	Disagree	1.4%	0.0%	0.0%	
	Neutral	4.1%	0.0%	33.3%	
	Agree	37.8%	33.3%	0.0%	
	Strongly agree	55.4%	66.7%	66.7%	
	Total	100.0%	100.0%	100.0%	
A mobile digital library would make library resources easily accessible to educators and learners	Disagree	1.4%	0.0%	0.0%	**0.016***
	Neutral	1.4%	0.0%	33.3%	
	Agree	35.1%	27.8%	33.3%	
	Strongly agree	62.2%	72.2%	33.3%	
	Total	100.0%	100.0%	100.0%	
I would use a mobile digital library to support my teaching if it were available to me	Neutral	1.4%	0.0%	0.0%	0.843
	Agree	37.8%	44.4%	66.7%	
	Strongly Agree	60.8%	55.6%	33.3%	
	Total	100.0%	100.0%	100.0%	
I would encourage my learners to use a mobile digital library if it were available	Strongly disagree	1.4%	0.0%	0.0%	0.988
	Agree	35.1%	33.3%	33.3%	
	Strongly agree	63.5%	66.7%	66.7%	
	Total	100.0%	100.0%	100.0%	
My school can have a fully functional mobile digital library if there can be a person responsible for its maintenance	Disagree	2.7%	0.0%	33.3%	0.060
	Neutral	2.7%	5.6%	0.0%	
	Agree	44.6%	55.6%	0.0%	
	Strongly agree	50.0%	38.9%	66.7%	
	Total	100.0%	100.0%	100.0%	
My school can have a fully functional mobile digital library if it can be cheaper to maintain	Strongly disagree	2.7%	0.0%	0.0%	0.457
	Disagree	1.4%	0.0%	0.0%	
	Neutral	5.4%	16.7%	0.0%	
	Agree	41.9%	33.3%	100.0%	

	Strongly agree	48.6%	50.0%	0.0%	
	Total	100.0%	100.0%	100.0%	
It is possible to have a functioning mobile digital library if there could be funding for hosting and maintenance	Strongly disagree	1.4%	0.0%	0.0%	0.671
	Disagree	2.7%	0.0%	0.0%	
	Neutral	4.1%	5.6%	0.0%	
	Agree	36.5%	44.4%	100.0%	
	Strongly agree	55.4%	50.0%	0.0%	
	Total	100.0%	100.0%	100.0%	
Having a functional mobile digital library is feasible if educators and learners will have regular training on how to use it	Strongly disagree	1.4%	0.0%	0.0%	0.599
	Disagree	1.4%	0.0%	0.0%	
	Neutral	1.4%	5.6%	0.0%	
	Agree	40.5%	33.3%	100.0%	
	Strongly agree	55.4%	61.1%	0.0%	
	Total	100.0%	100.0%	100.0%	

** Significant values (p<0.05) Chi-square analysis*

Table 6.14 presents data on a crosstabulation between the feasibility of using a digital library and the designation of educators. Overall, the statements exhibit markedly higher levels of agreement, with lower levels of agreement still surpassing levels of disagreement. A considerable majority of respondents strongly agreed with all the statements. Notably, none of the statements received higher levels of disagreement. The significance of these differences is assessed and presented in the provided table. At large, school/teacher librarians show the highest level of agreement across all statements. All senior teachers, and school/subject librarians, and 97.3% of teachers, expressed their agreement that a mobile digital library would be appropriate for teaching purposes. The statement in question received strong agreement from 60.8% of teachers and 68.4% of senior teachers. Furthermore, it was reported by all school and teacher librarians that a mobile digital library is suitable for learning, whereas 93.2% of teachers and 94.5% of senior teachers concurred with this view.

A vast majority of school/teacher librarians, as well as senior teachers, have recommended the implementation of a mobile digital library in schools, with a reported percentage of 95.9% and 94.5% respectively. Most senior teachers expressed the opinion that a mobile digital library would facilitate convenient access to library resources and services, unencumbered by time and spatial constraints. Specifically, 93.2% of teachers and 66.7% of school/teacher librarians concurred with this assertion. The consensus among senior educators was that a mobile digital library would enhance accessibility of library resources for both educators and learners. This view was shared by 97.3% of teachers and 66.6% of school/teacher librarians. The use of a mobile digital library to enhance teaching has been supported by senior teachers and

school/teacher librarians. Furthermore, they have expressed their willingness to encourage their students to utilize a mobile digital library if it were accessible to them. The vast majority of teachers, specifically 98.6%, corroborated this finding. A significant majority of educators, specifically over 90% of teachers and senior teachers, expressed their concurrence that a mobile digital library can be fully operational in their school, provided that there is an individual assigned to oversee its maintenance. However, a comparatively smaller percentage of school/teacher librarians shared this viewpoint. Nonetheless, it was confirmed by all school/teacher librarians, 90.5% of teachers, and 83.3% of senior teachers that the feasibility of a fully operational mobile digital library in their respective schools is dependent upon a reduction in maintenance costs. Furthermore, a significant proportion of school and teacher librarians, as well as over 90% of teachers and senior teachers, expressed their agreement that the establishment of a functional mobile digital library would be viable provided that there is adequate funding for its hosting and maintenance. Additionally, the respondents asserted that regular training for educators and learners on how to use the mobile digital library would be necessary to ensure its feasibility.

A chi-square goodness-of-fit test was utilized to examine potential variations in the scoring patterns per statement across different options. Specifically, the investigation focused on the feasibility of using a digital library and the designation of educators. The null hypothesis proposed an equal distribution of respondents scoring across each option for each statement, assessed individually. Conversely, the alternative hypothesis suggested a significant disparity in levels of agreement and disagreement. The highlighted p-values in the analysis, falling below the predetermined level of significance (0.05), indicate that the observed distributions were dissimilar. Consequently, it can be inferred that the discrepancies in how respondents scored (agree, neutral, disagree) were statistically significant. As displayed in Table 6.14, the Chi-square analysis showed a significant association between the designation of educators and “a mobile digital library would make library resources easily accessible to educators and learners”, where $X^2(6, n=95) = 15.66$, $p = .016$. This means that the designation of educators played a significant role in how a mobile library will make resources accessible.

6.7 Section D: The technological competence of teachers

Table 6.14: Ability to undertake digital activities

Activities	1	2	3	4	5	Mean
Uploading files on the internet	5.2%	6.3%	18.8%	38.5%	31.3%	3.84%
Downloading files from the internet	1.1%	4.2%	11.6%	45.3%	37.9%	4.15%
Searching for information using different search engines	3.2%	3.2%	16.0%	37.2%	40.4%	4.09%
Working with Microsoft office (Word, Excel etc.)	3.2%	6.3%	18.9%	46.3%	25.3%	3.84%
Using the latest technology for teaching	2.1%	3.2%	26.3%	45.3%	23.2%	3.84%
Creating quiz and questions	3.2%	9.5%	23.2%	46.3%	17.9%	3.66%
Social network	1.1%	7.4%	8.4%	42.1%	41.1%	4.15%
Emailing	1.1%	4.2%	7.4%	44.2%	43.2%	4.24%
Printing/Scanning	1.1%	5.3%	12.6%	41.1%	40.0%	4.14%
Creating videos	7.4%	10.6%	22.3%	35.1%	24.5%	3.59%

1=" Not at all able", 2=" Not really able", 3=" Fairly able", 4=" Able", 5="Extremely able"

Participants were asked to rate their abilities in performing digital tasks using a 5-point Likert scale, with '1' representing a complete lack of ability and '5' indicating an extremely high level of ability. The data pertaining to this is displayed in Table 6.17, which substantiates that every participant possessed a level of digital proficiency ranging from slightly above average to highly proficient, enabling them to engage in digital activities. In relation to particular digital activities, the findings indicate that the highest levels of ability were observed in using technology in the following areas: emailing (Mean=4.24), downloading files from the Internet (Mean=4.15), engaging in social networking (Mean=4.15), utilizing printing and scanning functions (Mean=4.14), and conducting information searches using various search engines (Mean=4.09). The participants' abilities were found to be the lowest for the tasks of video creation (Mean = 3.59) and quiz and question creation (mean = 3.66). Within this particular section, there exists a notable disparity between the frequencies of "being able" and "not able" across various technological proficiencies, with the former exhibiting a greater prevalence.

Table 6.16: Crosstabulation: Technological abilities of educators by quintile level

Technological abilities		Quintile level of school			X^2
		1	2	3	
Uploading files on the internet	Not at all able	12.0%	5.0%	2.0%	0.640
	Not very able	8.0%	0.0%	7.8%	
	Fairly able	20.0%	25.0%	15.7%	
	Able	32.0%	40.0%	41.2%	
	Extremely able	28.0%	30.0%	33.3%	
	Total	100.0%	100.0%	100.0%	
Downloading files from the internet	Not at all able	4.0%	0.0%	0.0%	0.643
	Not really able to	8.0%	5.3%	2.0%	
	Fairly able	12.0%	5.3%	13.7%	
	Able	36.0%	47.4%	49.0%	
	Extremely able	40.0%	42.1%	35.3%	
	Total	100.0%	100.0%	100.0%	
Searching for information using different search engines	Not at all able	8.0%	0.0%	2.0%	0.518
	Not really able	0.0%	5.3%	4.0%	
	Fairly able	20.0%	5.3%	18.0%	
	Able	32.0%	52.6%	34.0%	
	Extremely able	40.0%	36.8%	42.0%	
	Total	100.0%	100.0%	100.0%	
Working with Microsoft office	Not at all able	8.0%	0.0%	2.0%	0.852
	Not really able to	8.0%	5.4%	5.9%	
	Fairly able	16.0%	26.6%	17.6%	
	Able	40.0%	47.0%	49.0%	
	Extremely able	28.0%	21.0%	25.5%	
	Total	100.0%	100.0%	100.0%	
Using the latest technology for teaching	Not at all able	4.0%	0.0%	2.0%	0.653
	Not really able to	4.0%	5.3%	2.0%	
	Fairly able	36.0%	15.8%	25.5%	
	Able	28.0%	52.6%	51.0%	
	Extremely able	28.0%	26.3%	19.6%	
	Total	100.0%	100.0%	100.0%	
Creating quiz and questions	Not at all able	4.0%	0.0%	3.9%	0.597
	Not really able t	12.0%	5.3%	9.8%	
	Fairly able	20.0%	21.1%	25.5%	
	Able	40.0%	42.1%	51.0%	
	Extremely able	24.0%	31.6%	9.8%	
	Total	100.0%	100.0%	100.0%	
Social network	Not at all able	0.0%	0.0%	2.0%	0.559
	Not really able	8.0%	10.5%	5.9%	
	Fairly able	16.0%	10.5%	3.9%	
	Able	32.0%	31.6%	51.0%	
	Extremely able	44.0%	47.4%	37.3%	
	Total	100.0%	100.0%	100.0%	
Emailing	Not at all able	4.0%	0.0%	0.0%	0.528

	Not really able	4.0%	10.5%	2.0%	
	Fairly able	8.0%	10.5%	5.9%	
	Able	40.0%	31.6%	51.0%	
	Extremely able	44.0%	47.4%	41.2%	
	Total	100.0%	100.0%	100.0%	
Printing/Scanning	Not at all able	4.0%	0.0%	0.0%	
	Not really able	8.0%	0.0%	5.9%	
	Fairly able	16.0%	5.3%	13.7%	0.414
	Able	28.0%	42.1%	47.1%	
	Extremely able	44.0%	52.6%	33.3%	
	Total	100.0%	100.0%	100.0%	
Creating videos	Not at all able	12.5%	10.5%	3.9%	
	Not really able	12.5%	5.3%	11.8%	
	Fairly able	33.3%	10.5%	21.6%	
	Able	20.8%	21.1%	47.1%	**0.025***
	Extremely able	20.8%	52.6%	15.7%	
	Total	100.0%	100.0%	100.0%	

** Significant values (p<0.05) Chi-square analysis*

Schools at the second quintile level demonstrated the highest competence in conducting information searches across various search engines. Subsequently, schools categorised under quintile level 3 showed a percentage of 74.6%, while quintile level 1 schools displayed a percentage of 72%. Most respondents (74.5%) from schools in quintile level 3 revealed the highest ability in working with Microsoft Office. On the other hand, schools in quintile levels 1 and 2 exhibited comparable levels of ability, both at 68%. The use of new technology for teaching purposes was found to be most prevalent among respondents from schools classified under quintile level 2, with a rate of 78.9%. This was closely followed by respondents from quintile level 3 schools, who reported a utilization rate of 70.6%. A little more than half the respondents (56%) from quintile level 1 schools were able to use the latest technology for teaching. Schools classified as quintile level 2 displayed the highest competence in the development of quizzes and questions, with quintile level 1 schools following closely behind at a rate of 64%. Quintile level 3 schools exhibited a slightly lower level of competence in this area, with a rate of 60.8%. The schools in quintile level 3 exhibited the highest ability in using social networks, with 79% and 76% ability observed in quintile 2 and quintile 1 schools, respectively.

The findings indicate that a significant proportion of participants in schools categorized as quintile level 3 (92.2%) showed ability in using email communication technology. Similarly,

a substantial percentage of individuals in quintile level 1 (84%) and quintile level 2 (79%) schools also exhibited competence in this regard.

The data reveals that respondents from schools in quintile level 2 displayed the highest competence in utilizing printing and scanning technology, with a percentage of 94.7%. This was followed by respondents from quintile level 3 schools, who exhibited an ability rate of 80.4%. Respondents from quintile level 1 schools displayed the lowest proficiency rate at 72%. The results indicate that a significant proportion of the respondents in schools categorized as quintile level 2 (73.7%) demonstrated competence in utilizing technology for video creation. Similarly, 62.8% of participants in quintile level 3 schools and 41.6% in quintile level 1 schools were found to possess this skill. In general, the data suggests that schools categorized in quintile levels 2 and 3 exhibited significantly greater abilities for technology use in comparison to schools in quintile level 1.

To ascertain whether the scoring patterns per statement were expressively different per option, a chi square goodness-of-fit test was done between the technological abilities of educators by quintile level of schools. The null hypothesis claims that similar numbers of respondents scored across each option for each statement (one statement at a time). The alternate hypothesis states that there is a significant difference between the levels of agreement and disagreement. The highlighted sig. values (p-values) are less than 0.05 (the level of significance), it implies that the distributions were not similar. That is, the differences between the way respondents scored (agree, neutral, disagree) were significant. As displayed in Table 6.16, the Chi-square analysis showed a significant association between the technological abilities of educators and using technology to create videos, where $X^2(8, n=95) = 17.56$, $p = .025$. This implies that the technological abilities of educators play a significant role in their ability to create videos.

Table 6.15: Crosstabulation: Technological abilities of teachers by years of service

Technological abilities		Please indicate your years of service						X^2
		Less than 5 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	More than 25 years	
Uploading files on the internet	Not at all able	0.0%	8.0%	0.0%	0.0%	16.7%	10.0%	0.462
	Not really able	3.8%	8.0%	0.0%	0.0%	0.0%	15.0%	
	Fairly able	15.4%	16.0%	7.7%	16.7%	50.0%	25.0%	
	Able	46.2%	44.0%	38.5%	50.0%	16.7%	25.0%	
	Extremely able	34.6%	24.0%	53.8%	33.3%	16.7%	25.0%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Downloading files from the internet	Not at all able	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.721
	Not really able	0.0%	8.0%	0.0%	0.0%	16.7%	5.3%	
	Fairly able	11.5%	16.0%	7.7%	16.7%	16.7%	5.3%	
	Able	46.2%	44.0%	30.8%	33.3%	50.0%	57.9%	
	Extremely able	42.3%	32.0%	61.5%	50.0%	16.7%	26.3%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Searching for information using different search engines	Not at all able	0.0%	0.0%	0.0%	0.0%	16.7%	11.1%	0.653
	Not really able	3.8%	8.0%	0.0%	0.0%	0.0%	0.0%	
	Fairly able	19.2%	12.0%	15.4%	16.7%	16.7%	16.7%	
	Able	26.9%	44.0%	30.8%	50.0%	50.0%	38.9%	
	Extremely able	50.0%	36.0%	53.8%	33.3%	16.7%	33.3%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Working with Microsoft office (Word, Excel etc.)	Not at all able	0.0%	0.0%	0.0%	0.0%	16.7%	10.5%	0.401
	Not really able	0.0%	12.0%	0.0%	0.0%	16.7%	10.5%	
	Fairly able	15.4%	16.0%	15.4%	16.7%	33.3%	26.3%	
	Able	57.7%	48.0%	46.2%	66.7%	16.7%	31.6%	
	Extremely able	26.9%	24.0%	38.5%	16.7%	16.7%	21.1%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Using the latest technology for teaching	Not at all able	0.0%	0.0%	0.0%	0.0%	16.7%	5.3%	**0.040 ***
	Not really able	0.0%	0.0%	0.0%	16.7%	0.0%	10.5%	

	Fairly able	19.2%	32.0%	15.4%	0.0%	16.7%	47.4%	
	Able	46.2%	56.0%	46.2%	66.7%	50.0%	21.1%	
	Extremely able	34.6%	12.0%	38.5%	16.7%	16.7%	15.8%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Creating quiz and questions	Not at all able	3.8%	0.0%	0.0%	0.0%	16.7%	5.3%	0.067
	Not really able	0.0%	8.0%	0.0%	0.0%	16.7%	31.6%	
	Fairly able	19.2%	28.0%	23.1%	16.7%	0.0%	31.6%	
	Able	53.8%	48.0%	46.2%	83.3%	50.0%	21.1%	
	Extremely able	23.1%	16.0%	30.8%	0.0%	16.7%	10.5%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Social network	Not at all able	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.280
	Not really able	0.0%	4.0%	0.0%	16.7%	33.3%	15.8%	
	Fairly able	3.8%	8.0%	15.4%	0.0%	16.7%	10.5%	
	Able	50.0%	48.0%	23.1%	33.3%	33.3%	42.1%	
	Extremely able	46.2%	40.0%	61.5%	50.0%	16.7%	26.3%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Emailing	Not at all able	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.465
	Not really able	0.0%	4.0%	0.0%	16.7%	16.7%	5.3%	
	Fairly able	3.8%	4.0%	7.7%	0.0%	16.7%	15.8%	
	Able	53.8%	52.0%	23.1%	33.3%	50.0%	36.8%	
	Extremely able	42.3%	40.0%	69.2%	50.0%	16.7%	36.8%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Printing/Scanning	Not at all able	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.112
	Not really able	0.0%	0.0%	0.0%	0.0%	33.3%	15.8%	
	Fairly able	11.5%	20.0%	15.4%	0.0%	16.7%	5.3%	
	Able	46.2%	44.0%	23.1%	50.0%	33.3%	42.1%	
	Extremely able	42.3%	36.0%	61.5%	50.0%	16.7%	31.6%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Creating videos	Not at all able	0.0%	0.0%	0.0%	16.7%	33.3%	21.1%	0.084
	Not really able	8.0%	8.0%	7.7%	0.0%	16.7%	21.1%	

	Fairly able	28.0%	24.0%	23.1%	16.7%	33.3%	10.5%	
	Able	48.0%	44.0%	23.1%	33.3%	0.0%	26.3%	
	Extremely able	16.0%	24.0%	46.2%	33.3%	16.7%	21.1%	
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

** Significant values (p<0.05) Chi-square analysis*

A cross-tabulation analysis was conducted to examine the association between educators' years of service at a school and their ability to use technology. In general, the data confirms the notion that there exists a negative correlation between years of service and technological proficiency. In particular, participants who possessed over two decades of professional experience demonstrated a comparatively lower ability in the task of uploading files on the Internet, as opposed to participants with less than two decades of experience. Nevertheless, there is a consistent level of technological ability observed among groups in terms of their ability to download files from the Internet. This ability ranges from 66.7% among those with 20 to 24 years' experience to 92.3% for those between10 to 14 years' experience. In a similar vein, the ability in using various search engines to retrieve information was found to be consistent across all groups, with percentages ranging from 66.7% (individuals with 20 to 24 years of experience) to 84.6% (individuals with 10 to 14 years of experience). The level of competency in using Microsoft Office among individuals with over two decades of experience was significantly lower, ranging from 33.4% to 52.7%, in comparison to those with less than 20 years of experience, ranging from 72% to 84.7%. Once again, it was observed that individuals with over 20 years of experience were less able to use the latest technology for teaching purposes. Furthermore, their technological competence in generating quizzes and questions was found to be lacking, with a mere 36.9% of respondents possessing this skill among those with more than 25 years of experience. The proficiency in technological skills in social networking for individuals with less than 20 years of experience, was significantly higher compared to those with more than 20 years of experience. As the number of years of service increased, there was a consistent decline in the level of technological competence. Individuals with fewer years of service demonstrated a higher level of proficiency in technological skills pertaining to emailing, printing, scanning, and creating videos.

A chi-square goodness-of-fit test was employed to investigate whether there were notable differences in the scoring patterns per statement across various options. The specific focus was on the technological abilities of educators categorized by their years of service. The null hypothesis assumed that equivalent proportions of respondents scored across each option for each statement, analyzed independently. Conversely, the alternative hypothesis proposed a significant divergence in levels of agreement and disagreement. The significance values (p-values) highlighted in the analysis, which fell below the selected level of significance (0.05), indicate dissimilar distributions. Hence, it can be inferred that the discrepancies in how respondents scored were statistically significant. As displayed in Table 6.19, the Chi-square

analysis showed a significant association between years of service of educators and technological abilities in working with Microsoft office (Word, Excel etc.), where $X^2(15, n=95) = 13.4$, $p = .040$. This implies that the years of services of educators plays a significant role in their ability to work with Microsoft Office.

Table 6.16: Crosstabulation: Technological abilities by designation

Technological abilities		Please indicate your designation			X^2
		Educator	Senior Educator	School/Teacher Librarian	
Uploading files on the internet	Not at all able	6.8%	0.0%	0.0%	0.621
	Not really able	5.4%	10.5%	0.0%	
	Fairly able	16.2%	31.6%	0.0%	
	Able	40.5%	26.3%	66.7%	
	Extremely able	31.1%	31.6%	33.3%	
	Total	100.0%	100.0%	100.0%	
Downloading files from the internet	Not at all able	0.0%	5.6%	0.0%	0.650
	Not really able	4.1%	5.6%	0.0%	
	Fairly able	13.5%	5.6%	0.0%	
	Able	44.6%	44.4%	66.7%	
	Extremely able	37.8%	38.9%	33.3%	
	Total	100.0%	100.0%	100.0%	
Searching for information using different search engines	Not at all able	2.7%	5.6%	0.0%	0.939
	Not really able	4.1%	0.0%	0.0%	
	Fairly able	15.1%	22.2%	0.0%	
	Able	38.4%	33.3%	33.3%	
	Extremely able	39.7%	38.9%	66.7%	
	Total	100.0%	100.0%	100.0%	
Working with Microsoft office (Word, Excel etc.)	Not at all able	2.7%	5.6%	0.0%	0.918
	Not really able	6.8%	5.6%	0.0%	
	Fairly able	17.6%	27.8%	0.0%	
	Able	48.6%	33.3%	66.7%	
	Extremely able	24.3%	27.8%	33.3%	
	Total	100.0%	100.0%	100.0%	
Using the latest technology for teaching	Not at all able	2.7%	0.0%	0.0%	0.325
	Not really able	2.7%	5.6%	0.0%	
	Fairly able	21.6%	50.0%	0.0%	
	Able	50.0%	22.2%	66.7%	
	Extremely able	23.0%	22.2%	33.3%	
	Total	100.0%	100.0%	100.0%	
Creating quiz and questions	Not at all able	4.1%	0.0%	0.0%	0.142
	Not really able	6.8%	22.2%	0.0%	
	Fairly able	20.3%	38.9%	0.0%	
	Able	48.6%	27.8%	100.0%	
	Extremely able	20.3%	11.1%	0.0%	

	Total	100.0%	100.0%	100.0%	
Social network	Not at all able	1.4%	0.0%	0.0%	0.578
	Not really able	8.1%	5.6%	0.0%	
	Fairly able	5.4%	22.2%	0.0%	
	Able	43.2%	33.3%	66.7%	
	Extremely able	41.9%	38.9%	33.3%	
	Total	100.0%	100.0%	100.0%	
Emailing	Not at all able	1.4%	0.0%	0.0%	0.990
	Not really able	4.1%	5.6%	0.0%	
	Fairly able	6.8%	11.1%	0.0%	
	Able	44.6%	38.9%	66.7%	
	Extremely able	43.2%	44.4%	33.3%	
	Total	100.0%	100.0%	100.0%	
Printing/Scanning	Not at all able	1.4%	0.0%	0.0%	0.960
	Not really able	5.4%	5.6%	0.0%	
	Fairly able	10.8%	22.2%	0.0%	
	Able	41.9%	33.3%	66.7%	
	Extremely able	40.5%	38.9%	33.3%	
	Total	100.0%	100.0%	100.0%	
Creating videos	Not at all able	6.8%	11.1%	0.0%	0.534
	Not really able	9.6%	16.7%	0.0%	
	Fairly able	23.3%	22.2%	0.0%	
	Able	34.2%	27.8%	100.0%	
	Extremely able	26.0%	22.2%	0.0%	
	Total	100.0%	100.0%	100.0%	

** Significant values ($p<0.05$) Chi-square analysis*

A cross-tabulation was conducted to evaluate the association between the technological proficiency of educators and their professional designation. The resulting data is displayed in Table 6.18. All school/teacher librarians exhibited highly proficient skills in utilizing all technological applications. The findings indicate that a substantial percentage of educators (71.6%) demonstrated higher levels of competence in uploading files on the Internet compared to senior educators (57.9%). More than 80% of educators and senior educators showed high levels of ability in downloading files from the Internet. The data reveals that a substantial percentage of educators (78.1%) and senior educators (72.2%) showed a high level of ability in conducting information searches using various search engines. The high level of ability in using Microsoft Office was found to be greater among educators (72.9%) in comparison to senior educators (61.1%). There was a notable disparity in the proficiency levels of using the latest technology for teaching purposes between the two cohorts, as evidenced by the teachers achieving a score of 73% and the senior teachers attaining a score of 44.4%. Significant disparities were observed in relation to proficiency levels in using technology for the purpose

of generating quizzes and questions, amongst teachers (68.9%) and senior teachers (38.9%). The findings of this study indicate that a significant proportion of teachers (85.1%) of the total sample, demonstrated a high level of ability in employing technological applications for social networking purposes. Similarly, among senior teachers, 72.2% exhibited a commendable capacity in effectively employing these technological tools. In a similar vein, a significant proportion of teachers (82.4% and 87.8%) and senior teachers (72.2% and 83.3%) demonstrated a high level of proficiency in implementing technology for tasks such as printing and scanning, as well as emailing. Fifty percent of the senior teachers and 60.2% of the teachers demonstrated competent skills in utilizing technology for video creation. On average, school/teacher librarians possessed the highest level of ability in technological applications, with senior teachers having the least.

To examine if there were significant variations in the scoring patterns per statement across different options, a chi-square goodness-of-fit test was conducted. Specifically, the analysis focused on the feasibility of using a digital library based on the quintile level of school. The null hypothesis stated that similar numbers of respondents scored across each option for each statement, evaluated one statement at a time. Conversely, the alternative hypothesis proposed a significant difference in levels of agreement and disagreement. The highlighted p-values, which were below the predetermined level of significance (0.05), indicate that the observed distributions were dissimilar. Thus, it can be concluded that the differences in how respondents scored were statistically significant. However, as shown in Table 6.18, the Chi-square analysis indicated no significant association between the variables.

6.8 Bivariate correlations (Spearman correlation test)

The Spearman correlation test was undertaken to measure the degree of association between two variables and to measure the strength and direction of association that exists between two variables. The correlation expresses the strength of linkage or co-occurrence between to variables in a single value between -1 and +1. This value that measures the strength of linkage is called correlation coefficient, which is represented typically as the letter r. Correlation coefficients whose magnitude are between 0.3 and 0.5 indicate variables which have a low correlation. Correlation coefficients whose magnitude are between 0.3 and 0.5 indicate variables which have a low correlation. And correlation coefficients whose magnitude are greater than 0.5 indicate variables which can be considered strongly correlated.

With regards to factors contributing to the successful development and use of a mobile digital library, the Spearman correlation test, yielded strong, positive correlations between:

- Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and resources and user friendliness of a mobile digital library platform (r=.729, p<.001). This shows that an increase in digital literacy training would lead to an increase in the use-friendliness of a mobile digital platform.
- The user-friendliness of a mobile digital library platform and remote and convenient accessibility of information for both educators and learners (r=.729, p<.001). This implies that an increase digital literacy training will lead to an increase in the remote and convenient accessibility of information.
- The need for financial support from the organization/department to ensure sustainability of service provision and the provision of reliable internet connectivity (r=.657, p<.001). This finding suggests that an increase in financial assistance would result in a correspondi ng improvement in the provision of reliable Internet connectivity.
- The need for financial support from the organization/department to ensure sustainability of service provision and the affordability of a mobile digital library (r=.573, p<.001). This demonstrates that an increase in financial assistance would result in a corresponding improvement in the affordability of a mobile digital library.
- The ability of educators, learners and school librarian to use the latest technology and the remote and convenient accessibility of information for both educators and learners (r=.572, p<.001). This suggests that an increase in ability to use technology would result in improved access to information for both educators and learners.
- The remote and convenient accessibility of information for both educators and learners and the encouragement of learners to use a mobile digital library if available (r=.442, p<001). This finding suggests that the improved availability and ease of accessing information remotely would result in a higher likelihood of learners being motivated to utilize a mobile digital library.

With regards to factors contributing to the successful development and use of a mobile digital library, the Spearman correlation test, yielded moderate positive correlations between:

- Digital literacy training for teacher librarians, educators and learners on the use of mobile platforms to access information and as the mobile digital library system is updated, educators and learners must keep up with the latest technology (r=.506, p<.001). This

finding points out that the implementation of increased digital literacy training would result in a corresponding increase in educators' ability to stay abreast of the most current technological advancements.

- The user-friendliness of a mobile digital library platform and the ability of educators, learners and school librarian to use the latest technology ($r=.479$, $p<.001$). This suggests that improving the user-friendliness of a mobile digital library would result in a corresponding increase in the utilisation of the latest technologies.
- The user-friendliness of a mobile digital library platform and the suitability of a mobile digital library for teaching purposes ($r=.561$, $p<.001$). The presented data indicates a positive correlation between the level of user-friendliness of a mobile digital library platform and its suitability for teaching purposes.
- The user-friendliness of a mobile digital library platform and a mobile digital library would make library resources easily accessible to educators and learners ($r=.423$, $p<.001$). This observation suggests that the accessibility of library resources is directly correlated with the level of user-friendliness exhibited by a mobile digital library.
- The user-friendliness of a mobile digital library platform and the use of a mobile digital library to support my teaching if it were available to me ($r=.403$, $p<.001$). This finding indicates that enhancing the user-friendliness of a mobile digital library would result in a corresponding increase in its utilisation for instructional purposes.
- The provision of reliable internet connectivity and remote and convenient accessibility of information for both educators and learners ($r=.520$, $p<.001$). This implies that the increase in the availability of dependable Internet connectivity would result in a corresponding rise in the ability to access information conveniently and remotely.
- The provision of reliable internet connectivity and the suitability of a mobile digital library in making library resources easily accessible to educators ($r=.401$, $p<.001$). The presented data demonstrates that an increase in the availability of dependable Internet connectivity would result in a corresponding improvement in the accessibility of information.
- The affordability of a mobile digital library and the ability of the school having a fully functional mobile digital library if it can be cheaper to maintain ($r=.358$, $p<001$). The data presented provides evidence that an increase in the availability of reliable Internet connectivity would lead to a corresponding improvement in the accessibility of information.

- The remote and convenient accessibility of information for both educators and learners and the ability for a mobile library to enable learners to easily access library resources and services without time and space limitations. (r=.457, p<001). This suggests that the level of accessibility and convenience of information directly correlates with the potential of a mobile library to facilitate learners' access to library resources.
- The remote and convenient accessibility of information for both educators and learners and the use of a mobile digital library to support teaching (r=.411, p<001). This suggests that the extent to which a mobile digital library is used for educational purposes is directly related to the degree of remote accessibility and convenience of the information.

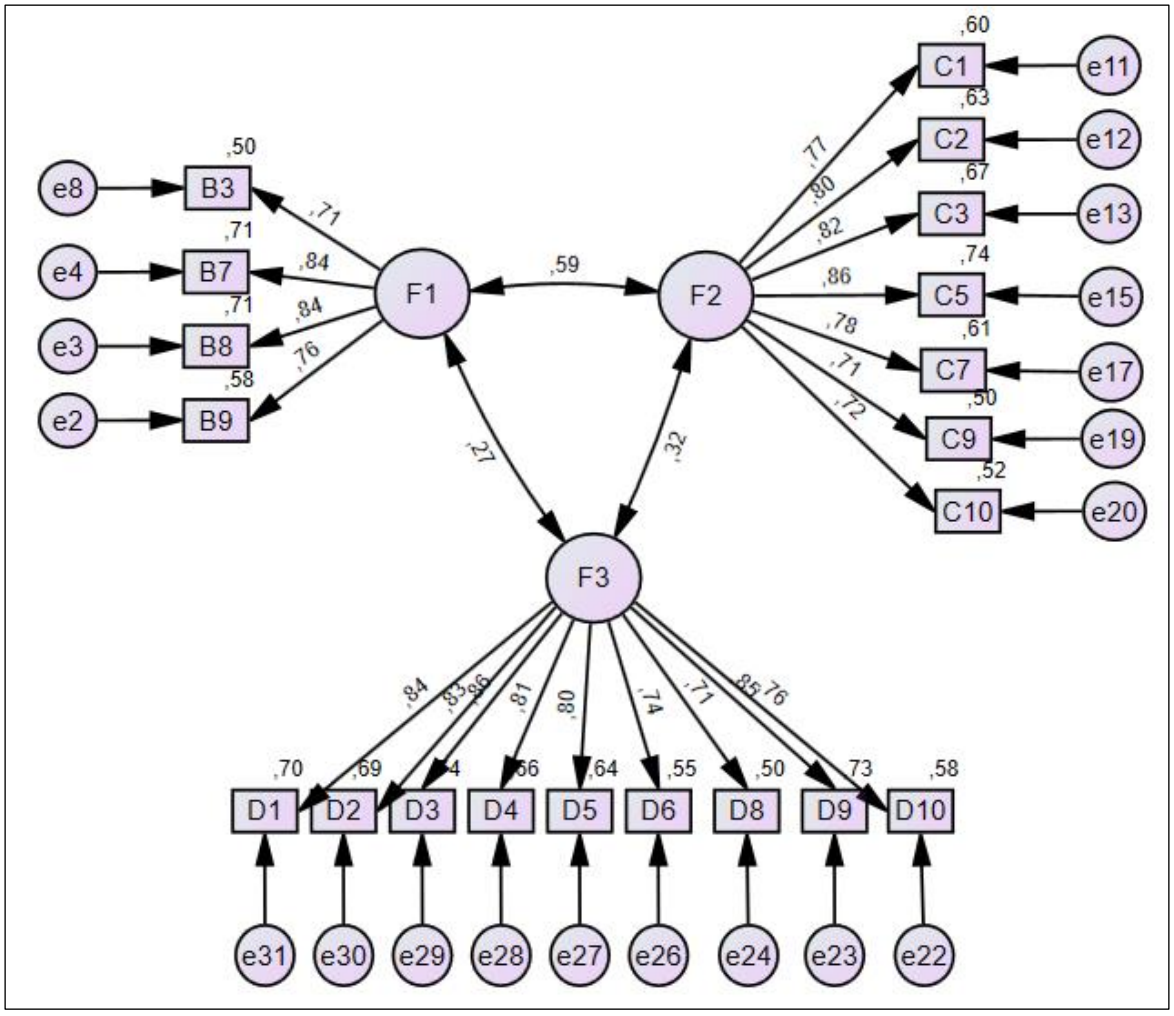


Figure 6.6: Structural Equation Model

The path diagram in Figure 6.6 illustrates the modified structural equation model (SEM). This particular model incorporates both factor analysis and multiple regression analysis techniques, offering a multivariate statistical approach for investigating the structural relationships between

observed variables and latent constructs. Through this model, researchers are able to analyze and understand the underlying connections that exist between these variables and constructs. The dimensions are coded as follows:

B	F1	Factors contributing to the successful development and use of a mobile digital library
C	F2	Feasibility of using a digital library
D	F3	Technology activities

6.8.1 Result (Default model)

Minimum was achieved

Chi-square = 290,126

Degrees of freedom = 167

Probability level = ,000

The Chi-square test assesses the hypothesis that the overidentified (reduced) model adequately fits the data to the same extent as a just-identified (full, saturated) model. In a just-identified model, each variable has a direct path to every other variable without any intervening variables. Consequently, the Chi-square value in such a model is always zero, indicating a perfect fit. Ideally, the probability associated with the Chi-square test should not be significant. However, it is important to note that achieving a non-significant Chi-square value in model testing is challenging, primarily due to the typically large sample sizes required. Therefore, if the Chi-square test yields a significant result, it is not a major concern as long as other indicators of model fit are satisfactory. In the current model, the p-value associated with the Chi-square test is < 0.050 ($p < 0.001$).

6.8.2 Maximum Likelihood Estimates

Table 6.17: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
B9	<---	F1	1,000				
B8	<---	F1	,873	,108	8,110	***	par_1
B7	<---	F1	,877	,108	8,105	***	par_2
B3	<---	F1	1,076	,160	6,743	***	par_3
C1	<---	F2	1,000				
C2	<---	F2	1,340	,163	8,213	***	par_4
C3	<---	F2	1,279	,152	8,434	***	par_5
C5	<---	F2	1,228	,137	8,983	***	par_6
C7	<---	F2	1,146	,143	8,026	***	par_7
C9	<---	F2	1,422	,198	7,166	***	par_8
C10	<---	F2	1,330	,183	7,273	***	par_9
D10	<---	F3	1,000				
D9	<---	F3	,859	,096	8,910	***	par_10
D8	<---	F3	,667	,093	7,167	***	par_11
D6	<---	F3	,813	,108	7,562	***	par_12
D5	<---	F3	,789	,096	8,213	***	par_13
D4	<---	F3	,883	,106	8,366	***	par_14
D3	<---	F3	,958	,107	8,961	***	par_15
D2	<---	F3	,795	,092	8,622	***	par_16
D1	<---	F3	1,022	,117	8,711	***	par_17

The variables exhibited substantial loadings on their respective factors, as indicated by the significant p-values (***$p < 0.001$). These findings corroborate the outcomes of the exploratory factor analysis (EFA) conducted in the factor analysis phase.

Table 6.18: Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
B9	<---	F1	,762
B8	<---	F1	,843
B7	<---	F1	,843
B3	<---	F1	,706
C1	<---	F2	,772
C2	<---	F2	,796
C3	<---	F2	,816
C5	<---	F2	,857
C7	<---	F2	,781
C9	<---	F2	,710
C10	<---	F2	,719
D10	<---	F3	,762

			Estimate
D9	<---	F3	,854
D8	<---	F3	,710
D6	<---	F3	,744
D5	<---	F3	,798
D4	<---	F3	,810
D3	<---	F3	,859
D2	<---	F3	,831
D1	<---	F3	,838

The model's parameters were estimated using maximum likelihood (ML) methods, employing an iterative procedure to maximize the likelihood of accurately predicting the criterion variable. All obtained coefficients exceeded the recommended threshold of 0.600. Statements displaying inadequate loadings or redundancy were omitted from the model.

6.8.3 Model Fit Summary

The recommended threshold for the relative chi-square, CMIN/DF, is not exceeding 5, which helps mitigate the influence of sample size. On the other hand, the cutoff range for TLI, CFI, NFI, and IFI is between zero and one. An RMSEA value equal to or less than 0.05 indicates a well-fitting model.

Table 6.19: CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	63	290,126	167	,000	1,737
Saturated model	230	,000	0		
Independence model	20	1516,846	210	,000	7,223

CMIN represents a Chi-square statistic that compares the tested model and the independence model to the saturated model. The relative chi-square, CMIN/DF, is the ratio of CMIN and the degrees of freedom, providing an indication of the extent to which the model's fit to the data is reduced when one or more paths are dropped. In the present analysis, the CMIN/DF value (1.737) is lower than the acceptable threshold of 5, satisfying the CMIN criterion.

Table 6.20: Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,809	,759	,909	,882	,906
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

These indices of goodness-of-fit assess the model's adequacy by comparing it to the independence model rather than the saturated model. The Normed Fit Index (NFI) measures the discrepancy between the chi-squares of the two models, divided by the chi-square value of the independence model. In the present investigation, the NFI is 0.809, which falls below the recommended threshold of 0.90 for a satisfactory fit. The Comparative Fit Index (CFI) adopts a similar approach utilizing a noncentral chi-square and is considered a robust index even with limited sample sizes. It ranges between 0 and 1, akin to the NFI, with a value of 0.90 indicating an acceptable fit. In this instance, the CFI value is 0.906, indicating a favourable fit.

Table 6.21: RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
"Default model"	,088	,071	,105	,000
"Independence model"	,256	,244	,268	,000

The Root Mean Square Error of Approximation (RMSEA) is a measure that estimates the degree of lack of fit in comparison to the saturated model. An RMSEA value of 0.050 or lower indicates a good fit, while a value between 0.050 and 0.080 suggests an adequate fit. LO 90 and HI 90 represent the lower and upper bounds of a 90% confidence interval for this estimate. In the current analysis, the model demonstrates an adequate fit, as indicated by the significant PCLOSE value (< 0.001). However, the recommended condition of a PCLOSE value above 0.050 is not met.

6.9 Regression Analysis

The significance level pertains to the magnitude of the relationships under investigation. The correlations are examined and assessed for significance in the subsequent analysis.

Table 6.22: Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
F1	<-->	F2	,170	,043	3,987	***	par_18
F3	<-->	F1	,170	,076	2,241	,025	par_19
F3	<-->	F2	,119	,045	2,661	,008	par_20

Table 6. 23: Correlations: (Group number 1 - Default model)

			Estimate
F1	<-->	F2	,591
F3	<-->	F1	,272
F3	<-->	F2	,324

Null hypothesis is when there is no correlation between each of the dimensions. Alternative hypothesis is when there is a significant correlation. In general, when the covariance between two constructs is significant, it is expected that the correlations between them will also be significant. This is because correlation is a standardized measure of covariance, providing information about the strength and direction of the relationship. In the current analysis, all relationships between the latent variables are found to be statistically significant ($p < .050$). These results indicate a robust and positive relationship between the latent variables, as evidenced by the positive estimates for each correlation coefficient. To ensure the model's accuracy, certain factors (statements) with low loadings were excluded from the analysis. Notably, the coefficients for each latent variable exhibited high factor loadings. Additionally, the path coefficients displayed in the diagram demonstrate a positive relationship between the latent variables. While the model is newly developed and may not perfectly capture the structural relationships, various indices indicate that it provides an adequate fit. To enhance the model, it is recommended to refine the factor loadings by adjusting the measured variables associated with the latent variables.

6.10 Chapter summary

The data analysis chapter provided an extensive examination of the quantitative data collected for this study, shedding light on the key objectives and issues surrounding the development and use of digital mobile libraries in disadvantaged schools in KwaZulu-Natal. By presenting the results through tables and graphs, the analysis offered a clear and organized depiction of the findings, enhancing the understanding and interpretation of the data. The inclusion of both

descriptive and inferential statistics allowed for a comprehensive exploration of the data, providing insights into the current state of digital mobile libraries in the context of disadvantaged schools. These findings contribute to the existing literature by revealing the challenges and opportunities that arise when implementing such technological interventions in educational settings. With a better understanding of these issues, policymakers, educators, and stakeholders can work towards developing effective strategies to bridge the digital divide and promote equitable access to educational resources for all students. The data analysis chapter sets the stage for the subsequent chapters, laying a solid foundation for the further exploration and discussion of the implications, recommendations, and potential future research directions to address the identified issues and promote the successful integration of digital mobile libraries in disadvantaged schools in KwaZulu-Natal.

CHAPTER SEVEN: DISCUSSION OF THE FINDINGS

7.1 Introduction

The preceding two chapters presented findings of the study from the interviews with teacher librarians, focus group discussions with teachers and questionnaires to teachers. This chapter discusses the salient findings relevant to the objectives of the study. The objectives of the study under which findings are interpreted and discussed are to identify factors that would contribute to the successful development and the use of mobile digital library model; to establish the feasibility of using a mobile digital library model for teaching; to ascertain technological competences of teachers to use mobile technology; and to develop a mobile digital library model suitable for teaching in under-resourced schools.

7.2 Biographical data

This section examines how quintile levels and years of service influence the use of mobile digital libraries in schools. Quintile levels, representing the socioeconomic status of schools, impact the availability of resources, such as technology devices and internet connectivity. Higher quintile schools tend to have better resources, enabling them to provide technology devices and offer reliable internet access. In contrast, lower quintile schools face challenges in implementing mobile devices and delivering consistent internet connectivity due to limited resources. Years of service as a teacher also plays a role in the adoption of mobile digital libraries. Teachers with fewer years of experience are more likely to be familiar with emerging technologies and demonstrate proficiency in utilizing digital resources. However, more experienced teachers may face challenges in adapting to new technologies, potentially affecting their use of mobile digital libraries. Nevertheless, experienced teachers bring a wealth of knowledge and can support their colleagues in incorporating digital materials into teaching practices.

7.2.1 Quintile level of schools

The study revealed that the largest number of teachers come from quintile level three schools, and the least number of teachers come from quintile level one schools. The quintile level of a school is typically determined by the socioeconomic status of the households and area from which its students originate. Quintile 1 represents the group that experiences the highest level of disadvantage, while Quintile 5 represents the group that experiences the lowest level of

disadvantage (van Dyk and White, 2019 p.7). The use of mobile digital libraries in schools is influenced by the quintile level in various ways. Firstly, the provision of technology devises (laptops, computers, etc) to students may be more prevalent in schools situated in higher quintiles, as these institutions often possess the necessary resources and financial capabilities. These devices have the capability to access educational materials and digital databases. Schools in the lower quintile face challenges in implementing mobile devices due to limited financial resources and inadequate access to necessary resources. Secondly, in order to access online resources, mobile digital libraries rely on internet connectivity. Schools in the higher quintile exhibit better internet infrastructure and connectivity, thereby facilitating enhanced accessibility to digital libraries. Lower quintile schools may encounter challenges in delivering reliable internet connectivity due to limitations in infrastructure or financial constraints. Thirdly, the acquisition of digital literacy skills is imperative for both students and instructors in order to effectively utilise mobile digital libraries. The provision of technology training and support could potentially facilitate the integration of digital libraries into the curriculum of schools in the higher quintile. In lower socioeconomic quintiles, pupils and teachers may necessitate additional assistance and training to effectively utilise mobile digital libraries.

The use of mobile digital libraries in schools belonging to the lower quintile may present challenges, thereby exacerbating the existing digital divide. Government initiatives, partnerships with organisations, grants and fundraising efforts have the potential to facilitate the provision of mobile devices and internet connectivity to schools in the lower quintile. And, while the use of mobile digital libraries can be influenced by the quintile level, it is important to note that school policies, leadership, and community efforts also play a significant role in this regard.

7.2.2 Years of service as a teacher

The findings of this study indicate that the majority of the population consists of individuals employed as teachers, particularly those who have accumulated less than five (5) years of professional experience. Teachers with five to nine years of experience constitute the second largest group in terms of numbers, with most teachers having less than ten years of professional teaching experience. This observation implies that the individuals in question were educated during a period defined by the widespread presence of emerging technologies, and they therefore have the potential to yield positive effects on the use of mobile digital libraries. Teachers with over 24 years of teaching experience was the least represented in the study. The

years of experience possessed by individuals in this group may suggest that there is a prevalence of older teachers in terms of age, as compared to those with fewer years of experience. The ability of this group in using modern technologies may be comparatively lower, potentially resulting in a negative effect on the use of a mobile digital library. According to Schreurs and Quan-Haase (2017), the acquisition of technological skills and the development of comfort with technology pose challenges for older adults due to an absence of skills and restricted social and institutional systems.

Conversely, the teachers with extensive experience may possess a higher level of familiarity and competence in using technology. Experienced educators possess a comprehensive understanding of the potential of technology to enhance their instructional objectives, and it is likely that they adapted their methods of teaching in response to the advancements in digital technologies. Experienced teacher may also possess greater adaptability and responsiveness to new technological advancements. It is possible that they have extensively used a multitude of online resources and technological advancements. Moreover, experienced teachers possess the ability to assist their less experienced counterparts in effectively incorporating digital materials into their teaching practises, facilitating the dissemination of best practises, and effectively resolving any potential challenges that may arise.

7.3 Educators awareness and understanding of the potential of mobile technologies in enhancing the provision of library services through the development and use of a digital mobile library

The study found that all educators were fully aware and understood the merits of mobile technologies and the importance of a mobile digital library. Participants were also aware and understand that the mobile technologies have the potential to improve the provision of school library services. One participant indicated:

> *"The degree of educators' and understanding of the potential of mobile technologies in enhancing the provision of library services would affect the development and use of a digital mobile library positively. When they know that the latest technology can improve library services, they will encourage the learners to use the mobile digital library. Knowing that the mobile digital library can improve the library services will make educators see the need for the better school library services that come with the digital mobile library. As the results, they contribute on how they want the mobile digital library to be developed. The usage of the library will increase. However, if the level of understanding is low, the usage of the library will decrease".*

According to Sharifabadi (2006), the successful implementation and use of digital technologies and mobile digital libraries in classrooms requires teachers to fully understand their benefits. First, teachers must understand digital technology and mobile digital libraries' benefits to integrate them into classroom. Awareness helps teachers see how these technologies can improve learning outcomes, student engagement, and customised and diverse instruction. It also helps them understand the benefits of mobile digital libraries, such as easy access to a variety of resources, adaptability to different learning styles, and digital literacy promotion. These benefits motivate teachers to use digital technologies and mobile digital libraries. Well-informed teachers can use these resources to make learning more engaging and interactive for pupils. Mobile digital libraries can support student-centred learning by providing resources for varied learning styles, interests, and skills. Teachers who understand digital technology can use it to teach students collaboration, critical thinking, and problem-solving. However, teachers' lack of knowledge could hinder digital technology and mobile digital library integration. It may lead to insufficient use of these resources, missed opportunities to improve learning, and a continuation of outdated teaching approaches that don't meet today's learners' requirements.

7.4 Currently library facilities at schools

Many teachers indicated that their schools do not have libraries. Others indicate that their libraries are no longer functional due to funding and lack of resources. In particular, one respondent stated: “Our school does have a library, but it has old resource and we do not have a librarian. It does not support teaching and learning. It is more of the staff room than a library”. Another respondent stated that “We do not have a library. The one we had collapsed due to lack of funds”. Teachers confirmed that they usually got their information from Google, other colleagues or the district office. Behind the incomplete functionality of the school library, the librarian indicated a lack of financial resources as the primary cause. The consequences of teachers expressing the lack of libraries or non-functional libraries in their schools due to financial constraints and limited resources are far-reaching. The absence of functional libraries significantly limits access to diverse educational resources for both teachers and students. Libraries play a vital role in providing a wide range of books, reference materials, and digital resources that enhance the educational process. Without access to these resources, teachers may struggle to find suitable materials to support their lessons, and students may be deprived of opportunities for enriched learning experiences. Rahman and Mohezar (2020) are also of the opinion that the digital library access to tools, such as databases, electronic journals and online reference tools, could improve the quality of teaching.

Moreover, libraries go beyond being repositories of knowledge; they cultivate a culture of reading, critical thinking, and information literacy skills. The presence of inadequate or non-functional libraries exacerbates educational inequalities, as schools with well-equipped libraries have an advantage in providing a comprehensive educational experience. Students in these schools have better access to information, resources, and opportunities for self-directed learning. Conversely, students in schools lacking library facilities face constraints that can further widen disparities in academic performance. Mojapelo (2016 p.83) also concluded that only a tiny minority of the public schools offer have functional school libraries in Limpopo province which results in the majority of the learners in particular lack reading skills and information literacy skills which are basics for lifelong and independent studies. Majapelo (2016) further states that "the non-existence of well-resourced and staffed school libraries with well-designed and spelt-out library programmes and services in the majority of the schools is a stumbling block for learners and teachers to effectively develop and acquire information literacy skills" to find retrieve information on their own. Addressing these issues requires investment and support. Financial resources must be allocated to update library resources, maintain infrastructure, and employ qualified librarians. Professional development opportunities for teachers are also crucial to maximize the benefits of library resources and integrate them into instructional practices effectively. By advocating for adequate funding and support for libraries, we can create a more equitable educational system where all students have equal access to educational resources and opportunities for intellectual growth as it recommended by Mojapelo (2015 p51) that there must be financial support and professional development of staff.

7.5 Teachers' perceptions on the need for and importance of a mobile digital library

The findings reveal that teacher librarians firmly believe that a mobile digital library can enhance school library involvement in teaching and learning. Nalluri and Gaddam (2016 p. 65) too believes mobile libraries create a new way to enhance connections between patrons and libraries by providing services like Open Access Catalogue via mobile optimized websites, audio books, e-books, audio language courses, streaming music, films, images, and other multimedia that can be used on mobile devices. The availability of a wide range of books and media, such as videos, through mobile devices is perceived as by teachers as beneficial for learners, as these resources are easier to comprehend. Access to a mobile digital library is not limited by time or location, provided the information seeker has internet access and a

compatible device. However, the study highlights that an incompatible information technology infrastructure can impede the use of mobile technology for library services. The results indicate that advances in technology have facilitated access to internet and library services through mobile devices. This has contributed to the recognition of the importance of books and information resources in the school curriculum, prompting the establishment and utilization of mobile digital libraries. The exclusion of Umlazi district from the analysis limits the generalizability of the findings, as the participation of quintile three schools in this district was not obtained. Furthermore, the trend of higher teacher employment in quintile three schools compared to lower quintile levels raises questions about resource allocation and its potential impact on library services. This study therefore highlights the positive perceptions of teacher librarians regarding the benefits of mobile digital libraries in enhancing school library services. The accessibility of a diverse range of books and media through mobile devices is seen as valuable for learners. However, the study also highlights the need for compatible information technology infrastructure to support the effective use of mobile technology in library services. The exclusion of Umlazi district from the analysis and the trend of teacher employment in different quintile levels present areas for further investigation and consideration in future research and policy development. By recognizing the significance of mobile digital libraries and addressing the challenges related to information technology infrastructure, educators and policymakers can harness the potential of digital resources to enrich teaching and learning experiences. With mobile digital libraries, learners easily observe and identify the learning objects since they are able to see those learning objects in person along with extended digital information. Their learning experiences are not confined to the textbook information (Shih; Hwang; Chu; & Chuang 2011: 502).

7.6 Factors that contribute to the successful development and the use of mobile digital library model for teaching support at under-resourced public high schools

The following section discuss the findings related to the factors that contribute to the successful development and usage of a mobile digital library. Factors such as digital literacy training, user-friendliness, affordability and financial support, effective marketing, internet connectivity and power supply, relevant books and information sources, and information accessibility will be explored under this section.

7.6.1 Digital literacy training for teacher librarians, teachers and learners

The research findings highlight the significance of continuous digital literacy training for teacher librarians, educators, and learners in the field of mobile digital libraries. It is crucial to adapt to the rapid advancements in technology and constantly enhance digital literacy skills to effectively utilize mobile platforms for accessing information and resources. The majority of teachers in this study strongly agree that digital literacy training is a critical factor in the development and use of mobile digital libraries. This belief aligns with connectivism theory, which emphasizes the creation of learning environments that promote connections and interactions with digital resources. Additionally, both teachers and senior teachers recognize the importance of digital literacy training for all stakeholders involved in mobile digital libraries. They acknowledge that such training enhances the user-friendliness of mobile platforms and maximizes their potential benefits. One respondent stated that "We partially use the latest technology as we need training".

According to Sharifabadi (2006) and Falloon (2020), investing in digital literacy training becomes essential for the successful implementation and operation of mobile digital libraries. Ongoing training programs equip teacher librarians, educators, and learners with the necessary skills to navigate and utilize mobile platforms effectively. This fosters a culture of continuous learning and adaptation to technological advancements. These findings have significant implications for educational institutions and stakeholders engaged in mobile digital libraries and Falloon (2020) concurs that he need for ongoing digital literacy training arises from the rapid pace of technological advancements. Teachers, teacher librarians, and learners must continuously update and improve their digital literacy skills to effectively use mobile platforms for accessing information and resources. Furthermore, these findings are aligned with the research of Ocran, Underwood, and Arthur (2020), who emphasized the importance of digital literacy in increasing the usage of mobile library devices to access library resources. This convergence of findings reinforces the significance of digital literacy in the context of mobile digital libraries.

7.6.2 User friendliness of digital library platforms

The study provides evidence regarding the significance of user-friendliness in the development and utilization of a mobile digital library platform, as perceived by school and teacher librarians. The majority of teachers and senior teachers (88.8%) expressed agreement with the importance of user-friendliness in the effective development and functioning of the system.

This agreement was consistently high across all districts, with notable levels of agreement in uMgungundlovu, Ugu, Amajuba, Pinetown, and Umlazi. The findings of this research have several implications. The high level of agreement among teachers and senior teachers regarding the significance of user-friendliness highlights its importance in the development and utilization of a mobile digital library platform. This indicates that educators recognize the value of a digital library that is easy to use and navigate, which enhances their experience and promotes effective use of the system. The study further suggests that improving the user-friendliness of a mobile digital library can lead to increased usage of the platform. When users consistently and easily find the information, they are looking for, it is more likely to be used often. Soltani-Nejad et. al. (2020 p.988) concur that user friendliness of the digital library, system and service information quality are substantial factors to user satisfaction. Thus, impacting to the usage of the digital library. This implies that investing in user-centric design and engaging in continuous improvement can result in greater engagement of the mobile digital library. The notable levels of agreement in specific districts, such as uMgungundlovu, Ugu, Amajuba, Pinetown, and Umlazi, highlight the need to consider regional differences when developing and implementing mobile digital library platforms. Understanding the unique needs and preferences of different districts can help tailor the system to specific contexts, increasing its relevance and usability. The agreement among teachers and senior teachers on the importance of user-friendliness suggests their active involvement and engagement in the development and use of the mobile digital library. This presents an opportunity for collaboration between educators and developers to ensure that the system meets the specific needs and expectations of teachers, further promoting its effective use in teaching and learning.

User-friendliness plays a vital role in digital library platforms. It encompasses intuitive design, seamless navigation, and availability, all of which contribute to a positive user experience. User-friendly platforms enhance engagement, attract more users, and promote regular usage of available resources. Intuitive design elements and clear navigation options support users with varying levels of technological proficiency or disabilities. Efficient information retrieval and search processes save time and increase productivity. Well-organized frameworks, user-friendly search functions, and effective browsing options enable users to focus on utilizing information rather than struggling with the platform. Overall, user-friendliness maximizes user experiences, encourages technology acceptance, ensures accessibility, facilitates efficient information retrieval, fosters positive user perceptions, and promotes the development of information literacy skills. Digital library platforms must prioritize user-friendliness to meet

user needs and achieve educational goals effectively. A number of researchers like Xu and Du (2019 p.7); Xu and Du (2018 p.70); Wang et al. (2018 p.615) and Rafique et al. (2021 p.13) highlight user friendliness as one the factors that affect the usage of the mobile digital library the most as users who easily find what they are looking for are bound to use the mobile digital library again if and when need arises.

7.6.3 Affordability and financial support

Khomo et. al. (2023) are of the opinion that critical factors that can be both successful and inhibit the development and usage of mobile digital library are financial support from the organisation and provision of reliable internet connectivity is critical in ensuring uninterrupted access to digital content. This study too discovered that a significant majority of teachers recognize the importance of receiving financial assistance from their organization or department to ensure the continuity of service delivery. This suggests that an increase in financial support would lead to improved provision of reliable Internet connectivity and affordability of a mobile digital library. One participant indicated that *"the usage of data to access the mobile digital library will be the disadvantage to other students who are struggling financially. The usage of the library will decrease if there is not financial support".* It is noteworthy that the districts with the highest percentages of teachers with this opinion are uMgungundlovu, Amajuba, and Ugu. Interestingly, these districts also happen to have a higher number of quintile three schools with functional school libraries. This implies that these districts may have a better understanding of the resources and support required for the successful implementation of a mobile digital library. One respondent in the study maintained that *"We believe financial support will make it easy for schools to have and use the mobile digital library. This library will need financial support in terms of hosting, maintaining, accessibility".*

The study further reveals that teachers from lower quintile schools are situated in financially disadvantaged areas. They indicated that their schools are located in communities facing financial struggles, and as a result, these schools also experience financial challenges. One participant stated that *"Our school cannot afford to host a mobile digital library. We are a poor and isolated school in the rural area where network coverage is a problem. The school cannot even afford to build classes".* Another respondent mentioned that "*Our school cannot afford to maintain a mobile digital library. Our school is very poor. We do not even have electricity and latest technology for teaching. So, it is not feasibly to have a mobile digital*

library". Given these circumstances, teachers from lower quintile schools express skepticism about the feasibility of implementing a mobile digital library in their schools. The reason for their skepticism is that these are poorest schools and are mostly found in the disadvantaged rural communities and they lack well-resourced and well-staffed libraries due to financial difficulties (Mojapelo, 2018 p.3). The implications of these research findings are significant for policymakers, educational organizations, and stakeholders involved in the implementation of mobile digital libraries. The recognition by a significant majority of teachers regarding the importance of financial assistance highlights the crucial role of funding in ensuring the successful implementation of digital library services. Increased financial support can address issues related to Internet connectivity and affordability, enabling the effective use of mobile digital libraries. One respondent indicated that *"We will not use the library if there is no financial support because the digital library must be hosted. We must also pay for data. So there wont a digital library if there is no financial support. As the result we cannot use something that is not accessible".*

Therefore, adequate financial assistance is crucial for the successful implementation and operation of mobile digital libraries. It enables the improvement of internet reliability and affordability, as well as the development and maintenance of necessary infrastructure and technology. Financial resources are needed to procure modern equipment, establish a secure infrastructure, and acquire content such as e-books, journals, databases, and multimedia resources. Sustained financial support allows for the recruitment of skilled personnel, ongoing progress, timely software troubleshooting, and user support and training. Training programs enhance the expertise of library workers, teachers, and students, leading to improved resource utilization and problem-solving skills. Sufficient financial resources are also needed to ensure the provision of user support and training.

7.6.4 Effective marketing of mobile digital library services

The findings highlight the significance of effective marketing for mobile digital library services in the establishment and utilization of such libraries. Khomo et al. (2023) emphasize that optimal use of mobile digital libraries relies on effective marketing strategies. The study reveals that teachers play a crucial role in the adoption and usage of mobile digital libraries, suggesting that their active promotion and marketing efforts are essential. The research findings highlight the significance of effectively marketing mobile digital library services in the establishment and operation of such libraries. Ocrana, Underwood and Arthur (2020:6) also discovered that

a proper marketing of digital library impact on the successful usage of a mobile library. It is crucial to raise awareness and promote the services offered by mobile digital libraries to ensure optimal usage by users. When teachers and teacher librarians actively discuss and promote the mobile digital library, it increases the knowledge and awareness of learners and other teachers within the school community. This, in turn, encourages the utilization of the mobile digital library. The study reveals that the group expressing this opinion predominantly consists of young teachers. This may indicate that younger generations are more digitally literate compared to older generations. It suggests that younger teachers are more receptive to change, including the adoption of mobile digital libraries, while other groups may exhibit resistance to change, particularly when technology is involved. The findings emphasize the importance of effective marketing strategies to engage all stakeholders and overcome potential barriers to the adoption and utilization of mobile digital libraries. Marketing plays a crucial role in the success of a digital school library by raising awareness, encouraging usage, and improving stakeholders' perception. Targeted promotion and understanding the needs of students and teachers are key for effective marketing campaigns. Collaborating with teachers, administrators, and parents and forming partnerships with educational organizations and community groups can extend the library's reach. Educating and supporting teachers and administrators ensures their active involvement. Continuous marketing efforts, including providing updates and personalized recommendations, are essential for sustained success.

7.6.5 The provision of reliable internet connectivity and power supply

The availability of dependable internet connectivity is crucial for the effective utilization of a mobile digital library, as revealed by the quantitative findings. The study highlights that the usage of a mobile digital library is highly dependent on the availability of internet access, with participants indicating that they “have issues with power cut and network coverage”. One participant noted specific challenges with regards to power:

> *“In our school we do not have electricity. It will be very difficult to use the library. Especially when our laptops need to be charged. As for connectivity, there sometimes load shedding. During that time connectivity get affected. Our school is in a low-lying area which make connectivity very weak. We sometimes need to go to the mountain to get signals. All this will affect the usage of the mobile digital library negatively”.*

Another participant shared a similar response:

> *"If our school, we have a serios problem with network coverage. Unfortunately, this situation would affect the usage of a mobile digital library badly. Unless we get the connection, we won't be able to use the mobile digital library at all in this school. We cannot even receive or make calls using our cell phones. Also, if there are power supply disturbances, we could not use computers to access the mobile digital library".*

These findings have several implications for the development and use of mobile digital libraries. Firstly, the study emphasizes the critical role of dependable internet connectivity in facilitating access to information from mobile digital libraries. This highlights the need for educational institutions and policymakers to prioritize the establishment of strong and reliable internet infrastructure to support the effective use of digital library resources, particularly in areas with financial constraints. Power supply and internet connectivity are vital for the effective utilization of mobile digital libraries, as acknowledged by teachers and teacher librarians. The lack of reliable power and internet access hampers the usage of digital libraries, hindering access to information and limiting the integration of technology in education. Insufficient power supply and internet infrastructure particularly impact underprivileged schools, exacerbating educational disparities and widening the digital divide. Investments in infrastructure, renewable energy solutions, and collaboration among stakeholders are necessary to address these challenges and ensure equitable access to digital resources. Conducting a study in Federal university libraries in Nigeria, Adedeji and Mabawonku (2021 p.17) discovered that power outages and lack of access to desired and needed information were some of the challenges confronting university lecturers in the use of library electronic resources. By addressing power and internet connectivity issues, schools can unlock the potential of digital libraries to provide valuable resources and promote inclusive and quality education for all students, regardless of their socioeconomic background.

7.6.6 Relevance of books/information resources of digital library platforms

All research participants agree that a mobile digital library's user-friendliness includes access to relevant information. A library that provides relevant, easy-to-access information will be used when needed. The study found that most schools in quintile levels 1, 2, and 3 agree that having curriculum-aligned books and information sources is essential to implementing and using a mobile digital library. The quantitative results show that a significant number of teachers in all districts recognise the importance of incorporating books and information resources into the school curriculum as a key component of a mobile digital library. One

participant confirmed that *"The availability of relevant digital content will affect the use of a digital mobile library positively. If resources found in the mobile digital library have relevant content, the usage will improve. As the result this impact positively in the development and usage of the mobile digital library".* One way of achieving this is to ensure that collaboration between teachers and librarians with regards to collection development. One participant noted that *"The teacher librarian will have to check with teacher when it comes to developing the collection. Teachers will have a say when it comes to subject covered by information resources".* Another respondent also mentioned that *"Collaboration between educators and school librarian can be improved by a mobile digital library. The school librarian can develop the collection according to what the educators need in terms of the content".* This implies that mobile digital libraries should prioritize the availability and accessibility of resources that align with users' needs and curriculum requirements. Hu and Zhang (2016, p.652) concur that students' attitude towards the usage of mobile library app is dependent on factors like ability of the mobile app friendly in terms of stability and dependability; provision of relevant information; etc. The study results highlight the importance of incorporating curriculum-aligned resources into mobile digital libraries.

The consensus among schools in quintile levels 1, 2, and 3 indicates the significance of integrating these resources to support teaching and learning goals. By providing content that directly aligns with the school curriculum, mobile digital libraries can enhance the effectiveness of instructional practices. This emphasizes the need for user-centric design and curriculum alignment in the development and use of mobile digital libraries. In addition to curriculum alignment, the mobile digital library should provide reliable and relevant information sources. Students need access to well-evaluated materials that they can trust. By offering high-quality resources, the digital library ensures that students receive accurate knowledge in today's information-rich environment. Moreover, the mobile digital library should cater to diverse learning styles and preferences. By providing a wide range of resources in different formats, such as e-books, movies, articles, and interactive content, the library supports personalized learning. Students can choose the format that best suits their learning preferences, promoting engagement and enhancing their learning experiences. A mobile digital library can also a crucial role in enhancing independent research and 21st-century skills. Students learn how to navigate digital resources, critically evaluate information, and improve their digital literacy skills. This prepares them for the digital age and ensures their ability to engage in self-directed learning.

7.6.7 Easy accessibility of information resources and teaching support

The findings highlight the importance of accessibility and convenience of information in the successful usage of a mobile digital library. The quantitative results indicate that improved availability and ease of accessing information remotely can increase learners' motivation to use the mobile digital library. This suggests that the level of accessibility and convenience directly influences the potential of the library to facilitate learners' access to resources. The qualitative findings further support the significance of accessible information in financially challenged schools. The mobile digital library, with its digital copies of books and resources, offers relief to financially struggling schools by providing simultaneous access to multiple teachers and learners. One participant noted that:

> *"The library can be accessed even when we are at home during preparation for the following day. A mobile digital library can improve school library service. It can be accessible easier than the physical school library. Information resources can be accessed by many learners at the same time unlike in the physical school library where only one learner can use a book at a time".*

These findings align with the quantitative results, which demonstrate that increased availability of reliable internet connectivity enhances convenient and remote access to information. The web-based nature of mobile digital libraries enables students to rely on them even outside of the physical school environment, as noted by one of the participants in the study who stated that *"A digital library can be accessed from anywhere. Learners can be interested in learning because they can check for information immediately at the time when they need it"* Research by Nalluri and Gaddam (2016) and Ghavifekr, Athirah and Rosdy (2015) also support the idea that mobile applications support learning by making library resources easily accessible. Respondents also noted that the ease of access of information sources will support teaching and learning in disadvantaged schools, which one participant indicating that *"Yes, as it is now it is difficult to find information since we do not have the library in our school. It would be great to have easy access to information. That would support teaching and learning. Teachers and learners need information to prepare for their classes".*

By emphasizing ease of access, digital mobile libraries facilitate efficient retrieval of necessary information in an era of information overload. Prioritizing accessibility enhances user experience, fosters active user participation, and contributes to achieving educational goals. In financially challenged schools, where traditional library resources are limited, digital mobile libraries provide equitable access to educational resources, bridge learning gaps, and promote

student engagement and academic success through self-directed learning opportunities (Ghavifekr, Athirah and Rosdy, 2015). Therefore, it is crucial for educational institutions to prioritize and enhance the accessibility and convenience of information in the design and implementation of mobile digital libraries, as this plays a vital role in facilitating teaching, learning, and overall educational outcomes.

7.7 Feasibility of using a digital mobile library model

The implementation of a digital mobile library in schools has the potential to enhance the quality of teaching materials and promote a culture of reading among students. Students have the ability to use their personal mobile devices or tablets to gain access to an extensive collection of electronic books and multimedia resources. The model has features such as mobility, convenience, and adaptability to cater to individual learning preferences. Students have the ability to conveniently transport their library and gain access to educational materials from any location. A digital mobile library has the capacity to provide a greater abundance of resources compared to a physical library, thereby enabling students to explore a wider range of subjects and perspectives. The following section discuss the data on the feasibility of using a digital mobile library model in disadvantaged schools. Factors such as teaching and learning opportunities, mobile technologies, improved collaboration, the encouragement of learners, affordability, information seeking behaviour, and technical infrastructure will be elaborated on.

7.7.1 Facilitation of teaching and learning opportunities

The quantitative results of this study indicate a strong consensus among teachers regarding the suitability of a mobile digital library for teaching purposes. Teachers believe that a mobile digital library offers a wide range of information resources to both students and teachers, and they express a strong desire for their schools to possess such a library, with participant indicating that it is important have a digital library at school as *"it will teach our pupils how to search and find information and the library will be open all the time".* Similarly, another participant stated that "*It is important because our school library has prescribed books only. It is also accessible during office hours whereas the mobile digital will increase accessibility of the library*". The introduction of a mobile digital library is seen as a means to enhance the ease of accessing library resources and services without temporal and spatial constraints. One participant noted that:

> *"A mobile digital library will support teaching and learning in financially challenged schools. These schools too need information to prepare for classes and learners need information to prepare for assessments. It would because these schools are struggling to get teaching aids. They cannot even find latest information. So, if there is a library that provide easy access to information, that library will be used by teachers".*

The implications of these findings are significant for schools and the integration of mobile digital libraries. The strong consensus among teachers regarding the suitability of a mobile digital library highlights the potential benefits it can bring to schools. Teachers recognize the value of having a wide range of information resources readily available for both students and themselves. This aligns with the goal of providing comprehensive and diverse learning materials to support students' educational needs. One participant indicated that *"Our school has few teachers. As the result we find it difficult to cover in detail all the sections of the syllabus. The digital library can help with resources that will have more information for learners and it will be accessible to them".* The desire expressed by teachers for their schools to possess a mobile digital library reflects a recognition of the advantages it can offer. By introducing a mobile digital library, schools can overcome temporal and spatial constraints associated with traditional libraries. Sharifabadi (2006) maintains that students and teachers can access library resources and services conveniently, irrespective of their location and time restrictions. This flexibility in accessing information promotes independent and self-directed learning, enabling students to engage with educational resources beyond the confines of the classroom. Furthermore, the implications extend to the potential enhancement of teaching practices. A mobile digital library can support teachers in diversifying their instructional materials and incorporating a variety of resources into their lessons. This can lead to more engaging and personalized learning experiences for students (Ghavifekr, Athirah and Rosdy, 2015). One participant noted that "*A mobile digital library can facilitate learning opportunities for learners. Learners can be excited by accessing books online. Availability of videos can interest learners. Resources like videos can improve learning opportunities because uploaded videos can explain further what was covered in class. The mobile digital library will have the content relevant to the school curriculum".* Additionally, the accessibility and convenience offered by a mobile digital library can facilitate teachers' professional development, allowing them to stay updated with the latest educational resources, research, and teaching methodologies.

Educators firmly believe in the benefits of mobile digital libraries, as they can compensate for limited physical resources in underprivileged schools and broaden educational opportunities. Mobile digital libraries offer diverse resources that accommodate different learning styles, allowing for self-directed and individualized learning. One participant noted that:

> *"A mobile digital library can promote student cantered learning. Learners can construct knowledge when they use the mobile digital library. Learners can learn on their own without relying too much on the teacher. It would because learners would have information resource at their disposal all the time. That would make education more about the learner. Having a library wherever they can mean promotion of learner cantered learning".*

Mobile digital libraries also address the digital divide by fostering digital literacy competencies and providing digital resources to empower students for success in the digital era. Furthermore, mobile digital libraries provide ongoing educational opportunities beyond the traditional school hours, promoting a culture of continuous learning. Educators value instructional materials such as videos, e-books, and comprehensive learning resources, which align with academic disciplines and support effective teaching and learning experiences. The mobile digital library serves as a valuable resource for both students and educators, offering accessible information for lesson preparation and independent student engagement. Overall, the study highlights the potential of mobile digital libraries to enhance learning experiences and bridge educational gaps in underprivileged schools.

The results also indicated that a mobile digital library would encourage thinking and understanding rather than memorization. A mobile digital library has the potential to reduce memorization in schools by promoting critical thinking, creativity, and information literacy skills by using a diverse range of accessible information sources. One participant stated that:

> *"A mobile digital library can encourage thinking and understanding rather than memorization. When a learner uses a mobile digital library, they will have access to other information. Other resource might explain the content better. As the results, the learner ends up understanding rather than memorizing. Videos available on the mobile digital library will make learners understand better what was covered in class".*

7.7.2 Mobile technologies and improvement of school library services

The current study conducted in various quintile category schools in selected districts in KwaZulu-Natal provides evidence that teachers and teacher librarians recognize the potential of mobile technologies to enhance school library services. One respondent state that "It is

important to use mobile technologies makes it easier for learner to understand. Teachers should use the latest technology for teaching because learners get excited when the latest technology is used. Lesson becomes clear for the learners as well". The findings align with a study in Malawi by Chaputula and Mutula (2018), which observed high utilization of mobile phones for accessing e-books, e-journals, and library websites, possibly attributed to the prevalence of smartphones and reliance on Google for information retrieval. Teacher librarians' express confidence in the positive impact of mobile digital libraries on teaching involvement, emphasizing the provision of a wide range of easily understandable books and media. Educators' understanding of mobile technology's potential positively affects the development and use of digital libraries. When educators recognize the capacity of technology to enhance library services, they are more likely to encourage students to utilize mobile digital libraries and advocate for improved school library services. Conversely, low levels of understanding can result in decreased library usage. The accessibility of mobile digital libraries, available from any location and at any time with internet access and a compatible device, further supports their potential to enhance library services. However, it is important to acknowledge the impact of incompatible information technology infrastructure on effective mobile technology use for library enhancement, as noted by Hamad, Farajat, and Hamarsha (2018).

7.7.3 Improvement of collaboration between teacher librarians and teachers

The findings of this study indicate that teacher librarians recognize the importance of knowledge sharing between teachers and learners and acknowledge the positive contribution of a mobile digital library in promoting learner-centered learning. Collaboration between teacher librarians and teachers plays a crucial role in the establishment and utilization of a mobile digital library. Teacher librarians bring their expertise in curating materials and ensuring their alignment with curriculum standards and student needs. By working together, they ensure inclusivity and cater to diverse disciplines and learning preferences. Teacher librarians also play a key role in instructing students on information literacy and research skills, enabling them to effectively navigate and critically analyze digital resources. They assist teachers in incorporating the mobile digital library into instructional plans and enhance ongoing education. Collaboration can also facilitate the development of assessment methodologies to evaluate the impact of the library on student learning outcomes. However, successful collaboration requires an enabling organizational culture, sufficient resources, and effective communication. Cultivating such an environment fosters shared decision-making and supports

the integration of the mobile digital library to enhance student engagement and academic performance (Ghavifekr, Athirah and Rosdy, 2015).

Digital libraries improve collaboration between teacher librarians and teachers by making resources more accessible. This increased accessibility facilitates the sharing of ideas, lesson plans, and best practices. The convenience of access fosters collaboration and knowledge sharing among educators. Digital libraries enable teacher librarians and teachers to collaborate on instructional content, curriculum resources, engaging learning materials, and adapting content to cater to a wide range of learners. One participant noted that "*Collaboration can improve because both teachers and teacher librarians can work together in the process of collection development".* The collaborative development process allows teacher librarians to leverage their understanding of information literacy and research skills while working with subject-specific teachers. This collaborative effort ensures that digital library resources are connected to the curriculum and aligned with learning objectives.

Furthermore, digital libraries enhance the connection and engagement between teacher librarians and educators, promoting professional growth. One participant noted that *"Collaboration between teachers, librarians and learners is important because they need to buy resources and train learners on how to use the mobile digital library. Teachers as well need to be trained by the teacher librarian. Both teachers and teacher librarian need to train learners on how to use a mobile digital library".* Digital platforms provide spaces for educators to engage in conversations, share knowledge, and participate in professional learning communities. Teacher librarians can support teachers in navigating the digital library and integrating materials into their instructional practices within these collaborative spaces. Teacher librarians can also assist educators in using technology tools and adopting modern pedagogical approaches.

7.7.4 Encouragement of learners to use a mobile digital library

The implications of these research findings are significant in the context of educational institutions categorized under quintile levels 1, 2, and 3. The data reveals a substantial percentage of schools in these quintile levels expressing their willingness to promote the use of a mobile digital library among their students. Particularly noteworthy is the majority agreement among schools in quintile level 1, indicating their strong support for the adoption and integration of a mobile digital library in their schools. This finding suggests a growing

recognition among schools in lower socioeconomic quintiles of the potential benefits and value that a mobile digital library can offer to their students. By embracing this digital learning tool, these schools aim to enhance educational opportunities, improve access to resources, and overcome the limitations of traditional library settings. The strong willingness to encourage the use of a mobile digital library highlights the proactive approach of these schools towards integrating technology and digital resources into their educational practices. participants cited various ways on how to encourage students use a mobile digital library. One participant indicated that *"learners can be asked or instructed to view some videos that explain more on the lesson given in class. The usage of the latest technology will encourage them to use the mobile digital library. Also, we can them more activities that will require information that is available in the mobile digital library".* Another respondent noted *"I would give learners topic that will be covered in out next classes and ask them to come to class prepared. They will have to use the mobile digital library to have access to information related to the topics given to them. That way the mobile digital library will contributing or supporting teaching and learning".* The findings further emphasize the importance of providing support and resources to schools in quintile levels 1, 2, and 3, as they strive to implement and effectively use a mobile digital library.

In their research, Dintwa and Sithole (2021) highlight the importance of fostering student participation and customizing educational activities to their learning styles in the digital age. Teachers are eager to use mobile digital library resources to encourage student engagement, assigning activities and assignments that utilize these resources. Educating students about the capabilities, resources, and benefits of the mobile digital library is crucial to encourage their usage. By allowing students to learn at their own pace and choose materials that align with their interests and learning styles, the mobile digital library promotes self-directed learning. Support and guidance are necessary to assist students in effectively using the mobile digital library, and gamification techniques can enhance motivation and usage. Integrating the mobile digital library into the curriculum and tasks helps students understand its value and incorporating student feedback ensures the library meets their needs and suggestions for improvement. In underprivileged schools, promoting the use of mobile digital libraries is essential to maximize benefits and ensure equal access to instructional materials. Overcoming barriers such as unstable internet connectivity and lack of compatible devices is crucial. Collaboration among educational institutions, government agencies, and community partners is needed to improve internet infrastructure and provide affordable or subsidized internet access

for disadvantaged students. Digital literacy is another challenge, as disadvantaged students may lack access to digital technology and the necessary skills. Additionally, the mobile digital library should provide engaging and culturally appropriate content to cater to the diverse needs and learning styles of culturally diverse students in underprivileged schools in South Africa.

7.7.5 Affordability of a mobile digital library in under-resourced high schools

Teachers from schools in quintile three express confidence in their schools' ability to afford and maintain a mobile digital library. One school in this quintile mentioned having the necessary facilities such as computer LAN, Wi-Fi, and a functioning school library, with the only concern being potential interruptions due to load shedding. The participant specifically stated:

> *"The school has the facility like computer LAN. We have Wi-Fi. We have computer LAN and the school library. Connectivity is not the problem unless there is load shedding. Our school can afford to have a mobile digital library because we have a wife, we have computer room. The problem can be accessibility of the mobile digital library to learner. Learners are not allowed to bring their cell phones to school. Also, some will have problem with data".*

Conversely, the other two schools in quintile three expressed doubts about their ability to maintain a mobile digital library. One challenge identified is the accessibility of the library for learners, as they are not allowed to bring their cell phones to school. Additionally, some learners may face difficulties accessing the library due to restrictions on connecting to the school's Wi-Fi network.

The research findings highlight several implications related to the confidence and concerns expressed by teachers from schools in quintile three regarding the affordability and maintenance of a mobile digital library. Firstly, it indicates that some schools in this quintile have the necessary infrastructure, such as computer LAN, Wi-Fi, and a functioning school library, which can support the implementation of a mobile digital library. However, load shedding remains a potential challenge that may disrupt access to the library. On the other hand, the doubts expressed by the other two schools in quintile three regarding their ability to maintain a mobile digital library raise concerns about the sustainability of such initiatives in certain educational contexts. These concerns could be related to financial constraints or limited resources available to support the maintenance and upkeep of the library. Furthermore, the implications extend to the accessibility of the mobile digital library for learners. The restriction on students bringing cell phones to school and limitations on connecting to the school's Wi-Fi

network pose challenges in terms of accessing the library resources. These barriers hinder the potential benefits and usage of the mobile digital library among the student population. The quantitative findings align with these observations, as a significant proportion of teachers agreed that affordability is a crucial factor in the development and utilization of a mobile digital library. It was also stated by Khomo et. al. (2023) that if there is no financial support from the organisation, it will be difficult to maintain and motivate library users to use the mobile digital library because the library system needs to be maintained and be up to date all the time. If there is no financial support, it will be very difficult to have a successful mobile digital library. The affordability of mobile digital libraries in under-resourced high schools is a crucial factor in their feasibility and effectiveness. Limited budgets and financial constraints can impede the adoption and maintenance of these libraries in under-resourced schools. One respondent stated, "We need financial support to host a mobile digital library". Device prices, internet connectivity, digital content, and training costs contribute to the affordability challenges. Under-resourced schools may struggle to acquire and maintain high-quality devices for students to use the digital library. Limited internet options and high costs can hinder students' access to the library both in and outside of school. The expenses associated with digital content and licensing, as well as the need for training and professional development, pose additional financial burdens on under-resourced schools. Addressing the affordability challenges of mobile digital libraries in under-resourced schools is essential to bridge the digital divide and provide equitable learning opportunities for all students, regardless of their socioeconomic backgrounds. It requires a comprehensive approach that involves financial support, resource allocation, and policy changes to ensure fair access to educational resources through mobile digital libraries.

7.7.6 Information seeking behaviour of schoolteachers

The findings from librarian interviews indicate that teachers frequently use the library for teaching purposes due to the availability of projectors and air-conditioning. However, it was noted that some teachers also use the library for meetings and regular class lessons, which goes against the intended purpose of the library as an educational resource for the school community. Additionally, teacher librarians reported that learners primarily use the library for reading their own materials, while teachers often go directly to the shelves to search for books. Techers stated that they seek information through ways such as *"We use google and our cell phones to access information", "we rely on google, other colleagues and the department of education website that we access when we are in places with a better connectivity", "we use/make copies*

of other books and we get information from colleagues from other schools". The implications of these findings are twofold. Firstly, it highlights the need for clearer understanding of the purpose and functions of the school library among teachers. While it is positive that teachers utilize the library for teaching purposes, using it for meetings or regular class lessons may hinder its availability and accessibility for other students. Therefore, there is a need to emphasize the role of the library as an educational resource and encourage teachers to utilize alternative spaces for meetings and regular class lessons. Secondly, the findings highlight the importance of meeting the diverse needs of both learners and teachers within the library. Learners primarily use the library for personal reading, indicating a desire for independent learning and access to materials of their choice. On the other hand, teachers rely on the library's book collection for information but also resort to external sources like Google, the Department of Education website, and colleagues from other schools when necessary. These findings highlight the importance of maintaining a relevant and up-to-date collection in the school library to meet the information needs of both teachers and learners.

These findings emphasize the significance of teachers' information seeking behaviour in effectively utilizing digital mobile libraries. Teachers' ability to search for and evaluate resources within the library directly impacts their instructional practices and the suitability of materials for their curriculum. Information literacy skills are essential for teachers to critically assess the quality and relevance of digital resources (Falloon, 2020). Teachers' information seeking behaviour also plays a crucial role in adapting resources to meet students' diverse needs. By actively searching for resources that cater to different learning styles and interests, teachers can create engaging learning environments that support personalized instruction. Additionally, teachers' information-seeking behaviour contributes to their professional growth and ongoing education, enabling them to stay updated with current research and teaching strategies. However, teachers may face obstacles such as limited time, lack of digital tool familiarity, and insufficient training and support. Educational institutions should prioritize professional development and support programs to enhance teachers' information literacy skills and ensure effective information seeking for both teachers and students.

7.7.7 Technical infrastructure available and how a mobile digital library should support teaching

The findings of the current study highlight the limited access to Wi-Fi and computer resources in schools. Out of all the schools surveyed, only three from quintile three reported having Wi-

Fi and computers or laptops available. It is also worth noting that despite having school libraries, these libraries were reported to be not fully functional. It was also discovered that in South African rural communities, school libraries are virtually non-existent and where they do exist, they are non-functional (Mojapelo, 2018 p.3). This indicates a significant disparity in the availability of digital resources and infrastructure among schools in quintile three. The lack of adequate Wi-Fi and computer access poses challenges for students in these schools, hindering their ability to fully utilize digital resources and engage in technology-enabled learning. Hamad, Farajat and Hamarsha (2018) exposed that shortage of information technology infrastructure affects the use of mobile technology concerning the enhancement of library services. This research highlights the urgent need for targeted interventions and investment in improving digital infrastructure in underprivileged schools, particularly in quintile three, to bridge the digital divide and provide equal opportunities for all students to access and benefit from digital resources in their educational journey. The implications of these findings are significant for schools in quintile three and their students. The limited access to Wi-Fi and computer resources poses several challenges for these schools. The lack of Wi-Fi and computer access restricts students' ability to engage in digital learning activities and utilize online educational resources. This hampers their access to digital tools, multimedia materials, and interactive learning platforms that can enhance their educational experience. The disparity in access to digital resources between schools in quintile three and schools with better infrastructure exacerbates existing educational inequalities. Students in schools with limited Wi-Fi and computer resources may be at a disadvantage compared to their peers in schools with better access to technology. Access to Wi-Fi and computers is crucial for developing digital literacy skills among students. The limited availability of these resources in quintile three schools hinders students' ability to navigate and critically evaluate digital information, effectively use digital tools, and engage in online collaboration and communication. The reported lack of functionality in school libraries suggests that limited access to digital resources extends beyond Wi-Fi and computers. This can result in a reduced ability for students to access a diverse range of educational materials, impacting their opportunities for independent research, self-directed learning, and academic growth.

7.8 Technological competences of the teachers

In the digital era, the competence of teachers in technology has emerged as an increasingly vital part of the schooling landscape. Educators are now required to possess a diverse set of technological competencies and expertise in order to effectively incorporate technology into

their teaching practises. This includes the ability to efficiently use a range of educational software, digital tools, and online platforms to optimise teaching and learning outcomes. This section discusses the data from the study on the technological competence of teachers in terms using the latest technology, uploading and downloading files from the internet, information search, the use of Microsoft and social network, and abilities in emailing, printing and creating videos.

7.8.1 The usage of the latest technology

The study revealed that teachers in quintile three schools had varying levels of access to and usage of the latest technology. Some teachers reported using laptops or computers for teaching, while others mentioned a dire lack of access to such technology in their schools. This finding is consistent with previous research by Chisango, Marongwe, Mtsi, and Matyedi (2020), which highlighted the inadequate information communication technology infrastructure in some schools, resulting in limited exposure to technology for learners. Similarly, teachers from quintile one and quintile two schools reported limited usage of the latest technology, with only a few using their personal devices for teaching. One participant reported that *"only 30% of our staff members use latest technology that we have for teaching"*. Quantitative analysis showed that a higher percentage of teachers in quintile one schools used the latest technology compared to quintile two schools. Quintile one schools, typically located in poor rural areas and townships, face significant resource limitations, including a lack of technological resources. These schools are characterized by a lack of resources in general, making it difficult to provide access to the latest technology. In particular, one participant noted:

> *"The degree of educators' and understanding of the potential of mobile technologies in enhancing the provision of library services would affect the development and use of a digital mobile library positively. When they know that the latest technology can improve library services, they will encourage the learners to use the mobile digital library. Knowing that the mobile digital library can improve the library services will make educators see the need for the better school library services that come with the digital mobile library. As the results, they contribute on how they want the mobile digital library to be developed. The usage of the library will increase. However, if the level of understanding is low, the usage of the library will decrease".*

Furthermore, the study found a notable difference in proficiency levels between senior teachers and ordinary teachers in using the latest technology for teaching. Senior teachers, who have been in the profession for a longer period, demonstrated lower proficiency compared to ordinary teachers, who are predominantly younger and more digitally literate. This suggests that the younger generation of teachers is more adept at using the latest technology due to their

familiarity with digital tools and resources. When asked on the importance of educators using the latest technology, one participant stated that *"It is important because it save a lot of time when preparing and when delivering the lesson",* while another respondent mentioned that *"Times have changed. We need to adopt change and use the latest technology".*

The integration of the latest technology as a competence of teachers is a topic of significant importance and debate in education. One participant stated that *"Once they know how to search and find information using their phones and laptop, they will use the library more",* whilst another respondent concurred *"If the level digital and information literacy is high, the usage of mobile digital library will increase"*. While proponents argue that technology can enhance teaching and learning experiences, critics raise concerns about the potential overshadowing of pedagogical knowledge and the challenges of staying updated with rapid technological advancements. The equitable distribution of technology and access to professional development opportunities are crucial considerations to ensure that all teachers can effectively utilize the latest technology in their instructional practices (Falloon, 2020). In summary, the findings of the study indicate varying levels of access to and usage of the latest technology among teachers in different quintile schools. The challenges of limited resources, including technological infrastructure, hinder the integration of technology in some schools. Additionally, the ability levels of teachers in using the latest technology vary, with younger teachers demonstrating higher competence. Addressing the disparities in technology access and providing adequate support and professional development are essential for promoting effective usage of the latest technology as a competence of teachers across all schools. Wang et al. (2018, p.615) and Ocrana, Underwood and Arthur (2020, p.6) also found out that ability of users to use the latest technology impact on the successful usage of mobile library.

7.8.2 Upload files on Internet

A considerable number of teachers reported a high level of proficiency in uploading files from or onto the internet, often utilizing their smartphones for this purpose. However, some indicted the need for training on this. The quantitative data further confirms that a significant percentage of educators exhibited greater competence in uploading files on the internet compared to senior educators. This trend can be attributed to the widespread adoption of smartphones and the proliferation of various social media platforms. With the increasing use of different platforms for storing videos and photos, it is unsurprising that many teachers assert their ability to upload files on the internet. The ability to upload files on the internet has emerged as a crucial skill for

educators in the contemporary era of digital technology. It facilitates the sharing of resources, enables collaboration among colleagues, and grants students access to educational materials. However, a critical discussion is necessary to examine the efficacy and ramifications of this competency. One advantage of teachers being able to upload files on the internet is the convenience and effectiveness in disseminating educational materials. They can enhance accessibility by uploading files to online platforms or learning management systems, allowing students to access resources anytime and anywhere. This promotes self-directed learning and provides supplementary materials for better comprehension. Additionally, teachers can collaborate with colleagues by sharing instructional resources, fostering a culture of collaboration and knowledge exchange. Dlamini (2022) confirms the low digital competence of teachers is hindering the adoption of technology in the classroom.

7.8.3 Download files from Internet

The competency of teachers in downloading files from the internet is considerably important in the current digital era. It provides educators with access to a wide range of educational resources, enabling them to enhance instructional materials and offer up-to-date information to students. However, a critical examination of this competency is necessary to understand its effectiveness and potential implications. One significant benefit of teachers' ability to download files is the access to diverse educational resources. Teachers can acquire e-books, research articles, multimedia content, and educational software, allowing for customization of instructional materials and promoting student engagement. Downloading files also enables educators to stay informed about the latest knowledge and technology. They can access current research findings, educational trends, and innovative teaching strategies, enhancing their instructional approaches to meet evolving student needs. Additionally, teachers can engage in professional development resources and online courses to expand their own knowledge and expertise.

However, there are challenges and considerations associated with this competency. Quality and reliability of downloaded materials are crucial factors. Teachers must critically evaluate the credibility and accuracy of the resources they acquire to ensure alignment with educational objectives and promote critical thinking. Ethical practices regarding copyright and intellectual property rights are also important. Teachers should be knowledgeable about copyright laws, appropriately attribute sources, and seek permissions when necessary. Technical difficulties and digital literacy challenges may arise when downloading files. Teachers also need the

necessary skills to navigate online platforms, manage downloaded files, and troubleshoot issues. Furthermore, availability and accessibility of downloading resources may vary across educational settings. Limited internet connectivity or restricted access to certain platforms can create a digital divide, leading to disparities in resource availability among educators and students. Efforts should be made to bridge this divide and ensure equal access to downloading resources. Ndimbovu and Nsibirwa (2022, p.66) discovered that learners require proper training and teachers need to update the training that they received at tertiary institutions when obtaining their qualifications. It is also recommended that the schools' approach relevant organisations to assist with the training of teachers in the use of ICTs who, in turn, can train the learners.

7.8.4 Searching for information

A significant number of teachers expressed a strong level of proficiency in utilizing various search engines to conduct information searches. However, it was commonly mentioned that Google is the preferred search engine among teachers. Some teachers acknowledged the need for additional training in information retrieval, as they often encounter challenges during their search processes. This need for training was more prevalent among teachers in lower quintile categories, who recognized the importance of improving their search skills to effectively find relevant information. They attributed their difficulties to a lack of knowledge in using appropriate search terms and keywords. The quantitative findings provide further support to these statements, indicating that teachers demonstrate the highest levels of competence when conducting information searches using different search engines. This competency was particularly evident among teachers with less than ten years of experience, suggesting that they were exposed to different databases during their own educational journey. Among the various quintile levels, schools in the second quintile exhibited the highest proficiency in conducting information searches across multiple search engines.

Effective digital learning requires teachers to search for information. Google is convenient, but bias, information quality, and digital literacy are concerns. Teachers must thoroughly examine sources for correctness and credibility. Overusing search engines can spread disinformation and impair critical thinking. Teachers should learn to navigate and use a variety of sources instead than just one search engine. Some teachers believe they need information retrieval training, emphasising the necessity for continual digital and information literacy professional development.

Teachers with great information search abilities can integrate relevant information into their lessons, encouraging inquiry-based learning and research. Teachers that struggle with knowledge retrieval may unintentionally distribute erroneous information, which limits students' engagement with credible sources and critical thinking. Technology, internet connectivity, and resources affect instructors' information searching skills. Bridging the digital divide and providing equitable access to technology and resources are essential. Critical thinking, various source knowledge, information retrieval, and digital literacy training are essential. Addressing technological access gaps and supporting underprivileged teachers is crucial. Information seeking skills help teachers encourage critical thinking, digital literacy, and evidence-based learning. Shipman; Bannon; Nunes-Bufford (2015, 131) concluded that in-service teachers use websites, their supervisors and their colleagues most frequently when they are searching for information for professional use. Library-related information sources, such as the online databases, journals and government publications are not as frequently used for work-related purposes because they find it much easier to search the web or ask a coworker for information than to use information literacy skills to search the databases for research publications. They seek information for writing lesson plans, developing exercises and projects, and developing student assessments.

7.8.5 Microsoft Office usage

The competence of teachers in working with Microsoft Office and the need for training in certain programs were examined in this study. While the majority of teachers reported being comfortable with using Microsoft Office, some expressed a need for training, particularly in programs like Microsoft Excel. The findings also revealed that teachers from schools in quintile level 3 exhibited the highest ability in working with Microsoft Office. This may be attributed to the larger number of teachers in quintile 3 schools, many of whom are younger and more familiar with using Microsoft Office. Consequently, years of experience in the teaching profession were found to play a significant role in teachers' ability to work with Microsoft Office. Furthermore, the study found that younger educators demonstrated a higher level of ability in using Microsoft Office compared to senior educators.

Teachers' proficiency in Microsoft Office is crucial for effective teaching and administrative tasks in the digital era. Many teachers demonstrate competence in using Microsoft Office applications such as Word, Excel, and PowerPoint, which have become standard tools for creating instructional materials. Proficiency in Microsoft Office enhances teachers'

productivity and streamlines administrative duties, enabling efficient management of student records and facilitating communication with colleagues and parents. However, accurately assessing teachers' proficiency in Microsoft Office poses challenges. Self-reported comfort levels may not reflect actual skills, with some teachers lacking advanced knowledge to fully utilize the tools. Targeted training and support are necessary to enhance teachers' proficiency, particularly in specific applications like Excel where some teachers may struggle. Technological advancements continually impact Microsoft Office skills, with regular updates introducing new features (Falloon, 2020). Teachers must stay updated to leverage the full potential of these tools, necessitating ongoing professional development and access to timely resources. Additionally, teachers' age and experience influence their proficiency, as younger teachers raised in the digital age may have greater familiarity with technology. Older teachers may require additional support to bridge the digital divide and develop proficiency in Microsoft Office.

7.8.6 Social network

The research findings demonstrate a high level of ability among teachers in utilizing technology for social networking purposes. Social media platforms have gained immense popularity in recent times, with many teachers employing them to communicate with students and parents. The cost-effectiveness of using social media platforms for communication, compared to traditional phone calls, is a significant driver for its adoption. Among the different quintile groups, schools in quintile level 3 exhibited the highest competence in utilizing social networks. This finding is consistent with the higher availability of resources in quintile 3 schools compared to the other quintile categories. Moreover, quintile 3 schools are more prevalent in townships rather than rural areas, where internet connectivity may be less reliable. Moreover, the presence of a younger generation of teachers is prominent in quintile 3 schools, and their proficiency in utilizing social media can be attributed to their familiarity and frequent use of these platforms in their daily lives. In the digital era, social media has become increasingly important for teachers. Platforms like Facebook, Twitter, and Instagram offer new ways for teachers to communicate, collaborate, and share information. The advantages include improved communication between teachers, students, and parents, as well as opportunities for professional development and networking. However, challenges and concerns must be addressed, such as privacy and ethical issues, the spread of misinformation, and disparities in technology access. Clear guidelines and policies are needed to ensure responsible use of social

media in educational settings. Efforts should also be made to bridge the digital divide and provide equitable access to technology and internet resources for all teachers.

7.8.7 Emailing

The results of the study reveal that individuals exhibited the highest levels of ability in utilizing technology for emailing purposes. The widespread usage of smartphones has greatly influenced the communication practices of individuals, as smartphones require users to have an email account for login purposes. Consequently, individuals who possess smartphones tend to utilize email accounts as a means of communication with others who also possess email accounts. This explains why individuals with fewer years of professional experience demonstrated a greater proficiency in technological skills related to emailing. The implications of these findings are twofold. Firstly, the widespread adoption of smartphones and the need for email accounts for various activities have contributed to the development of technological skills related to emailing. This highlights the importance of incorporating email skills training in educational programs and professional development initiatives to ensure individuals are equipped with the necessary digital literacy skills. Secondly, the higher proficiency observed among individuals with fewer years of service suggests that younger generations are more adept at using technology for emailing purposes. This highlights the importance of considering generational differences in digital literacy skills and tailoring training and support programs to address the needs of individuals with less experience or familiarity with technology.

7.8.8 Printing and scanning

The findings indicate that teachers, like professionals in other fields, frequently engage in printing and scanning documents. However, a consistent decline in technological competence is observed as the number of years of experience increases. Teachers with fewer years of service demonstrate a higher level of proficiency in printing and scanning skills. This decline in competence among more experienced teachers may be attributed to age-related vision impairments and resistance to change. Some senior teachers face health issues with their eyes and exhibit a reluctance to adopt new technologies, which impacts their technological competence in printing and scanning functions. The findings highlight the implications of age-related factors and resistance to change on teachers' technological competence in printing and scanning functions. As the number of years of service increases, there is a decline in proficiency among more experienced teachers.

7.8.9 Creating videos

The findings indicate a consistent decline in technological competence as the number of years of service increases among educators. Individuals with fewer years of teaching experience demonstrate a higher level of proficiency in technological skills pertaining to video creation. Additionally, the study reveals a notable discrepancy in technological engagement between senior citizens and younger individuals, with the younger generation being more active in social media platforms where video creation and uploading are prevalent. The decline in technological competence among educators with longer years of service suggests that experience alone may not guarantee abilities in video creation skills. This decline may be attributed to factors such as limited exposure to newer technologies and a potential resistance to adopting emerging trends.

The study shows the importance of technological skills in video creation, as educators require proficiency in operating devices and utilizing relevant software. Moreover, the disparity in technological engagement between senior citizens and younger individuals highlights the need for targeted training initiatives to enhance educators' technological competencies, particularly in the area of video creation. To address these findings, educational institutions should implement comprehensive training programs and support initiatives to enhance educators' technological skills, thereby fostering their ability to create and utilize videos effectively in educational settings. By bridging the technological gap and promoting proficiency in video creation, educators can enhance the learning experience for students and harness the potential of digital media in education.

7.9 Relevance of the study findings to the theories of constructivism and connectivism

The combined application of constructivism and connectivism theories in the viability and effective use of mobile digital libraries in disadvantaged schools poses a compelling case for research. Constructivism places a strong emphasis on active learning and the active construction of knowledge. This pedagogical approach is particularly beneficial for students attending disadvantaged schools, where access to resources and support may be limited. Mobile digital libraries have the potential to offer students equal access to a wide range of educational resources, facilitating their ability to construct knowledge independently and engage in self-directed learning. The theory of connectivism holds equal relevance to the study for schools facing limitations, as it acknowledges the importance of digital networks and connections in

the process of learning. Mobile digital libraries have the potential to mitigate the digital divide by affording students in disadvantaged schools the opportunity to connect with online communities, experts, and resources that extend beyond the constraints of their immediate physical surroundings. This facilitates the creation of a feeling of interconnectedness and cooperation, thereby empowering students to acquire knowledge from other learners, examine diverse viewpoints, and develop a sense of independence in their studies. The successful implementation of mobile digital libraries in disadvantaged schools can be achieved through the use of constructivist and connectivist principles. The adoption of mobile technologies in teaching and learning can be effectively supported by incorporating active learning experiences, encouraging collaboration, and developing critical thinking and problem-solving skills. These theoretical frameworks offer an efficient pedagogical basis for such endeavours. Mobile digital libraries have the potential to enhance the educational experience of students in disadvantaged schools by equipping them with a wide range of resources, tools, and opportunities for self-directed learning. This can play a crucial role in narrowing the educational disparity and promoting educational equity.

7.10 Significant Contribution to the Body of Knowledge

It is imperative that constructivism and connectivism as theories underpinning the current study is put into practice in the design of a proposed model for the development of a mobile digital library. These theories can be used as existing knowledge that can be used in the design and development of the mobile digital library. According to Rajkoomar (2015), "the constructivist paradigm uses a mixture of methods of teaching and modes of delivery in the classroom environment and visual media in the electronic environment to aid knowledge construction and reinforcement. As such, multimedia designs and information retrieval concepts are central components of the constructivist learning space".

Figure 7. 1 highlight the key constructs of Constructivism that was considered in the design and development of the mobile digital library in under-resourced schools with no libraries or non- functional libraries.

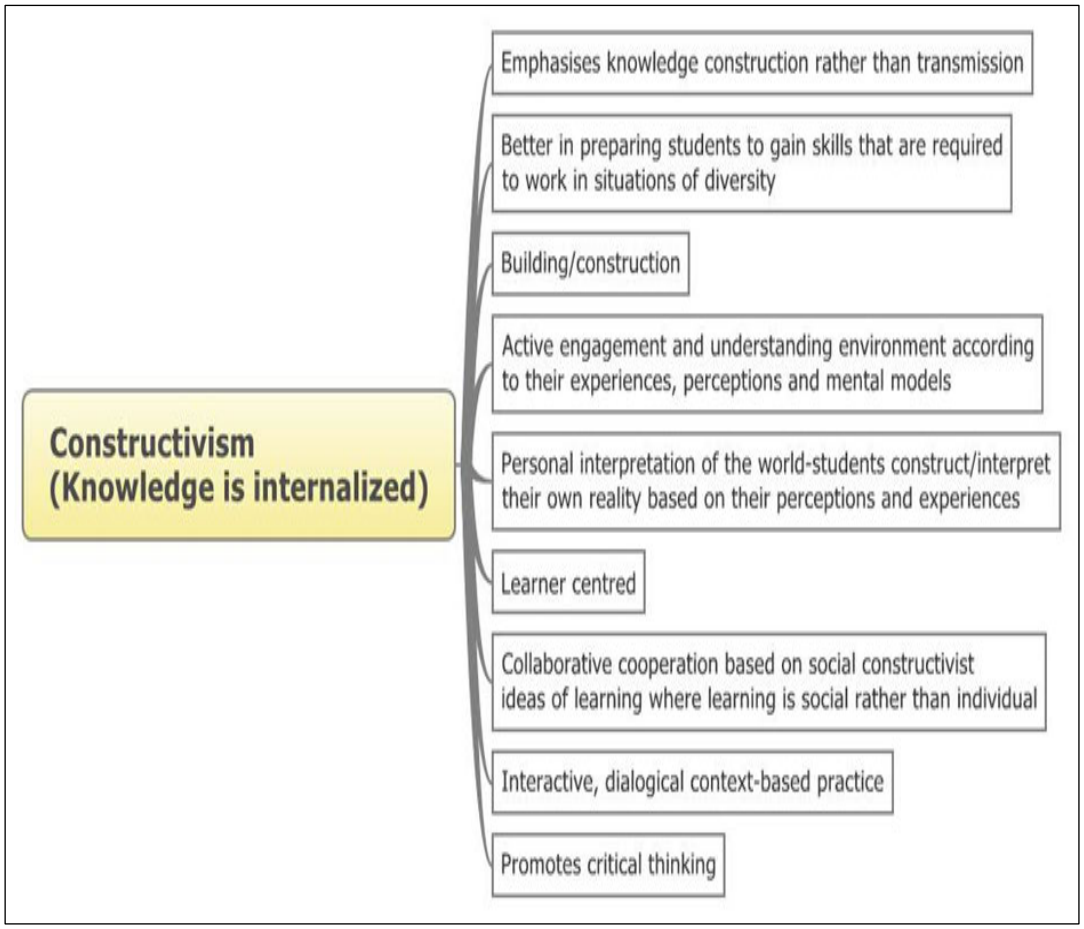


Figure 7.1: Key tenets of Constructivism
Source: Extracted from Rajkoomar (2015)

Constructivism advocates that students should reflect on their learning. Therefore, the source material contained in the digital library should promote reflection and active engagement. There needs to be collaboration between the teachers and teacher librarian especially in the collection development for the digital library. The collection needs to be aligned to the curriculum and promote critical thinking.

Figure 7. 1 highlight the key constructs of Connectivism that was considered in the design and development of the mobile digital library in under-resourced schools.

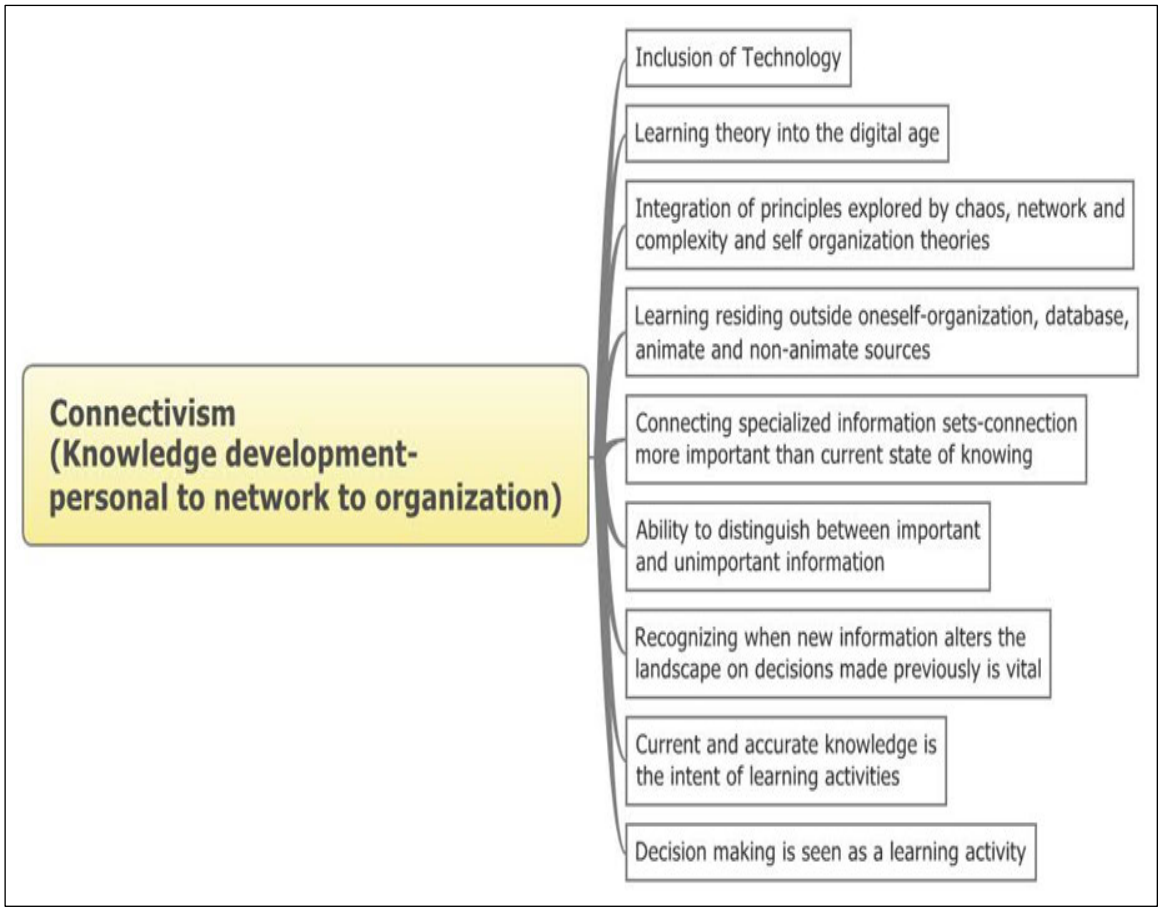


Figure 7.2: Key tenets of Connectivism
Source: Extracted from Rajkoomar (2015)

Connectivism advocates the inclusion of technology especially using networks. The mobile digital library with enable teachers and students to access up-to-date information from a wide variety of resources including multimedia. The collection in the digital library needs to be organized systematically for effective information retrieval. The responsible person for uploading the collection as well as the users (teachers, teacher librarians and learners) of the mobile digital library need to possess the ability to distinguish between important and unimportant information and to be able to create new information. The information in the digital library needs to be current and accurate. Decision making in terms of resources contained in the mobile digital library as well as the student trained to retrieve relevant material for their assignments can be seen as a learning activity.

Figure 7.3 presents the proposed model for development of a mobile digital library in public high schools in KwaZulu-Natal that are under-resourced with no libraries or librarians. The model was derived from educational pedagogy (Chapter 2), the theories underpinning this research study (Chapter 1) and the findings of the study (Chapter 5, Chapter 6 and Chapter 7).

In addition, the model is informed empirically by the evidence based Structural Equation Model (SEM) whose dimensions are outlined in Figure 6.6, section 6.8 of Chapter 6.

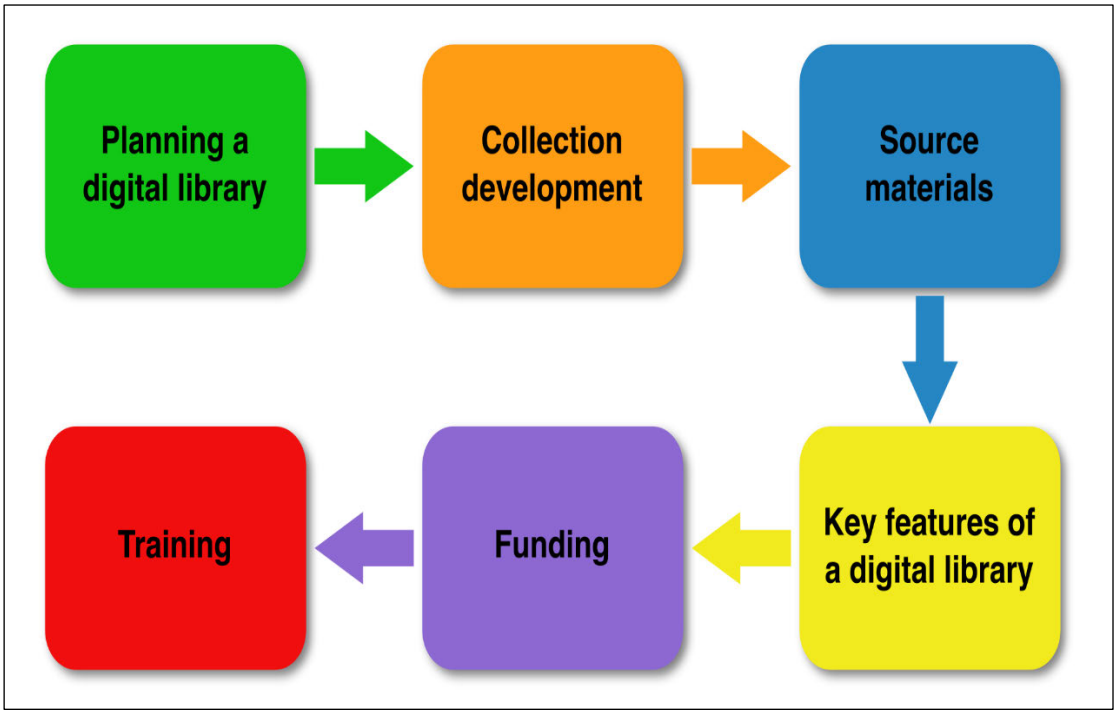


Figure 7.3: Process Model for the development of a mobile digital libraries in under-resourced public schools in KwaZulu Natal
Source: Researchers own compilation

The steps for the Process Model presented in Figure 7.3 is described in detail below:

Planning

Planning mainly involves understanding the various tasks related to producing a mobile digital library, developing plans for handling these tasks, identifying required resources and formulating a timeline for accomplishing these tasks. A feasibility study needs to be conducted to assess the viability of the project before detailed planning. The result of the feasibility study could be a recognized proposal for obtaining organizational approval or funds for the developing a mobile digital library (Rajkoomar, 2015).

Collection development

Specify the need for developing the digital library collection, provide its purpose and who the target user community is. Indicate if senior management and stakeholders have shown interest and expressed what is the need. The purpose may be improving preservation of some rare or

delicate materials, improving access to and the visibility of certain material or facilitating re-use of documents (Rajkoomar, 2015). Identifying the target user community for a digital library collection and their profile is very important. In developing the mobile digital library there must be collaboration and consultation with all the stakeholders.

Digital collections can include:

- Access to external materials not held in-house by providing pointers to Web sites, other library collections, or publishers' servers.
- Local collection – digital information that is available to a particular group of users.
- Acquisition of original digital works created by publishers and scholars. Examples – electronic books, journals, and databases.

Source materials

Define the source material that establishes the digital library collections and the key features of this source material. For example, the source material can include project reports, past examination papers, audio and video lectures, staff publications, working papers, songs and musical scores. Specify what portion of the material is to be digitized and if only a sub-set or all the material will be covered in the digital collection. Copyright restrictions must be assessed. The conversion of the source materials available in hardcopy into a digital format is an important task in creating a digital library collection. There should be a precise statement about the related requirements and their processes, namely:

i. Converting the source material into required digital format.
ii. Providing the digitization requirements.
iii. Digitizing the source material workflows.

Key features of the digital library

Key features of the digital library collection you plan to build must be defined. The nature of the collection must be identified, for example, static or dynamic. The type of usages you would allow the users to adhere to and the kind of service delivery they should expect from you must be identified, for example, CD-ROM or on-line. The parts of a digital library must work together smoothly to make the library a highly usable application for the librarians and for the systems administrators or both. Browsers stimulates the design for better user interfaces for networked applications. Browsers are so flexible that they are used as interfaces to almost every type of application on the Internet.

Interface designs should include:

- Consistency in appearance, in controls and function is important to users.
- Users need feedback – they need to understand what the computer is doing and why they see certain results.
- Skilled users should be offered shortcuts, while beginners should have well defined options.
- Error handling should be simple and easy to comprehend.
- The user should feel in control.

The performance of computer applications and networks has a significant impact on usability. Some factors to be considered:

- Some computers are more powerful than others.
- Some people have their own computer whilst others share.
- A variety of computers with a variety of operating systems are owned by users.
- The usability also depends on how quickly it responds to instructions.
- Multiple copies of the entire collection may be placed at several sites through mirroring.
- Specific information rather than the entire library collection can be replicated by caching.
- Caching will prevent delays the next time it is used.
- Metadata needs to be clearly defined for search and retrieval requirements.

Funding

The resources and finances required for creating and maintaining digital collections must be identified. There is a need to identify:

- The type of information technology (IT) infrastructure required for establishing and maintaining the digital library.
- The personnel requirements and.
- The amount of money requirements involved for startup and maintaining the collection.

The schools that do not have funding should apply for grants.

Training

It is important that the end-users of the mobile digital library undergo training for the optimal use the mobile digital library

7.11 Chapter summary

In summary, the success of implementing a mobile digital library in schools is contingent upon several factors, with feasibility and the technological competence of teachers being key determinants. Feasibility encompasses aspects such as infrastructure, internet connectivity, device availability, and financial resources, which must be adequately addressed to ensure the effective implementation and sustainability of a mobile digital library. Additionally, the technological proficiency of teachers plays a crucial role in leveraging the potential of a mobile digital library. Teachers who possess the necessary skills and knowledge can effectively integrate technology into their instructional practices, creating engaging and interactive learning experiences for students. Conversely, a lack of technological competence among teachers hinders the successful integration and utilization of a mobile digital library, limiting its impact on teaching and learning. To promote the success of a mobile digital library in schools, it is imperative to address feasibility considerations and provide teachers with the necessary support, training, and resources to enhance their technological competence. By doing so, schools can optimize the potential of a mobile digital library, ultimately enhancing student learning experiences and outcomes. The next chapter gives summary and key finding of the study.

CHAPTER EIGHT: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

Chapter seven was discussed the findings relevant to the objectives of the study. This chapter serves as a summary of the key findings that are relevant to the objectives of the study. It encompasses the main discussions from Chapter Seven, where factors contributing to the successful development and use of a mobile digital library model were identified. Additionally, the feasibility of utilizing such a model for teaching was established. The chapter also highlights the technological competences that teachers need to effectively utilize mobile technology. Furthermore, an explanation was provided on how a demo of a mobile digital library was developed. Lastly, the study offers recommendations for the successful hosting and usage of a mobile digital library and suggestions for future research. Overall, this chapter presents a comprehensive overview of the study's main findings and provides valuable insights for implementing and utilizing a mobile digital library model.

Research objectives

The objectives of the study under which findings are summarised and concluded are:

8.1.1. To identify factors that would contribute to the successful development and the use of mobile digital library model.

8.1.2. To establish the feasibility of using a mobile digital library model for teaching;

8.1.3. To ascertain technological competences of teachers to use mobile technology; and

8.1.4. To develop a mobile digital library model suitable for teaching in under-resourced schools.

8.2 Summary of the findings

Summarized below are salient findings of the study as directed by the research objectives.

8.2.1 Identification of factors that would contribute to the successful development and the use of mobile digital library model

Teachers must fully understand the benefits of digital technologies and mobile digital libraries in order to successfully implement and use them in the classroom. Awareness of these benefits helps teachers recognize how these technologies can improve learning outcomes, student engagement, and customized instruction. The accessibility and adaptability of mobile digital

libraries to different learning styles also promote digital literacy. However, the lack of teacher knowledge can hinder the integration of these resources, resulting in missed opportunities for improved learning. Regarding library facilities in schools, many teachers reported the absence or non-functionality of libraries due to funding constraints and inadequate resources. This significantly limits access to diverse educational resources for both teachers and students. Libraries not only provide access to books and reference materials but also cultivate a culture of reading, critical thinking, and information literacy skills. The absence of functional libraries exacerbates educational inequalities, as schools with well-equipped libraries have an advantage in providing comprehensive educational experiences. Addressing these issues requires financial support to update library resources, maintain infrastructure, and employ qualified librarians. Educators perceive mobile digital libraries as beneficial for enhancing school library involvement in teaching and learning. Access to a wide range of resources through mobile devices is seen as valuable for learners, promoting comprehension and easy access to information. However, the effectiveness of mobile digital libraries relies on compatible information technology infrastructure, which can impede their use. Advancements in technology have facilitated access to internet and library services through mobile devices, but challenges such as financial constraints, power supply issues, and unreliable internet connectivity need to be addressed. Factors that contribute to the successful development and use of mobile digital libraries in under-resourced schools include digital literacy training, user-friendliness of the platforms, affordability and financial support, effective marketing, reliable internet connectivity and power supply, relevant books and information resources, and easy accessibility. Ongoing digital literacy training for teacher librarians, teachers, and learners is crucial to navigate and utilize mobile platforms effectively. User-friendly platforms enhance engagement and increase usage. Financial support is essential for infrastructure, content acquisition, and personnel training. Effective marketing strategies are needed to raise awareness and promote usage. Reliable internet connectivity and power supply are vital for accessing digital resources. Providing relevant books and information resources aligned with the curriculum enhances the effectiveness of instructional practices. Finally, easy accessibility ensures convenient and remote access to information, improving teaching and learning experiences.

8.2.2 Feasibility of using a mobile digital library model for teaching

The feasibility of implementing a digital mobile library model in schools, particularly in disadvantaged settings, has been examined. The results highlight the potential benefits and

considerations of this model. Teachers overwhelmingly agree that a mobile digital library is suitable for teaching, as it offers a wide range of resources and enhances access to educational materials. The model's mobility, convenience, and adaptability cater to individual learning preferences and allow students to access resources from anywhere. Compared to physical libraries, a digital mobile library provides a larger collection of materials, enabling students to explore diverse subjects and perspectives. Implementing a digital mobile library can overcome limitations of time and space associated with traditional libraries, facilitating independent and self-directed learning. It also supports teachers in diversifying instructional materials and creating engaging and personalized learning experiences. Moreover, it helps bridge educational gaps in underprivileged schools by compensating for limited physical resources, promoting digital literacy, and offering ongoing educational opportunities. Collaboration between teacher librarians and teachers is crucial for the successful implementation of a mobile digital library. Teacher librarians contribute their expertise in curating materials, aligning resources with the curriculum, and instructing students in information literacy. Collaborative efforts enhance connections between teacher librarians and educators, fostering professional growth and improving instructional content quality. Encouraging students to use a mobile digital library involves educating them about its benefits and tailoring activities to their learning styles. Addressing affordability challenges, such as device costs and internet access, is crucial for under-resourced schools. Providing financial support, allocating resources, and implementing policy changes are necessary to ensure equitable access to educational resources. Teachers' information seeking behavior and information literacy skills play a vital role in effectively utilizing digital mobile libraries. Improving teachers' information literacy through professional development and support programs is essential for successful information seeking and resource utilization. The availability of technical infrastructure, such as Wi-Fi and computers, is a key factor in the feasibility of a mobile digital library. Limited access to these resources in underprivileged schools, particularly in quintile three, hinders students' full utilization of digital resources. Bridging the digital divide and investing in digital infrastructure are necessary to provide equal opportunities for all students.

8.2.3 Technological competences of teachers to use mobile technology

The study examined teachers' proficiency in various technological areas, including the use of the latest technology, uploading and downloading files, information search, Microsoft Office usage, social networking, emailing, printing, and creating videos. The study found that teachers in different types of schools had varying levels of access to and usage of the latest technology.

Some schools faced resource limitations, particularly in technological infrastructure. It was also observed that senior teachers exhibited lower proficiency in using the latest technology compared to younger teachers who are more digitally literate. To ensure effective technology integration, it is important to address disparities in technology access and provide adequate support and professional development opportunities. Regarding uploading files on the internet, a significant number of teachers reported high proficiency, often utilizing smartphones for this purpose. This competency facilitates resource sharing, collaboration, and student access to educational materials. However, it is important to examine the effectiveness and implications of this skill, considering factors such as quality assessment, ethical practices, and technical challenges. Teachers' ability to download files from the internet was found to be considerably important. It provides access to a wide range of educational resources and supports staying up to date with the latest knowledge and technology. However, challenges such as evaluating resource quality, adhering to copyright regulations, and addressing technical difficulties need to be considered. Efforts should be made to bridge the digital divide and improve digital literacy to ensure equal access to downloading resources. Teachers demonstrated competence in utilizing search engines, with Google being the preferred choice. However, some acknowledged the need for additional training in information retrieval. Competence varied among teachers, with younger and less experienced teachers demonstrating higher competence. Enhancing digital and information literacy training is necessary to support effective information seeking. Proficiency in using Microsoft Office was generally high among teachers, although some expressed the need for training in specific programs like Excel. Proficiency levels varied, with younger teachers demonstrating higher competence. Proficiency in Microsoft Office enhances productivity and administrative tasks, but ongoing professional development is essential to keep up with technological advancements. Teachers showed a high level of ability in utilizing social networks for communication, with schools in certain categories demonstrating greater competence. Social media platforms offer various advantages, including improved communication, professional development opportunities, and networking. However, guidelines and policies are needed to ensure responsible use and to address disparities in technology access. Emailing proficiency was found to be high among teachers, influenced by the widespread adoption of smartphones. Proficiency levels were higher among younger teachers and those with less experience, highlighting generational differences in digital literacy skills. Incorporating email skills training into educational programs is important to equip teachers with necessary digital literacy skills. Printing and scanning documents were frequently performed tasks by teachers, but proficiency declined

with increasing years of experience. This decline may be attributed to age-related factors and resistance to change. Proficiency in printing and scanning is crucial for teachers' tasks, and efforts should be made to address technological challenges and support teachers in this area. Competencies in creating videos declined with increasing years of experience among educators. Younger individuals demonstrated higher proficiency, which can be attributed to their engagement with social media platforms. To enhance technological competencies in video creation, training programs and support initiatives should be implemented.

8.3 Recommendations

- Technology integration and professional development: Provide comprehensive training and professional development programs for teachers to enhance their technological competencies, especially in areas where proficiency was found to be lower, such as using the latest technology, Microsoft Office programs, and video creation. Offer ongoing support and opportunities for teachers to stay updated with technological advancements and best practices for integration into their teaching practices.
- Addressing disparities in technology access: Recognize and address disparities in technology access among different types of schools. Allocate resources and funding to improve technological infrastructure in schools facing resource limitations, particularly in underprivileged areas. Ensure all teachers and students have equal opportunities to access and utilize the latest technology.
- Information retrieval and digital literacy training: Provide additional training and support for teachers to enhance their information retrieval skills and digital literacy competencies. Focus on effective information seeking strategies, evaluation of resource quality, ethical practices such as copyright regulations, and addressing technical challenges. Offer ongoing digital literacy training to support teachers in utilizing search engines and online resources effectively.
- Collaboration and networking: Encourage collaboration and networking among teachers, particularly in the use of social media platforms for communication, professional development, and resource sharing. Develop guidelines and policies to ensure responsible use of social networks and address disparities in technology access. Facilitate opportunities for teachers to learn from each other and share best practices.
- Continuous evaluation and improvement: Regularly assess the effectiveness of technology integration efforts and identify areas for improvement. Collect feedback from teachers and

students to understand their needs and challenges. Use this feedback to refine training programs, allocate resources effectively, and make necessary adjustments to ensure ongoing improvement.

- Collaboration between teacher librarians and teachers: Foster strong collaboration and communication between teacher librarians and teachers. Encourage regular meetings, joint planning sessions, and curriculum alignment discussions. Teacher librarians can contribute their expertise in curating resources, supporting information literacy instruction, and helping teachers integrate digital resources effectively into their teaching practices.
- Student engagement and education: Educate students about the advantages of using a mobile digital library and provide guidance on how to effectively utilize its resources. Tailor activities and assignments to cater to different learning styles and encourage active student participation. Promote digital literacy skills, critical thinking, and information evaluation skills to ensure students can effectively navigate and utilize digital resources.
- Increase teachers' awareness and training: It is crucial to raise awareness among teachers about the benefits of digital technologies and mobile digital libraries. This can be achieved by implementing comprehensive training programs to enhance teachers' understanding and competence in using these technologies effectively. There should be a focus on integrating digital resources into instruction, personalized learning, and student engagement strategies.
- Overcome infrastructure challenges: Ensure compatible information technology infrastructure, reliable internet connectivity, and consistent power supply to maximize the effectiveness of mobile digital libraries. Address financial constraints, power supply issues, and unreliable internet connectivity to enable seamless access to digital resources.

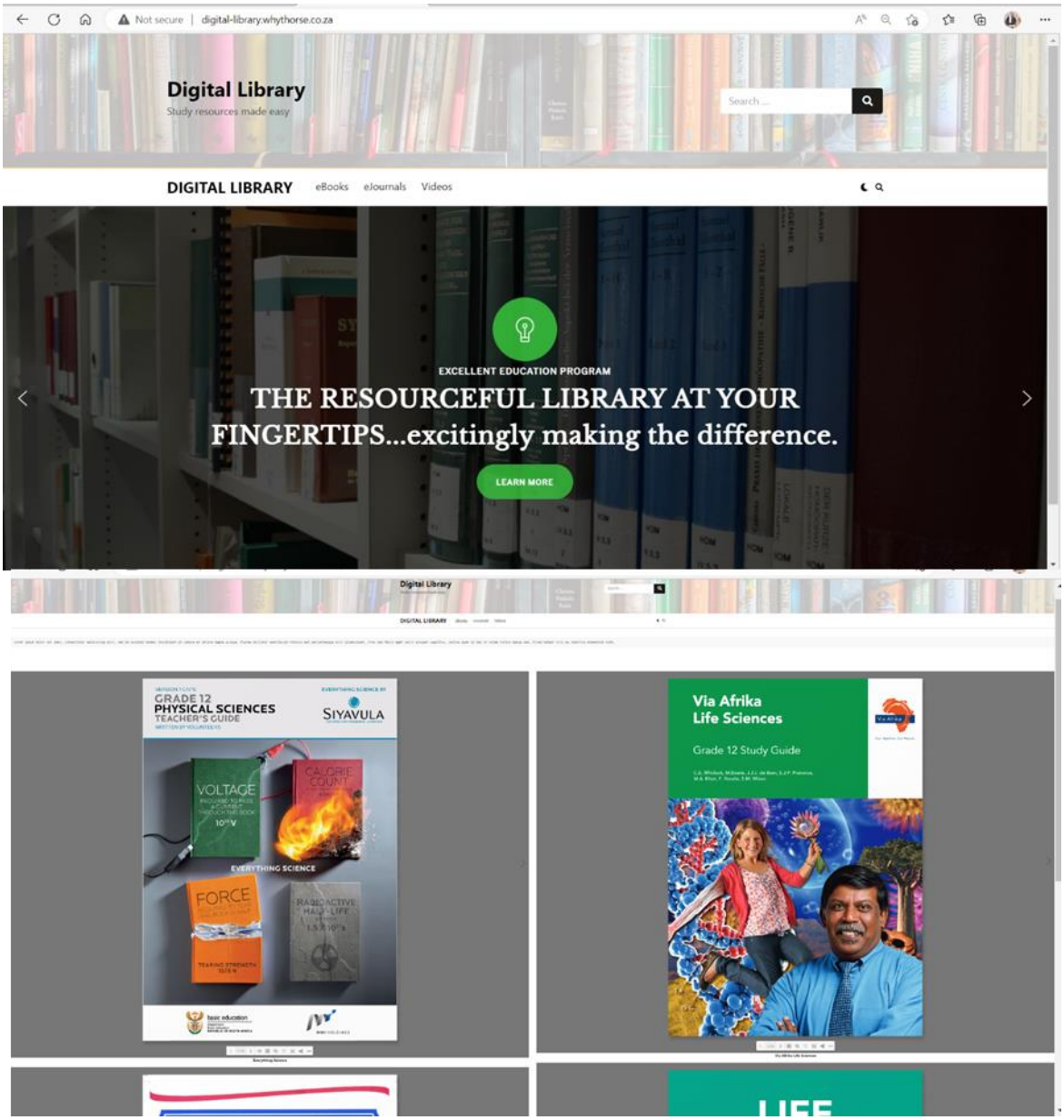
8.4 Develop a mobile digital library model suitable for teaching in under-resourced schools

One of the primary aims of the present study was to formulate a model for a mobile digital library. The researcher anticipates that this model will offer a solution or serve as a basis for addressing the existing challenges pertaining to the accessibility of information resources in underprivileged high schools in KwaZulu-Natal.

The mobile digital library model was constructed utilizing the WordPress framework and was hosted on the Host King platform, specifically under the domain whythorse.co.za. This website functions as a digital platform for accessing educational resources such as study guides, electronic journals, videos, and other materials. Each category of information resources was

individually uploaded onto separate pages to facilitate easy navigation for teachers. The user-friendliness of the mobile digital library mode is enhanced by the presence of easy navigation features. The development of a mobile digital library involved the creation of both a site-back-end and a site-front-end in order to ensure the provision of pertinent digital content. This implies that only individuals possessing site-back-end login credentials are granted permission to upload materials to the mobile digital library. The site's back-end is utilized for the maintenance and management of the mobile digital library. This measure guarantees the implementation of a regulatory framework to monitor the content being uploaded onto the digital library. By implementing this approach, there will be a level of regulation over the digital content available within the mobile digital library framework. Furthermore, the limited accessibility to the site's back-end necessitates collaboration between teacher librarians and teachers during the development of the collection. The website's front-end is designed to cater to individuals seeking to acquire knowledge and skills.

The mobile digital library is expected to enhance learning opportunities for learners by enabling remote access to information resources. The provision of resources, such as instructional videos, serves to enhance the accessibility of learning opportunities for individuals seeking to acquire knowledge and skills. Through the utilisation of a mobile digital library, educators have the opportunity to engage in collaborative efforts with teacher librarians, facilitating the sharing of information resources and subject materials among their students as well as fellow teachers. A mobile digital library model that supports teaching by ensuring that a conducive learning environment whereby a learner has access to information anytime and from anywhere is created.



http://digital-library.whythorse.co.za

8.5 Future research

Future research should prioritize the development and evaluation of a mobile digital library prototype tailored for educational settings. Key research factors to consider include usability, learning outcomes, engagement, accessibility, usage patterns, teacher and librarian perspectives, technological infrastructure, long-term sustainability, comparative studies, and user feedback. By thoroughly examining these factors, researchers can assess the effectiveness of the prototype, its impact on learning outcomes, inclusivity, and feasibility for implementation. Incorporating iterative design processes and gathering user feedback throughout the research endeavor will enhance the refinement and efficacy of the prototype.

Additionally, future research should focus on exploring the potential for customization and personalization within mobile digital library prototypes. This entails investigating how users can tailor the library interface, content recommendations, and learning pathways to suit their specific needs and preferences. Long-term impact and sustainability evaluations are also essential, encompassing scalability, maintenance, and cost-effectiveness considerations over time. Furthermore, it is crucial to investigate strategies for promoting institutional support, professional development, and community engagement to ensure the ongoing utilization, sustainability and success of mobile digital libraries.

8.6 Conclusion

In conclusion, this research study has examined the potential of mobile digital libraries in disadvantaged schools and has provided valuable insights into the benefits and challenges associated with their implementation. The findings indicate that mobile digital libraries have the capacity to bridge educational gaps by granting students access to a diverse range of resources, fostering digital literacy skills, and facilitating personalized and engaging learning experiences. However, the successful integration of mobile digital libraries hinges upon addressing several critical factors, including raising teacher awareness and understanding, overcoming infrastructure limitations, mitigating funding constraints, and enhancing information literacy skills. By considering the recommendations and strategies proposed in this research, educational institutions and stakeholders can make informed decisions and take proactive measures to harness the potential of mobile digital libraries, thereby enhancing education in disadvantaged schools and fostering more equitable and inclusive learning environments.

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ANNEXURE A: QUESTIONNAIRE FOR TEACHERS AND TEACHER LIBRARIANS

For each question, please select one option that best applies to you.

1. Demographic data

1.1. Under which district is your school?

QUINTILE LEVEL	
Amajuba	
Pinetown	
Ugu	
Umgungundlovu	
Umlazi	

1.2. Under which Quintile level is your school?

QUINTILE LEVEL	
Quintile level 1	
Quintile level 2	
Quintile level 3	

1.3. Please indicate your years of service.

NO. OF YEARS	
Less than 5	
5 – 9	
10 – 14	
15 – 19	
20 – 24	
25+	

1.4. Please indicate your designation.

POSITION	
Senior teacher	
Teacher	
School/Teacher librarians	

2. Factors contributing to the successful development and use of a mobile digital library

Please indicate your level of agreement that the following factors **<u>are critical for the successful development and use</u>** of a mobile digital library.

Critical factors	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2.1. Digital literacy training for teacher librarians, teachers and learners on the use of mobile platforms to access information and resources.					
2.2. User friendliness of a mobile digital library platform.					
2.3. Financial support from the organization/Department to ensure sustainability of service provision.					
2.4. Ability of teachers, learners and teacher librarian to use the latest technology.					
2.5. As the mobile digital library system is updated, teachers and learners must keep up with the latest technology.					
2.6. Effective marketing of mobile digital library services					
2.7. The provision of reliable internet connectivity.					
2.8. Relevance of books/Information resources to the school curriculum.					
2.9. Affordability of a mobile digital library.					
2.10. Remote and convenient accessibility of Information for both teachers and learners.					

3. Feasibility of using a digital library

Please indicate your agreement with the following statements

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
3.1.A mobile digital library would be suitable for teaching purposes.					
3.2. A mobile digital library is appropriate for learning.					
3.3.I would recommend that schools have a mobile digital library.					
3.4.A mobile digital library would enable me and my learners to easily access library resources and services without time and space limitations.					
3.5.A mobile digital library would make library resources easily accessible to teachers and learners.					
3.6.I would use a mobile digital library to support my teaching if it were available to me.					
3.7. I would encourage my learners to use a mobile digital library if it were available.					
3.8. My school can have a fully functional mobile digital library if there can be a person responsible for its maintenance.					
3.9. My school can have a fully functional mobile digital library if it can be cheaper to maintain.					
3.10. It is possible to have a functioning mobile digital library if there could be funding for hosting and maintenance.					
3.11. Having a functional mobile digital library is feasible if teachers and learners will have regular trainings on how to use it.					

4. Technology ability

Please rate your level of ability regarding the following activities:

Technology activities	Not at all able	Not really able	Fairly able	Able	Extremely able
4.1 Uploading files on the internet.					
4.2 Downloading files from the internet.					
4.3. Searching for information using different search engines.					
4.4. Working with Microsoft office (Word, Excel etc.).					
4.5. Using the latest technology for teaching.					
4.6. Creating quiz and questions					
4.7. Social networks,					
4.8. Emailing,					
4.9. Printing/Scanning					
4.10. Creating videos					
Please list below other technological activities you are able to perform.					

Thank you very much for your time and effort in completing this questionnaire. Make sure you have responded to all items relevant to you

Musa P. Khomo (Mr)
Department of Information Systems
Durban University of Technology
P.O. Box 1334
Durban 4000
Tel.: +27 31- 373 6774
E-mail: musawenkosik@dut.ac.za

ANNEXURE B: FOCUS GROUP INTERVIEW GUIDE FOR TEACHERS

DEVELOPMENT OF MOBILE DIGITAL LIBRARY MODEL FOR TEACHING SUPPORT IN SELECTED UNDER-RESOURCED PUBLIC HIGH SCHOOLS IN KWAZULU-NATAL

Introduction (including how the schools will benefit from the study) of the research project by the researcher.

1. Factors contributing to the successful development and the use of mobile digital library model

1.1. Are you aware and understand that the mobile technologies have the potential to improve the provision of school library services?

1.2. How would the degree of teachers' and learners' awareness and understanding of the potential of mobile technologies in enhancing the provision of library services affect the development and the usage of a digital mobile library?

1.3. Please explain how the digital literacy training for teacher librarians, teachers and learners on the use of mobile platforms to access the range information resources would impact on the usage of a digital mobile library in schools.

1.4. How would the availability of relevant digital content affect the use of a digital mobile library?

1.5. How do you think user friendliness of digital library platforms would affect the development and the usage of a digital mobile library in high schools?

1.6. How do you think a financial support to access mobile libraries can affect the usage of a digital mobile library in high school?

1.7. How would power supply and access to internet connectivity affect the usage of a digital mobile library in high schools?

1.8. Do you think easy accessibility of information resources would support teaching and learning in financially challenged schools? Please support your answer.

1.9. Do you think collaboration between teachers and teacher librarians

can be improved by a mobile digital library? Please justify.

1.10. Do you think a mobile digital library can improve school library service? Please support your answer.

1.11. Do you think a mobile digital library can facilitate learning opportunities for learners? Please support your answer.

1.12. Do you think knowledge sharing between teachers and learners is important? Do you think a mobile digital library can contribute to this process?

1.13. Do you think a mobile digital library will promote student centered learning? Please support your answer.

1.14. Do you think a mobile digital library will encourage thinking and understanding rather than memorization? Please explain.

1.15. Do you think a mobile digital library can provide a favorable environment that can influence learning? Please support your answer.

1.16. Which other factors would contribute positively to use of a mobile digital library? How would these factors contribute positively?

2. Feasibility of using a digital mobile library model.

2.1 Do you think your school can afford to maintain a mobile digital library? Please explain.

2.2 How would you encourage your learners to use a mobile digital library if it was made available in your school?

2.3 How would you use a mobile digital library to support teaching and learning in your school?

2.4 How do you think a mobile digital library would facilitate information retrieval for both teachers and learners?

2.5 Do you think it is important to have a digital mobile library in your school? Please support your answer.

2.6 How does your school library support teaching and learning?

2.7 How do you access other information resources other than prescribed textbooks?

2.8 Is the latest scholarly information useful to you?

2.9 Do you have anything to add on how you search for information**?**

2.10 What technical infrastructure is available for teachers to access resources? Do you have access to Wi-Fi?

2.11 How would you want a mobile digital library to support teaching and learning?

2.12 What electronic resources will be beneficial for teaching and learning?

2.13 What electronic content will be useful for teaching?

3. Technological competences of teachers

3.1. Do you use the latest technology for teaching? If so, what technology do you use?

3.2. Do you think it is important for teachers to use the latest technology for teaching? Please explain.

3.3. How do you upload/download files on/from the Internet?

3.4. How comfortable are you when searching for information from different search engines?

3.5. How comfortable are you with Microsoft Office usage?

4. What else would you like to say about a proposed mobile digital library?

ANNEXURE C: INTERVIEW GUIDE FOR TEACHER LIBRARIANS

DEVELOPMENT OF MOBILE DIGITAL LIBRARY MODEL FOR TEACHING SUPPORT IN SELECTED UNDER-RESOURCED PUBLIC HIGH SCHOOLS IN KWAZULU-NATAL

INTERVIEW GUIDE FOR TEACHER LIBRARIANS

1.1. Under which District is your school?
1.2. Under which Quintile level is your school?
1.3. For how long have you been a teacher librarian?
1.4. Is your school library fully functional?
1.5. Do you involve educators in collection development?
1.6. What do you think will be the duties of a teacher librarian when there is a mobile digital library?
1.7. How do you think the teacher librarian will contribute to teaching and learning?
1.8. How does the school library support teaching and learning in your school?
1.9. How does the school library help users (learners and educators) if they do not find information resources they are looking for?
1.10. How does the school library support teaching and learning?
1.11. Do you think a mobile digital library can improve your school library involvement in teaching and learning? Please support your answer.
1.12. Do you think it is feasible for your school to maintain a mobile digital library? Please support your answer.

2. **Factors contributing to the successful development and the use of mobile digital library model**

1.17. Identify factors that can contribute positively to the usage of a mobile digital library**.** How would these factors contribute positively?
1.18. Do you think easy accessibility of information resources would support teaching and learning in financially challenged schools? Please support.
1.19. Do you think collaboration between educators and school librarian can be improved by a mobile digital library?
1.20. Do you think a mobile digital library can improve school library service?
1.21. Do you think a mobile digital library can increase leaning opportunities for learners?
1.22. Do you think knowledge sharing between teachers and learners is important? Do you think a mobile digital library can contribute to this process?
1.23. Do you think a mobile digital library will promote learner centered learning?
1.24. Do you think a mobile digital library will encourage thinking and understanding rather than memorization? Please explain.
1.25. Do you think a mobile digital library can provide a favorable environment that can influence learning?

3. **Information seeking behavior of school educators**

3.1. How often do educators and learners use your school library? What do they use your library for?

3.2. How do your users access information resources for teaching?

3.3. How do your users access other information resources other than prescribed textbooks?

3.4. Do you think mobile digital library can conveniently facilitate information retrieval?

4. **Technological competences of educators**

4.1. Do educators use the latest technology for teaching? Please explain.

4.2. Do you think it is important for educators to use the latest technology for teaching? Please explain.

4.3. How comfortable are you in using mobile technology?

4.4. What else would you like to say about a proposed mobile digital library?

ANNEXURE D: PERMISSION TO CONDUCT RESEARCH

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

OFFICE OF THE HEAD OF DEPARTMENT

Private Bag X9137, PIETERMARITZBURG, 3200
Anton Lembede Building, 247 Burger Street, Pietermaritzburg, 3201
Tel: 033 392 1063
Email: Phindile.duma@kzndoe.gov.za

Enquiries: Phindile Duma **Ref.**:2/4/8/4032

Mr MP Khomo
PO Box 1334
DURBAN
4000

Dear Mr Khomo

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: "**DEVELOPMENT OF MOBILE DIGITAL LIBRARY MODEL FOR TEACHING AND LEARNING SUPPORT IN UNDER RESOURCED PUBLIC HIGH SCHOOLS IN KWAZULU-NATAL**", in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the Intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 01 April 2022 to 02 April 2025.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Phindile Duma at the contact numbers above.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.

UGU DISTRICT
UMGUNGUNDLOVU DISTRICT
PINETOWN DISTRICT
AMAJUBA DISTRICT
UMLAZI DISTRICT

Mr GN Ngcobo
Head of Department: Education
Date: 04 April 2022

GROWING KWAZULU-NATAL TOGETHER

ANNEXURE E: CONSENT LETTER

CONSENT

Full Title of the Study: Development of mobile digital library model for teaching and learning support in under resourced public high schools in KwaZulu-Natal

Names of Researcher/s: Musa Phumelela Khomo

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, **Musa Khomo**, about the nature, conduct, benefits and risks of this study.
- I have also received, read and understood the above written information regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant	**Date**	**Time**	**Signature/RightThumbprint**

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

Musa Khomo	28 March 2022	
Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

ANNEXURE F: ETHICAL APPROVAL

Faculty Research Office
Durban University of Technology
15 September 2021

Student: Musawenkosi Phumelela Khomo
Student Number: 19550507
Degree: Doctor of Philosophy in Library & Information Science
Email: 19550507@dut4life.ac.za
Supervisor: Dr Rajkoomar
Supervisor email: mogier@dut.ac.za

Dear Mr Khomo

ETHICAL APPROVAL: LEVEL 2

I am pleased to inform you that the Faculty Research Ethics Committee (FREC) following feedback from two reviewers, has granted preliminary permission for you to conduct your research 'Development of mobile digital library model for teaching and learning support in under resourced public high schools in KwaZulu-Natal'.

When ethics approval is granted:
You are required to present the letter at your research site(s) for permission to gather data. Please also note that your research instruments must be accompanied by the letter of information and the letter of consent for each participant, as per your research proposal.

This ethics clearance is valid from the date of provisional approval on this letter for one year. A student must apply for recertification 3 months before the date of this expiry.

Recertification is required every year until after corrections are made, after examination, and the thesis is submitted to the Faculty Registrar.

A summary of your key research findings must be submitted to the FRC on completion of your studies.

Yours sincerely

Dr Trisha Ramsuraj

FREC Deputy Chair
Faculty of Accounting and Informatics
Durban University of Technology
Ritson Campus
Durban, South Africa, 4001

ANNEXURE G: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN A SCHOOL

KZN Department of Basic Education

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT YOUR PREMISES

Dear Principal

My name is Musa Phumelela Khomo, a postgraduate student at Durban University of Technology. My student number is 19550507. My thesis is entitled: '*Development of mobile digital library model for teaching and learning support in under resourced public high schools in KwaZulu-Natal*'.

I am hereby seeking your consent to undertake part of this research with your staff as willing participants. I have provided you with a copy of my research proposal which includes the data collection tools and consent forms to be utilized in the research process. I also provide a copy of the approval letter which I received from Faculty of Accounting and Informatics Research Committee.

I will be visiting your school premises located in April/May 2022 where I will engage with 12 of the educators and school librarian/s. I will explain my research, invite questions, and ask them to volunteer to participate. All participation is on a voluntary basis with all responses being kept confidential and their identities anonymous. After obtaining their written consent, I will conduct my interviews and distribute my questionnaires. This process should take about 45 minutes.

If you require any further information, please contact me via cell phone 083 335 3053 or email my email musawenkosik@dut.ac.za My supervisors may be contacted via email mogier@dut.ac.za or office-phone number 031 3736776.

Thank you for your time and consideration in this matter. Kindly sign below to acknowledge consent for me to conduct the requested research.

Yours sincerely

Musa P. Khomo
DUT PhD student

Approved by:

_____ 15 September 2021

FREC Chair Date
Faculty of Accounting and Informatics Research Ethics Committee

ANNEXURE H: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN THE DEPARTMENT OF BASIC EDUCATION

KZN Department of Basic Education

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT SOME OF THE QUANTILE 1-3 LEVEL HIGH SCHOOLS IN KWAZULU-NATAL

Dear Head of the Department of Basic Education

My name is Musa Phumelela Khomo, a postgraduate student at Durban University of Technology. My student number is 19550507. My thesis is entitled: '*Development of mobile digital library model for teaching and learning support in under-resourced public high schools in KwaZulu-Natal'*.

I am hereby seeking your consent to undertake part of this research with your staff as willing participants. I have provided you with a copy of my research proposal which includes the data collection tools and consent forms to be utilized in the research process. I also provided a copy of the approval letter which I received from Faculty of Accounting and Informatics Research Committee.

I will be visiting your schools' premises in April, May and June 2022 where I will engage with 12 of the educators and school librarian/s. I will explain my research, invite questions, and ask them to volunteer to participate. All participation is on a voluntary basis with all responses being kept confidential and their identities anonymous. After obtaining their written consent, I will conduct my interviews and distribute my questionnaires. This process should take about 45 minutes.

Below is a list of randomly quantile selected quantile 1-3 high schools from five randomly selected districts: -

Name of the schools	Municipality	District
Sinqobile combined school	Dannhauser	Amajuba
Zama high school	Newcastle	Amajuba
Dedangifunde secondary school	Newcastle	Amajuba
Dick Ndlovu secondary school	Ethekwini	Pinetown

Ingqungqulu high school	Ethekwini	Pinetown
Qiko high school	Umdoni	Ugu
Kwajabula high school	Ethekwini	Ugu
Singele high school	Ethekwini	Ugu
Thuthukisa secondary school	Richmond	Umgungundlovu
Dwengu high school	Mkhambathini	Umgungundlovu
Georgetown high school	Msunduzi	Umgungundlovu
Isisusa secondary school	Ethekwini	Umlazi
Zuzumqhele high school	Ethekwini	Umlazi
Hamilton makhanya high school	Ethekwini	Umlazi

If you require any further information, please contact me via cell phone 083 335 3053 or email my email musawenkosik@dut.ac.za My supervisors may be contacted via email mogier@dut.ac.za or office-phone number 031 3736776.

Thank you for your time and consideration in this matter. Kindly sign below to acknowledge consent for me to conduct the requested research.

Yours sincerely

Musa P.
Khomo DUT
PhD
student

_____

Approved by:

15 September 2021

_____

FREC Chair Date
Faculty of Accounting and Informatics Research Ethics Committee

ANNEXURE I: LETTER OF INFORMATION

Title of the Research Study: Development of mobile digital library model for teaching and learning support in under-resourced public high schools in KwaZulu-Natal.

Principal Investigator/s/researcher: Musawenkosi Phumelela Khomo, M Tech (DUT).

Co-Investigator/s/supervisor/s: Dr. M. Rajkoomar, PhD (DUT) LIS and Dr. N. Naicker, PhD (UKZN)

Brief Introduction and Purpose of the Study:

Greeting,

I am a postgraduate student at DUT doing research for my Doctor of Philosophy in Library and Information Science. I would like to invite you to participate in the research. Research is a systematic search or enquiry for generalized new knowledge.

It would be much appreciated if you could spare some time to participate in this research by taking part in the interviews and completing a questionnaire. Your responses would be used for research purposes only and would be treated with strict confidentiality. You can ask as many questions as you wish because it is important that you fully understand the study. You are also entitled to discuss the study with your family and friends and are under no obligation to commit at this stage.

The aim of this research is to develop a mobile digital library model suitable for teaching and learning at under-resourced high schools. Its objectives are to identify factors that will contribute to the successful development and the use of mobile digital library model; to establish information seeking behavior of high schools' educators; to ascertain technological competences of educators to use mobile technology; and to develop a mobile digital library model suitable for teaching and learning in under-resourced schools.

You are requested to participate in the focus groups interviews/interview and complete the questionnaire after you have assessed the mobile digital library. Interviews will be held in your school. Based on information received in interviews, a digital library model will

be developed by the researcher, and you will be asked to assess it and complete a questionnaire. The focus group interviews will take not more than 45 minutes. It would take you no more than 15 minutes to complete the questionnaire. Only 12 participants from each randomly selected school will participate in focus group interviews.

Other people who will participate in focus group interview will be your colleagues from your school. The only outside person will be the researcher. It should not be uncomfortable to participate in this study. You and your profession will benefit from this study as you will get a chance to have a say on how you want a mobile digital library facilitate teaching and learning.

Interviews and questionnaires will be done in your school so you will not have to pay any travelling fees to participate in this research.

Your responses would be used for research purposes only and would be treated with strict confidentiality. When this study is completed, all recordings will be destroyed and disposed. Only the researcher and the supervisors of the research will have access to data collected. Results of this research will be made available on request and a journal article will also be published. Recordings will be on audio recordings and hard copies of questionnaires and will be kept in the office of the researcher for a period of three (3) years then destroyed.

Please contact the researcher (031 373 6774/083 335 3053), my supervisor (031 3736776 or mogier@dut.ac.za) or the Institutional Research Ethics Administrator on 031 373 2375 if you have more questions. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

Kind Regards,

Musa P. Khomo

ANNEXURE J: ETHICS TRAINING CERTIFICATE

TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Musawenkosi P. Khomo

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2021/07/25
CID : hNLAgm0K5y

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

FMH Continuing Education Program (5 Credits)
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Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2881.html) - Swiss Academy of Medical Science (SAMS/ASSM/SANW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

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