Primary School Teachers' Readiness to Integrate Information and Communication Technology into their Teaching and Learning

By

GILROY WALDO FRANCIS

Thesis submitted in fulfilment of the requirements for the degree of

Master of Education

in the Faculty of Education and Social Sciences

at the Cape Peninsula University of Technology

Supervisors

Dr Nyarai Tunjera

Prof Agnes Chigona

Mowbray

July 2024

The dissertation/thesis may not be published either in part (in scholarly, scientific or technical journals), or as a whole (as a monograph), unless permission has been obtained from the University.

DECLARATION

I, **Gilroy Waldo Francis**, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my opinions, not necessarily those of the Cape Peninsula University of Technology.

Signed

2024/08/15

Date

ABSTRACT

This study aimed to explore the extent to which ICT training has developed skills, prepared and enabled primary school teachers to use ICTs to sustain curriculum delivery and to understand the benefits and challenges that primary school teachers experience when using ICT for curriculum delivery. Qualitative data through semi-structured interviews with four teachers were conducted to gain a deep understanding of influencing factors, skills, benefits and challenges the educators faced in making this new technological shift. The data analysis showed that subject-specific training is needed and can be a vital factor in enhancing instructors' proficiency in using technology to its maximum capacity. Providing teachers with comprehensive technical training is crucial to ensure they possess the requisite abilities. Findings show that the mindset of educators regarding the utilisation of ICTs encompasses a readiness to acquire knowledge, enhancing the teaching and learning process. Other important elements are the availability of diverse resources and the ability of ICT to facilitate continuous interaction among learners. The researcher concluded that technical support and training provided by ICT play a crucial role in this regard. The barriers to the use of ICT in education include teachers' insufficient knowledge and practice, the adverse effects of national load shedding, limited availability of resources, incidents of classroom and device vandalism, inadequate provision of subject-specific training and learner devices, and the absence of teacher-control functionality on learner tablets.

The findings emphasise the importance of ICT champions in schools and recommend that the ICT committees provide technical support. The findings have significant value for E-Learning institutions and other educational institutions adopting ICT. Furthermore, these unique insights could be of significance to the Western Cape Education Department (WCED) and other key stakeholders involved in the design and implementation of programmes on E-Learning. Some conversion factors, such as society of practice and university-level skills, were found to have enhanced the capabilities of the participating teachers; however, the majority of the conversion factors seemed to have limited the teachers' abilities, making it more difficult for them to use ICTs in the classroom with confidence, freedom, or complete effectiveness.

The results show that ICT utilisation is comparatively low for instruction in a select group of Western Cape public primary schools for several reasons. For students to meet the expectations of technological advantages, recommendations were made to quickly address the various internal and external obstacles impeding teachers' ability to use ICTs effectively for teaching and learning. The

researcher experienced challenging factors in conducting this research and anticipated many problems, including money limitations, scheduling constraints, site access, and extrapolating the results. However, the researcher identified recommendations such as: The principal's contribution to driving an intervention strategy to promote technological proficiency, the creation and execution of long-term professional development initiatives, designing of ICT policies in line with the profile of teachers, modernising educational tools and Wi-Fi connectivity and after-school training sessions.

ACKNOWLEDGEMENTS

I wish to thank:

DEDICATION

I dedicate my dissertation to future researchers. If you have a dream, always learn to protect it to the best of your ability. Education is not preparing you for life; education is life itself. Knowledge is power; you are never too old to learn and make every experience educational. “Every person’s life is a fairy tale written by God’s hands, honour your character and embrace yourself.”

LIST OF ABBREVIATIONS

CAI:	Computer-Assisted Instruction
CAT:	Computer Application Technology
CPUT:	Cape Peninsula University of Technology
DBE:	Department of Basic Education
DOC:	Department of Communication
DCDT:	Department of Communication Digital Technology
DOE:	Department of Education
DTPS:	Department of Telecommunication and Postal Services
E-Beam:	Electronic Beam
E-Education:	Electronic Education
E-Learning:	Electronic Learning
GET:	General and Further Education and Training
HOD:	Head of Department
ICT:	Information and Communication Technology
ISPA:	Internet Service Providers of South Africa
IT:	Information Technology
PC's:	Personal Computers
TPACK:	Technological Pedagogical Content Knowledge
USA:	United States of America
WCED:	Western Cape Education Department

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1. Introduction

The exploration was prompted by the researchers' experience of five years of instruction for elementary school students in grades 5-7. My experience with integrating new ICTs in education convinced me to research the preparedness of educators in improving instruction and learning within a classroom environment. Technological innovation and the use of gadgets are growing, which can benefit instruction and learning in many sectors, including educational institutions. Technological innovation affects many industries in all regions of society (Bilyalova, 2017:176). Technology can help the teaching and learning process by enhancing educators' overall effectiveness in developing instructional and learning tasks for learners. Several researchers looked into the usage of ICT in the educational setting and found that "using ICT in the classroom helps educators to increase learners' proficiency" (Barreh, 2013). ICT can assist teachers with designing appropriate material that will enable learners to explore alternative and innovative learning experiences in the classroom (Yusrizal, 2019).

Institutions such as schools must train and educate educators on ICT integration into their classrooms. In developing countries like the Philippines, all instructors, regardless of gender, have to study ICT and are encouraged to combine ICT into their teaching at all levels (Egede, 2021). Digital technology has introduced modifications to the traditional ways of instructing and learning, and it is crucial for institutions such as educational institutions to undertake strategies and guidelines for ICT integration.

"Digital technologies can contribute to developing online teaching in various sectors, including universities and schools" (Cachia et al., 2021; König et al., 2020). Some universities have reported low digital capability, which led to widening gaps and inequalities in teaching and learning Blaskó et al., 2021. Such results have engendered the need for schools to research and understand technological development (European Commission, 2020) and grow their digitalisation capacity (Costa et al., 2021). Digitalisation offers opportunities for essential improvement in institutions of learning (OECD, 2021; Rott & Marouane, 2018) and impacts many components of an institution's improvement (Delcker & Ifenthaler, 2021). Digitalisation is a complicated system that calls for huge-scale transformative adjustments beyond the technical factors of infrastructure (Pettersson, 2021). Digitalisation refers to "a chain of deep

and coordinated tradition, team of workers, and technology shifts and working models" (Brooks & McCormack, 2020: 3). "that brings cultural, organisational, and operational trade via the mixing of digital technology" (JISC, 2020). Successful digital transformation calls for institutions to expand their digital potential phases, creating the essential "subculture, regulations, infrastructure, in addition to digital competence of college students and groups of workers to assist the effective integration of technology in teaching and studying practices" (Costa, et al., 2021:163).

1.2. Background and Motivation

Granted, the introduction of educational technology and the educator's capability to integrate technology into classroom pedagogy have been questioned. This research focuses on understanding how educators in a rural school setup are willing to incorporate ICT within their teaching and learning. Understanding how prepared educators are to innovatively integrate ICTs into their instructional methods in a rural school will help ensure an uninterrupted learning quality. "Since the initiation of the technological era, and its advent in South African public schools over the last decades, positive elements have been identified through various researchers as being accountable for creating what they call 'unfreedoms' which militate instructors using ICTs accurately and efficaciously in public schools" (Gunzo, 2020; Chisango & Lesame, 2019; Mwapwele, Marais, Dlamini & Van Biljon, 2019; Salam, Zeng, Pathen, Latif & Shaheen, 2017; Tiba, 2018; Van Zyl & Sabiescu, 2016). Elements that influence the inadequate application of ICT in classrooms include Inadequate ICT support and little technical assistance in education. In light of this, improving the virtual ICTs or technologies is another path to enhance society's excellence, even in education. "Educational experts advocate for infusing ICT into teaching because of its benefits. As mentioned, ICT acts as a catalyst for multidimensional facilitation and interplay between teachers and students" (Pultoo et al., 2020). "To successfully integrate ICT, all parties must cooperate and participate in training and infusing ICT in their teaching pedagogy" (Roblin et al., 2018; Hero, 2019). Moreover, "teachers' acceptance of technology integration in lessons and the use of innovative techniques to infuse 21st-century skills is vital to ensure the successful implementation of technology integration in the classroom" (Pultoo et al., 2020).

Problem Statement

Over the past decades, the preparedness of teachers to integrate ICT in education has been on an upward trend. Several elements have contributed to the rapid change in the advancement of ICT in schools and universities. Consequently, the outbreak of COVID-19 forced academic establishments to provide alternative approaches to supplement the conventional teaching technique (Wyk et al., 2020). However, Mafenya (2022) argues that this surprising transition has disrupted teaching and learning. However, studies have shown that teachers are limited in implementing ICT to its full potential in schools (Chigona, 2013; Tunjera & Chigona, 2020). As we experience rapid digital technological growth and transformation within the classroom and in the hands of learners, it has become evident that there is an urgent need to explore teachers' current practices in integrating technology into their teaching pedagogies. In this study, many factors came to light; however, the researcher identified a problem seeking whether there is any difference in how teachers used ICT before, during and post COVID-19. This issue can result in serious challenges, especially if we face such a pandemic again. The following questions guide this study:

1.3. Research Questions

The following questions guided this research investigation:

i. What factors influence primary school teachers' preparedness to use ICT?
ii. Sub-research questions
iii. To what extent has the ICT training developed skills, prepared and enabled primary school teachers' readiness to integrate ICT to sustain curriculum delivery?
iv. What benefits and challenges do primary school teachers experience when using ICT for curriculum delivery?

1.4. Research Objectives

Research objectives are the expectations from the research to be conducted, which are classified below.

i. To explore the extent to which the ICT training has developed skills, prepared and enabled primary school teachers to use ICT to sustain curriculum delivery.
ii. To understand the benefits and challenges that primary school teachers experience when using ICT for curriculum delivery.

1.5. Contribution of this Study

The findings will be beneficial to school principals, policymakers, and teachers. In the case of teachers and principals, these stakeholders make choices and are in charge of carrying out programs in their schools. This research is anticipated to give interested parties beneficial details on elements affecting instructors' constrained utilisation of ICTs in education, particularly in "disadvantaged" schools. Thus, the actual study contributes to developing the skills of school principals and aims to enhance coaching circumstances and make them favourable for the use and accessibility of ICT in classrooms, especially in underprivileged schools. The study will offer policymakers in such colleges directions to support instructors in learning how to use ICTs innovatively. These can be used for coaching via amending and remodelling rules to guarantee educators' and novices' availability of information on ICTs. This research may be of specific worth to newly qualified educators by offering them authority with data on approaches to enhance their competencies in using ICT in education.

1.6. Overview of the Study

This thesis is organised into five chapters as follows:

Chapter One - Introduction

This chapter provides the subject matter and the study's motivation. It outlines the research issue that is the foundation for the researcher's determination to engage in this research. The chapter further provides the main research questions and sub-questions, as well as the objectives and goals of the study. The researcher also explained the study's contribution.

Chapter Two – Literature review

This chapter presents a detailed literature review on ICT use globally and in South Africa, and how educators integrate ICT in their teaching. It focuses on ICT adoption in South African classrooms. This covers the elements that result in teachers' use of ICTs, the significance of integrating ICT into instruction and learning and the utility of software for ICT commonly used in a Smart Classroom. The chapter also discusses teachers' readiness to integrate digital technologies into their pedagogies. It also provides an overview of the factors that affect an instructor's ability to adopt innovation in educating and learning.

Chapter Three - Research methodology

This chapter provides a discussion on the method, paradigm, the pattern populace, the survey, and the one-on-one interviews used in this study. It presents the research strategy,

population, sampling procedures, and data collection techniques. The chapter also provides a discussion on the data analysis and the trustworthiness of the study. It further explains the research limitations and moral issues of the study.

Chapter Four – Results

The data is analysed, and the results are provided for the study's sub-questions. The findings are related to the potential technique.

Chapter Five – Discussion

This chapter provides an understanding of the requirements and motivators (derived from the documented recordings and results in chapter four) that can be connected to the skills that the participating teachers were found to need and lack. In the public primary school, the choice of educators' preparedness to effectively use ICTs in their instruction and learning methods is crucial.

Chapter Six – Conclusion and Recommendations

In this chapter, the researcher outlines suggestions for practice, policy, and additional study to prepare teachers to promote effective use and ICT integration for teaching and learning by providing key recommendations that can play an important part in moving to a more digital manner of educating learners more technologically.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

The integration of Information and Communication Technology (ICT) into education has become a defining feature of contemporary teaching and learning worldwide. Governments, policymakers, and education systems increasingly regard ICT as a catalyst for improving the quality of education, enhancing learner engagement, and preparing students with the digital skills required in the twenty-first century (UNESCO, 2023). In primary schools, ICT integration is vital because early exposure to technology can foster foundational digital literacy skills. However, the teachers' readiness to meaningfully incorporate ICTs into their teaching practice determines the technology pedagogical effectiveness. Teachers' facilitative role acts as an enabler for meaningful application of technology that enhances pedagogical delivery of content; their preparedness directly influences the success or failure of ICT initiatives.

This literature review explores the factors that influence teachers' readiness to integrate ICT in primary schools. The review is guided by the study's research questions and seeks to understand factors that influence teachers' adoption of ICT into their teaching. Teacher attitude and belief, how institutional and contextual factors shape their preparedness, and what benefits and challenges teachers encounter in the process of integration. By situating these issues within both global and South African contexts, the chapter establishes a theoretical and empirical foundation for the research.

The study adopted the Technological Pedagogical Content Knowledge (TPACK) framework, which provides the theoretical lens for exploring teacher readiness. The TPACK framework was used to help examine teacher attitudes, professional development, and institutional and systemic barriers. Furthermore, the study considers the extent to which ICT training has prepared teachers to integrate technology into their classrooms, highlighting gaps between training and practice. The chapter also explores the benefits and challenges of ICT use in curriculum delivery, before narrowing to the South African context, highlighting policies that are in place and how they influence on-the-ground realities. In spite of growing research in ICT integration, there is a persistent gap between policy aspirations and classroom practice, particularly in developing contexts such as South Africa. Although international literature provides insights into effective ICT training and integration models, less is known about how

these translate into contexts marked by resource constraints, uneven infrastructure, and diverse teacher experiences. This research, therefore, responds to the need for context-sensitive evidence by exploring primary school teachers' readiness to use ICT in curriculum delivery, with attention to the role of training and institutional support.

2.2. Theoretical Framework

Technological Pedagogical Content Knowledge (TPACK)

Shulman (1986) proposed a concept of Pedagogical Content Knowledge (PCK) that revolutionised the understanding of teaching not as a practice of transmitting knowledge only, but as a unique set of skills specific to teaching. Shulman (1986) describes PCK as teachers' ability "…the most useful forms of representation of the most powerful analogies, illustrations, examples, explanations, and demonstrations – in a word, the ways of representing and formulating the subject … that make it comprehensible to…" (p. 9). With the advent of technology as a tool that enhances PCK, Mishra and Koehler (2006) extend PCK to include technology, providing a comprehensive model for understanding the specialised knowledge teachers need to effectively integrate technology into their teaching. The framework identifies three core knowledge domains: Technology, Pedagogy, and Content (TPACK), as shown in Figure 1. The integration of ICT into teaching and learning is not just about providing hardware and software. ICT integration is a complex process that requires an

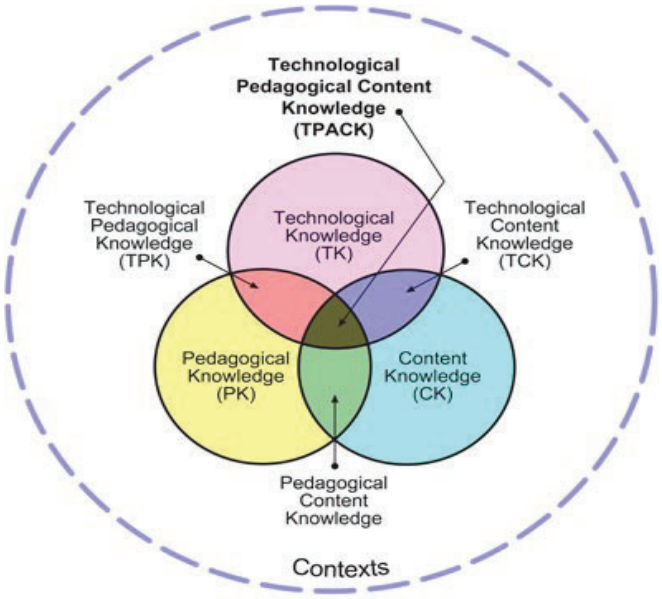


Figure 1 TPACK framework source tpack.org

understanding of how to use technology within a sound pedagogical strategy, making content comprehensible to learners.

Content Knowledge (CK) is how well a teacher knows their subject. This includes the ideas, facts, theories, and steps that are part of a certain discipline. Pedagogical Knowledge (PK), on the other hand, is what a teacher knows about classroom management, student evaluation, teaching methods, and how students learn. Then we have Technological Knowledge (TK), which means that a teacher knows how to use different kinds of technology, such as hardware and software.

The TPACK framework shows how these areas are connected, which leads to four more knowledge domains that overlap with the first four. PCK is a teacher's specialist understanding of how to teach certain ideas in their field. This means that teachers need to know how to present information in a way that works for different kinds of students, which will help them understand it better. TCK, on the other hand, is about figuring out how technology might help students learn more about a subject. This area stresses how important it is for teachers to link their TK with their CK. For example, they can use a simulation (TK) to help students grasp physics principles (CK) better.

TPK is about how different technologies can make education better. It means knowing which tech tools can help you learn, no matter what the subject is. For example, you could use an online collaboration tool to help with group work. Finally, TPACK represents the pinnacle of this framework, integrating all the knowledge a teacher needs to effectively use technology in teaching a specific subject (Tunjera, 2020). It's about understanding the dynamic relationship between these three core components in a given teaching context. The TPACK framework is a suitable theoretical lens to explore teacher integration of technology into their teaching practices.

Despite the wide adoption of TPACK, researchers critiqued it on several grounds. Cox and Graham (2009) noted difficulties in reliably measuring the overlapping domains of TPACK, arguing that these forms of knowledge are fluid and context-specific. They further argue that what constitutes effective TPACK differs across settings. () posit that access to technology determines its adoptability, even when teachers have similar ICT integration skills. Furthermore, others criticise overemphasising portraying technology as a central, rather than a tool that should enhance pedagogical and content goals (). These critiques are

acknowledged; however, they do not diminish its value but highlight the need to apply TPACK flexibly and critically.

There are alternative models, Puentedura's (2006) Substitution, Augmentation, Modification, and Redefinition (SAMR), and Hughes et al.'s (2006) Replacement, Amplification, and Transformation (RAT), which also provide insights into ICT integration. However, these models focus on levels of technology integration rather than the application of the types of knowledge teachers need. Therefore, TPACK is better suited as it explores teacher knowledge of using technology to enhance learning outcomes.

Adopting TPACK, this study situates teacher preparedness within a comprehensive theoretical lens that balances technological, pedagogical and content knowledge domains unique to teachers. TPACK provides a strong foundational analysis of teacher-related, ICT training, professional development and institutional and systematic factors that influence the readiness of primary school teachers in South Africa to integrate technology in their teaching and learning.

2.3. Factors influencing primary school teachers' preparedness to use ICT

Teacher preparedness for ICT integration is shaped by a complex interplay of personal, professional and institutional factors. This section reviews key factors influencing teacher readiness and is organised into three subsections: teacher attitudes and beliefs, professional development and institutional/systematic support.

2.3.1. Teacher Attitudes and Beliefs

Research consistently identifies teachers' attitudes and beliefs as critical elements affecting their integration of ICT into instruction. Research indicates that teachers with a favourable attitude towards technology are more inclined to embrace emerging teaching strategies that foster technological advancement (Alieto et al., 2024). Negative attitudes, on the other hand, can truly stop students from using technology well (Konga & Tantekin Erden, 2021). Studies show that a teacher's perspective not only affects how willing they are to utilise ICT, but also how creative they are when they do (Dahri et al., 2022; Hämäläinen et al., 2021; Taghizadeh & Ejtehadi, 2023). Years of study in educational psychology support this theory. For example, Ertmer and Ottenbreit-Leftwich (2010) indicate that teachers' attitudes can have a big effect on how they think about their classroom activities.

Furthermore, educators' confidence in their capabilities significantly influences their propensity to adopt digital tools in the classroom (Hämäläinen et al., 2021). Teachers who don't feel sure of themselves may have bad thoughts regarding ICT. Ur Rehman et al. (2024) emphasise that the fear of failure significantly impedes teachers, rendering them reluctant to investigate the technologies available to them. Kotzé et al. (2016) assert that this avoidance frequently arises from the belief that technology is excessively intricate or hazardous. Emotional responses, consequently, affect cognitive engagement; educators linking ICT with stress or failure are less inclined to investigate its instructional possibilities.

Studies reveal that exposure to technology may reduce anxiety to some extent, and that targeted support is necessary to overcome persistent fears and foster adoption (Aranda-Jan & Qasim, 2023; Afzal et al., 2023). Furthermore, supportive professional environments, where teachers observe colleagues successfully integrating ICT and receive constructive feedback, can strengthen confidence. This suggests that teacher attitudes are not fixed but can be nurtured through social modelling and collaborative learning (Kamali & Javahery, 2024).

Prensky (2009) suggested that younger teachers, having grown up with technology, are naturally more prepared to use ICT. However, Reid et al. (2023) provide evidence that this assumption is misleading: digital familiarity does not automatically translate into pedagogical readiness. While exposure develops operational skills, it does not ensure the ability to apply ICT effectively in complex teaching contexts. Younger teachers may be comfortable with technology, but their effectiveness depends on structured professional learning and lifelong engagement. Hence, motivation for continuous learning is a stronger predictor of readiness than age or background exposure.

Teachers' values and motivation also shape ICT integration. According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use are central determinants of adoption (Davis, 1989). When teachers see ICT as enhancing learner engagement or simplifying instructional tasks, they are more likely to integrate it. Evidence shows that teachers who perceive ICT as valuable are more persistent in overcoming challenges (Chai et al., 2013). Motivation drives persistence: beliefs about value guide the willingness to invest time and effort. Structured exposure to successful examples can shift sceptical attitudes and strengthen adoption.

In the South African context, attitudes cannot be separated from structural realities. Heavy curriculum demands, large class sizes, and inadequate infrastructure often constrain ICT use.

Even teachers with positive attitudes may struggle to apply technology meaningfully under these conditions. The implication is that attitudes alone are insufficient; they must be supported by enabling conditions, such as training, resources, and systemic alignment. A holistic approach linking positive attitudes with institutional and policy-level support is therefore critical for sustainable ICT integration.

2.3.2 Professional Development

Professional development (PD) is widely recognised as a cornerstone of teacher preparedness for ICT integration. Research shows that without sustained and pedagogically focused training, teachers often struggle to translate technical skills into classroom practice. Many initiatives emphasise the mechanics of using digital tools but neglect to demonstrate how these tools can be meaningfully embedded into pedagogy (Mishra & Koehler, 2006; Tunjera, 2020). This suggests that technical competence alone is insufficient; teachers also need guidance on the pedagogical purposes of ICT and how it can be used to enhance learning.

Effective professional development is typically continuous, collaborative, and responsive to the teaching context. Ertmer and Newby (2013) highlight the value of communities of practice, where teachers can share strategies, reflect together, and build confidence through peer learning. International examples such as Singapore and Finland illustrate the benefits of embedding ICT training into career-long teacher development programmes, ensuring that teachers view ICT not as an add-on but as an integral part of professional practice (Voogt et al., 2013). Workshops that last only a few days may help people learn more about technology, but research shows that they don't have much of an effect unless they are followed up with ongoing mentoring and coaching.

Professional development in South Africa, on the other hand, is often broken up, driven by donors, and not tied to what happens in the classroom (Tunjera & Chigona, 2020). Teachers often say they don't get enough follow-up help, which makes them feel alone when problems come up. Even individuals who want to utilise ICT find it hard to keep it integrated when training doesn't meet their specific teaching demands or provide them with room to adjust to their own situations. This shows that teachers require professional development that goes beyond one-time events and instead encourages learning that is built in, reflective, and supported by peers. This will help instructors use ICT in a way that is long-lasting and confident.

2.3.3 Institutional and Systemic Factors

Teachers' preparedness to use ICT is greatly influenced by institutional and systemic factors. Research continuously demonstrates that when schools lack dependable infrastructure, such as connectivity, working devices, or technical help, even highly qualified teachers find it difficult to integrate technology (UNESCO, 2023). For instance, it has been discovered that the lack of ICT resources in South African rural schools directly impairs administrative and instructional procedures (Munyoka, 2022). This implies that teacher readiness is dependent on the supportive environment that the educational system offers, rather than being just the responsibility of the individual.

Teachers might feel supported in experimenting with digital tools when school leadership fosters creativity, allocates resources effectively, and provides a clear vision for ICT use (Major et al., 2021). On the other side, teachers frequently turn back to conventional approaches when school administration is unfocused or uncommitted to incorporating technology. Thus, the use of technology by instructors in the classroom can be decided by the school administration.

Teacher preparedness to use ICTs in the classroom is further influenced by ICT in education policy frameworks. Though implementation has been varied and sluggish, South Africa's e-Education White Paper (2004) outlined ambitious targets for technology integration. According to studies, instructors frequently feel under pressure to finish curricula that are heavy on content, which leaves little time for them to experiment with novel ICT-based pedagogical strategies (Reid et al., 2023; Abedi, 2023).

Finally, systemic inequalities compound the challenge. The digital divide between urban and rural schools, and between privileged and disadvantaged communities, creates uneven opportunities for both teachers and learners (Almulla, 2024). Even teachers with positive attitudes may feel discouraged when students lack access to devices or connectivity outside school. This highlights that ICT readiness must be understood not only at the teacher level but within broader social and institutional structures that either enable or constrain technology use.

2.4. Benefits and challenges of ICT use for curriculum delivery

The final sub-question asks about the benefits and challenges primary school teachers experience when using ICT for curriculum delivery. The literature presents a balanced view, highlighting both the transformative potential and the significant hurdles.

2.4.1. Benefits of ICT Integration

The documents and broader academic literature identify numerous benefits of integrating ICT into the curriculum:

Increased Student Engagement and Motivation, ICT makes learning more interactive and fun. Educational apps, games, and multimedia resources can capture students' attention and motivate them to participate more actively in the learning process (McDonald, 2019).

Enhanced Pedagogical Approaches, ICT provides teachers with new tools to diversify their instructional methods. They can use digital whiteboards, simulations, and online platforms to create a more dynamic learning environment. This aligns with the idea that ICT enables new and creative pedagogies (Hannaway, 2024).

Improved Collaboration and Communication, technology facilitates communication between teachers and students, and among students themselves. Collaborative online tools can foster teamwork and problem-solving skills, and online platforms can be used for communication between teachers and parents regarding student progress.

Access to Information and Resources, ICT provides unprecedented access to a wealth of information. Teachers can use the internet to find educational resources, and students can conduct research, explore diverse topics, and access information beyond what is available in traditional textbooks.

Development of 21st-Century Skills, beyond core subjects, ICT integration is essential for developing critical skills needed in the modern world. Students learn digital literacy, critical thinking, problem-solving, and collaboration, preparing them for future academic and professional challenges (UNESCO, 2023).

2.4.2. Challenges of ICT Integration

Despite the benefits, teachers face a variety of challenges when using ICT for curriculum delivery:

Infrastructural Barriers, as discussed previously, a lack of reliable internet connectivity, insufficient and outdated hardware, and a lack of technical support are major and persistent challenges, particularly in South African rural schools (Munyoka, 2022). Digital Divide and Inequality, the uneven distribution of ICT resources creates significant educational inequalities. Students from low-income backgrounds may not have access to devices or the internet at home, widening the gap between them and their more privileged peers.

Pedagogical and Content-Related Issues: Teachers may face challenges in adapting their traditional teaching methods to a technology-rich environment. There is a risk of over-reliance on technology, which can lead to a "superficial" understanding of concepts if not integrated properly. Concerns about students using technology for leisure (e.g., online gaming, social media) instead of academic purposes are also a valid concern (Almulla, 2024)

Security and Privacy Concerns, the open nature of the internet poses risks, including access to undesirable websites and exposure to misinformation. Teachers must spend time monitoring student activity, which can divert their focus from teaching.

Lack of Teacher Support, the absence of sustained professional development and a lack of peer collaboration can leave teachers feeling isolated and unsupported in their attempts to integrate technology. This can lead to frustration and a return to more traditional, comfortable teaching methods.

The dual nature of these benefits and challenges underscores the need for a comprehensive and strategic approach to ICT integration in education. The benefits are significant, but they can only be realised if the challenges are systematically addressed through sound policy, sufficient funding, and effective, ongoing support for teachers.

2.5. ICT in the South African context

The integration of ICT in South African schools is an evolving journey, guided by a series of government policies and initiatives aimed at leveraging technology for national development. Key policy papers from the South Africa Connect strategy, the Department of Communication and Digital Technologies (2023), and the Department of Education (2003) show that the government wants to make everyone digitally literate. The e-Education program wants "every South African learner... to be ICT capable" in the future, and teachers will use ICT to make teaching and learning better (Department of Education, 2019). One thing that comes up a lot in the research, though, is the difference between policy and reality. The policies have a big picture, but they have been put into place slowly and unevenly. The differences are made worse by the fact that there aren't any standard ways to use ICTs in teaching and learning. Inequalities in getting to the right facilities are still a big problem. Studies showed a lack of computers, tablets, and internet access, which directly contradicts the goals stated in the national plans (Aranda-Jan & Qasim, 2023; Afzal et al., 2023).

Also, even though policies require teachers to be trained, the quality and availability of these programs have been all over the place. A lot of teachers have had some kind of training, but it hasn't always given them the confidence and skills they need to really change the way they teach. However, this is a very important point that this study aims to look into in more depth. Because of this, South Africa is a great example of the complicated problems and challenges that come with integrating ICT in a growing country. Not only does policy matter for the success of this effort, but so does the fair and effective use of resources, professional development, and systemic support.

2.6. Conclusion

This chapter has provided a literature review that establishes the theoretical and empirical context for this study. It began by positioning the research within the TPACK framework, which emphasises the dynamic interplay of technological, pedagogical, and content knowledge. The review then addressed each of the study's research questions. It identified key factors influencing teacher preparedness, including personal attitudes, the quality of professional development, and the institutional environment. The discussion on the extent of ICT training revealed that while it has provided some skills, its effectiveness in enabling genuine readiness for curriculum delivery is often limited by a lack of pedagogical focus and sustained support. Finally, the chapter outlined the significant benefits of ICT integration, such as enhanced student engagement and the development of 21st-century skills, while also detailing the persistent challenges related to infrastructure, the digital divide, and pedagogical shifts. The review of the South African context highlighted a persistent gap between ambitious policy and the realities of implementation on the ground. The next chapter will detail the research methodology used to investigate these themes and gather empirical data to address the research questions more directly.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter sets out to explain the methodology and design that were utilised to collect and analyse data for this study. It discusses the research methodology, research design, sampling, data collection, data analysis, validity, reliability, ethical considerations, and study limitations.

3.2. RESEARCH PHILOSOPHY

This study adopted the interpretive paradigm within a social constructivist worldview. This philosophy was chosen to examine the factors that influence teachers' preparedness to use ICT. The study explored how ICT skills are used to enable teachers to sustain curriculum delivery. Furthermore, examined the extent to which teachers experience both the benefits and challenges of integrating ICTs into their teaching. This research was mainly based on previous researcher's findings on the technological changes witnessed in recent years which generating endless new opportunities for learning, as well as additional pedagogical challenges (Davidovitch & Yavich, 2018). The use of e-learning is often misunderstood and, in my opinion, cannot be replaced with classroom activities and discussions. This research discussed the use of laptops and tablets by students in the classroom, as well as how these devices affect students' perceptions of their learning, participation, and motivation (Washington, 2017). The role players within the school system were interviewed about their preparedness to effectively integrate technology in their teaching and learning within the school. There are various aspects to keep in mind during the research

3.3. RESEARCH PARADIGM

Positivism, Interpretivism, Critical Theory, and Pragmatism are the four main paradigms that influence how researchers approach their work in educational research. The presumptions made by these paradigms regarding reality, knowledge, and the researcher's role vary. This study was directed by the standards of the interpretivism paradigm. This research focused on investigating the influential factors and insight on issues such as the preparedness of teachers to make use of ICT within the classroom. Secondly, the extent how ICT developed skills which prepare and enable teachers to use ICT to sustain curriculum delivery and ultimately, revealed

the benefits and challenges that teachers faced when using ICT for delivering of the curriculum. Therefore, the researcher studied the numerous frameworks and concluded that reality is unique to each observer therefore it became evident that the an interpretivism research approach was the ideal model for looking for changed perspectives, insights, and encounters of educators (Henning et al., 2004).

3.4. RESEARCH DESIGN

Two fundamental examination procedures might be utilised for exploration in the social sciences, the quantitative technique, which is focused on gathering mathematical information, and the qualitative technique which allows researchers to gather participants' experiences, perceptions, and behaviour. Qualitative research answers the how and why questions instead of how many or how much (Christensen, Johnson, & Turner, 2011). Christensen, et al. (2011) states Qualitative research is an interpretative research approach that relies on multiple types of subjective data and investigates people in particular situations in their natural environment. The essential focal point of subjective strategies is proof that improves the understanding of the issues under study. As stated by Amakali (2013:38), Qualitative research deals with an in-depth understanding of the issue being studied. It relies primarily on individuals who can provide data about their experiences, and it works appropriately with small numbers of people. Chipangura (2013:23) suggests that qualitative research produces more in-depth and comprehensive information; uses subjective information and participant observation to describe the context being studied and provides various ways in which data can be analysed. The subjective examination allows the information to unfurl characteristically, along with acceptable and itemised data as a far-reaching composed depiction. Subjective exploration upgrades the assessment of complicated questions that are not very recognisable by utilising quantitative techniques.

A qualitative technique examines and thoroughly analyses members' perceptions to gather a scope of information (Babbie and Mouton, 2015). A qualitative approach will be used for the research. Qualitative studies usually have what, how, and why questions which are directly linked to the question that will be researched, and it is also based on words and specifically deals with the use of a small number of participants. As stated by Barnham (2015) The

researcher may ask open-ended questions. if it is needed, however, Yilmaz (2013) notes Qualitative researchers use participant's observation and in-depth interviews which will ideally link to the information which is required.

The researcher used a qualitative case study. Creswell (2014:22) defines the qualitative examination as a means of exploring information which means people or groups ascribe to social or human issues. Amakali (2013:38) states that qualitative research deals with in-depth knowledge of the difficulties studied. It was primarily based on individuals who can provide data about the story, which is a small number of human beings. The reason for the researcher's choice was that the researcher aimed to focus on the specifics of the lived experiences of educators. Therefore, the researcher chose a primary rural school in the Cape Winelands district. From the methods that were utilised, in-depth rich data were gathered about primary school teachers' readiness to merge information and communication technology into their teaching and learning.

This section describes the chosen methodological approach and adjusts what can be done to respond to the following research question. What are the factors that influence teachers' preparedness to use ICTs? This formulation of this question necessitated a thorough focus on the subject at hand and sought to investigate the teaching preparation process technologically. This was done in a two-way manner. Firstly, to what extent has the ICT training developed skills, prepared and enabled teachers to use ICTs to sustain curriculum implementation? Secondly, what are the benefits and challenges that teachers experienced when using ICT for curriculum implementation? A technique that I used is qualitative research as it is a methodical procedure of examination of the people who are doing the action. Qualitative researchers work with few cases and many variables. In a qualitative study, the researcher usually starts with the question 'how' or 'what' to get an explanation and interpretation of information, while a researcher in a quantitative study, which can be seen as the opposite, usually asks 'why', and always look for comparisons of individuals (Ragin, 1994).

According to Denzin & Lincoln (2000), qualitative research is a multimethod focus, involving an interpretive, naturalistic approach to its subject matter. This indicates that qualitative

researchers investigate certain items within their usual settings attempting to interpret or make sense of phenomena in light of the meanings that people attach to them. Furthermore, Creswell (2007) states that a phenomenological study describes the meaning that a concept or phenomenon has for several people in their lived experiences. Therefore, I used interpretivism, defined as researchers' interpretation different data of a study. Interpretivists believe that the best way to get to the answer is through social inventions such as language, mindfulness, and shared values. The interpretive approach is based on a naturalist approach to data collection. These data collections include interviews and observations that were gathered during engagements with the participants from the selected school.

The researcher interviewed various teachers at the selected school. My focus was interviewing one teacher of each foundation phase, intermediate, and senior phase. This aims to concentrate on revealing what all participants share as they experience a particular phenomenon, in this case, the phenomenon can be seen as the preparedness to merge technology into their pedagogy in a classroom setting, to find a normal and reliable description of a phenomenon, without being influenced by preconceived ideas about the phenomenon. I selected an in-depth method of interviews as I view it as suitable for producing precise data for my research.

Table 1 Summary of the research design

3.5. CASE STUDY APPROACH

The research employed a single case study approach. The reason for the researcher's choice of this particular school was based on fitting the profile for this specific study because the school was technologically equipped with the necessary resources. It was the perfect target to represent the population which made it easy for the researcher to select and obtain a more in-depth understanding of factors surrounding the preparedness of teachers influences, development of skills obtained and the benefits and challenges that comes with integrating ICT in the classroom. Therefore, a single case study was used based on the size of the school and the sample that was needed for this study which made it sufficient for the researcher to

gain a deeper understanding of the research questions that were investigated. Yin (2018) refers to a bounding the case, that provided the researcher with a more in-depth comprehension of the phenomenon. The key is to identify the case and the limitation of a specific case, by answering what is included in the case and what is excluded. The use of the information that will be collected aims to put the spotlight on educators' readiness to integrate information communication technology into their pedagogy.

3.6. POPULATION AND SAMPLING PROCEDURES

Population and sampling

Qualitative studies often employ sampling strategies that allow for in-depth exploration of a particular phenomenon. The observed population refers to the aggregate of elements from which the sample is selected (Babbie & Mouton, 2015:174). Creswell (2012:142) defines a population as a group with similar attributes. By examining these variables, it can be inferred that a population is a collection of subjects where a specific record is generated.

Target population

How ready are the teachers to integrate information and communication technology into their teaching and learning?				
Sub-questions	Sample size	Collection method	Data analysis	Instrument
To what extent has the ICT training developed skills prepared and enabled teachers to use ICTs to sustain curriculum delivery?	4 Teachers	Survey	Thematic analysis	open-ended questions + leads & prompts
What are the benefits and challenges that teachers experience when using ICT for curriculum delivery?	4 Teachers	In-depth interviews	Thematic analysis	Interview schedule – open-ended questions + leads & prompts

In this study, the target population consisted of four educators at a single rural school in the Cape Winelands district. The researcher's choice to focus on this specific school was due to

its infrastructure and facilities for integrating ICTs in the classroom, allowing for an investigation of educators' readiness to incorporate ICT into their pedagogy in a rural setting.

Sampling method

Purposive sampling was used in this study. This method involves selecting participants who possess specific characteristics or perspectives that the researcher aims to investigate. By intentionally choosing educators who met the defined criteria, the researcher ensured that the sample was information-rich, as suggested by Patton (2015). Padilla-Díaz (2015) further emphasises the importance of specific criteria in purposive sampling.

Sample selection

The researcher purposefully identified four teachers: one educator from each phase (foundation phase, intermediate phase, and senior phase) and the ICT champion. Chipangura (2013:24) defines sampling as the process of selecting a portion of the population to represent the entire group. Patton's (2002) qualitative methods primarily aim to achieve a deep understanding. The researcher's choice to spread the sample across different phases was to understand how educators' readiness to integrate ICTs in their teaching practice varies among different grade levels. The selection criteria included the following:

The HOD, who had been at the school since 2017 and received training on using ICTs in teaching and learning, was identified.

Educators who actively used technology in their classrooms and utilised tools such as E-beam, data projectors, visualizers, tablets, and laptops were considered.

The researcher asked for volunteers, which indicated participant interest.

The final sample was selected based on these criteria, considering phase, experience, knowledge, and skills through a survey.

Sample size

While the sample size was not explicitly mentioned in the text, it was limited to four educators due to the qualitative nature of the study and the focus on in-depth exploration. In qualitative research, smaller sample sizes can often provide rich and detailed data.

3.7. DATA COLLECTION

The research is done based on interviews conducted with teachers to gain their perspectives on the use of e-learning within the classroom and within the context of the school. See Figure

2 below by Myers & Newman, (2007) which provided some guidelines which were taken into consideration by the researcher before the study was undertaken.

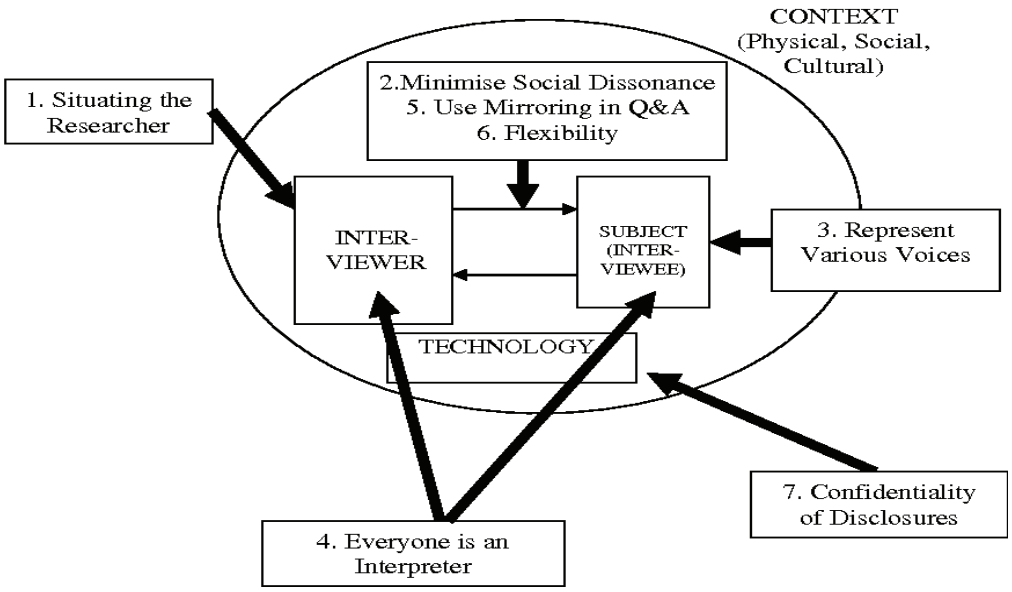


Figure 2 Figure 2: Guidelines for the qualitative research interview

According to Creswell (2013), the analysis of data consists of the following features:

- The preparation and organising of the data
- Representing the data in figures, tables, or discussions, and
- Reducing the data into themes.

There is a spread of methods of data series in qualitative research. Qualitative studies collect data using survey questionnaires, interviews, group discussions, and observation are the widely and typically used data collection instruments. These methods frequently appear as a narrative. The information can be within the shape of descriptive phrases that can be tested for styles or that means, occasionally by implementing coding (Creswell, 2013). Table 1 provides a summary of data collection and analysis.

The researcher used a survey to determine to what extent the ICT training developed skills, prepared and enabled teachers to use ICTs to sustain curriculum delivery (see Appendix C), followed by semi-structured interviews being recorded. The primary data collection method for this study was semi-structured interviews. Seeking participants' experiences, challenges, benefits, a standardised interview protocol was developed to ensure consistency across interviews, while also allowing for flexibility to probe deeper into participant responses with protocols as follows:

1. Background info of participants
2. Open ended question focus on core research questions
3. Follow up probes
4. Interviews

The collection of data can be characterised as the interaction by which data is accumulated and estimated on factors of interest in a set up methodical manner that empowers the responding to of expressed research questions, test theory and assess results (Nghaamwa, 2013). Chipangura (2013) therefore states that it is evident that there is immediate contact with individuals on a one-on-one premise or an immediate association with the chosen people in a gathering area as shown by using data collection methods for qualitative research. The technique for data collection alludes to how the analyst acquires the exact data to address the research questions (Christensen, Johnson, & Turner, 2011). The interview procedure is designed to ask the same set of questions to all interviewees, each with a limited number of response categories (Fontana & Frey, 2005). However as stated by Rubin & Rubin (1995) qualitative interviewing requires intense listening and a systematic effort to hear and understand what people tell you. This procedure, as per Creswell (2013:168) allows a person to take notes during the interview about the response of the interviewee.

3.8. DATA ANALYSIS

In this study, data were analysed qualitatively using thematic analysis. The aim is to transcribe all the data notes/audio into text/words. On completion of the process of data, the raw data was organised (categorised) and openly coded: semi-structured interviews through transcription and thematic analysis was used as a strategy for distinguishing, breaking down and announcing patterns called (themes) inside data. In qualitative examinations, adaptability means whether the investigation results can be dependable in use or moved to various settings. Connelly (2016:436) makes sense that subjective specialists centre around the witnesses and their story without saying this is everybody's story backing the review's adaptability with a rich, itemized depiction of the specific circumstance, area, and individuals examined, and by being straightforward about examination and reliability.

In subjective exploration, the term 'steadfastness' alludes to the stability of the data over time and the conditions of the study. It is similar to reliability in quantitative research, but with the understanding that stability of conditions depends on the nature of the study (Connelly,

2016). Furthermore, Connelly (2016) proposes that strategies for steadfastness incorporate the support for a cycle log review trail and companion interviews with a partner afterward. A review of the sort was directed as far as the greater review and solely after this was finished, the specialist had the option to guarantee that information utilized from the greater review had gone through thorough examination, hence guaranteeing dependability. This study veered from conventional ways to deal with the subjective examination which recommends that information assortment and investigation frequently occur at the same time; to stay objective.

The above processes were utilised to guarantee dependability and unwavering quality of information gathered for the review. This study was carried out at a rural primary school. The concept of trustworthiness in qualitative research comprises various essential elements, such as credibility, transferability, dependability and confirmability that is in a previously marginalised neighbourhood. After the interview, it is always crucial to analyse and integrate the outcomes. It then enables you to create an image of what is important and what will be less important to the school. The data from this survey was used to meld the conclusions, best practices, limitations, and recommendations based on the findings.

3.9. TRUSTWORTHINESS

The concept of trustworthiness in qualitative research comprises various essential elements, such as credibility, transferability, dependability and confirmability which are explained further below. Trustworthiness is the extent of self-belief in information, interpretation, and strategies used ensure quality research (Ahmed, 2024). Therefore, the researcher took the following components of trustworthiness into consideration during the study.

Credibility denotes the extent to which the trustworthiness of the study results can be established. Ahmed (2024) posits that credibility assesses whether the research findings accurately reflect the participants' initial opinions and constitute reliable information based on their original data. To ensure credibility, the study employed a member checking where participants were given the transcripts of their interviews to check.

In qualitative research, transferability refers to the degree to which the findings can be generalised to different contexts or environments. The researcher provided a comprehensive account of the study's context and methodologies to guarantee this. This allows researchers

to assess the applicability of the findings to their own circumstances. The use of multiple data sources further validated this concept.

Dependability refers to the consistency of research findings over time. It is a measure of whether the study's conclusions and interpretations are well-supported by the data collected from participants (Cohen et al., 2007). To ensure dependability, an external individual conducted an inquiry audit to verify that the research process and results were consistent and reliable.

Confirmability is the extent to which research findings can be verified by others. It ensures that the conclusions are based on the data provided by participants, rather than the researcher's personal biases or imagination (Nowell et al., 2017). In this study, an audit trail was used to document the research process, providing a clear path from the raw data to the final conclusions. This allows for external validation of the findings.

The trustworthiness of this study was evaluated using the concepts of credibility, transferability, dependability and confirmability. The four trustworthiness strategies ensure the rigor and quality of qualitative research.

3.10. ROLE OF THE RESEARCHER

When conducting studies like these and negotiating acceptance, positionality is crucial. The researcher was unavoidably influenced by one's own beliefs and values, biases, including experiences and opinions, and these were as much as possible accounted for and monitored in this study to reduce the impact of personal bias on the study's development, argument, and findings. The role or position of the researcher is an educator at the school where the study was conducted. Hence, the researcher aimed to get to the observations and perceptions of the participants of the study. Conducting this study involved gathering sensitive information from local schools. To avoid personal bias, the researcher used bracketing, a method that involves setting aside one's own preconceived ideas and experiences to focus purely on the participants' perspectives.

3.11. LIMITATIONS

This research faced several challenges. While some problems like financial constraints and scheduling issues were anticipated, four key limitations were identified and addressed in this

study. These include time limitations, gaining the trust of gatekeepers, the generalizability of findings, and potential researcher bias.

Gatekeepers' Trust

A major challenge was gaining access to and trust from gatekeepers, the individuals who grant researchers permission to conduct studies at a location (Creswell & Guetterman, 2019). Several schools were initially approached but showed a reluctance to participate, citing a need to prioritize academic time. After numerous attempts, one school principal finally agreed to allow the research. The difficulty in securing a research site created a significant delay in the data collection process.

Time Constraints

Time constraints posed another limitation. Managing the interview process was difficult as participants were often busy or in meetings. This delayed the data collection timeline. As Creswell and Guetterman (2019) suggest, it's important for researchers to be realistic about the time required for each session and to communicate this clearly to participants beforehand.

Generalizability of Findings

The generalizability of findings is a common limitation in qualitative research, especially with small sample sizes. While some argue that the depth of data is more important than the number of participants, it remains a challenge to determine the ideal sample size. Since qualitative case studies typically have small samples (Hammarberg et al., 2016), the findings from this study cannot be broadly applied to a larger population.

Researcher Bias

As a novice researcher, there was a risk of researcher bias and a lack of proficiency in obtaining information. Acknowledging this, the researcher took care to be transparent about their role and to use techniques like bracketing to minimize personal influence on the study's findings (Thorne, Stephens, & Truant, 2016).

3.12. ETHICAL CONSIDERATIONS

Ethical consideration is a set of ideas and values that have to be followed while conducting human studies. The following ethical principles were taken in consideration:

Ethical clearance

The researcher sourced the ethical exemption from the Cape Peninsula University of Technology Research Ethics Committee. Further, the requested permission from the Western Cape Education Department (WCED), as the governing board of the schools, was requested and granted.

Informed consent

In this study, participants were informed of the scope of the research and were provided with detailed information on the research aims, objectives and overall plan. The researcher informed the participants of their power of freedom of choice to withdraw from the research at any time without question (Roshaidai & Arifin, 2018). The participants signed a written informed consent form, which provided a detailed account of what the study is about and what is expected from them as research participants. The participants were informed that their participation was voluntary. The study further did not expose the participants to any harm, and this was communicated to them. The procedure of acquiring members' consent consisted of the following: consent must be freely given (voluntary), and individuals should understand what is being asked of them (Arfin, 2018).

Anonymity

Participants' anonymity and confidentiality were maintained by not disclosing the members' names and identities when collecting, analysing, and reporting the research findings. Interview data protection and confidentiality surroundings were managed cautiously at some point during the interview session in a confined naturalistic setup chosen by the participant (Creswell & Creswell, 2014). During the data analysis and dissemination of the findings, the researcher used pseudocode to ensure the anonymity of the research participants.

3.13. CHAPTER SUMMARY

This qualitative study was designed to explore the factors that influence teachers' readiness to use ICT in their classrooms. Guided by an interpretive worldview, the research gathered rich, detailed data through individual, in-depth interviews with participants. The findings were analysed using content and thematic analysis to understand educators' preparedness for integrating technology in their teaching.

Having outlined the methodology, the next section will discuss the study's results and how they relate to the research questions.

CHAPTER FOUR

RESULTS

4.1. INTRODUCTION

In the previous chapter, the methodology used for the collection of data was discussed. This chapter presents an analysis and discussion of the themes, subthemes and categories uncovered through thematic data analysis to answer the research questions.

The chapter will show findings for the four sub-questions that have guided the study:

1. How prepared were educators to integrate ICT into their pedagogy to ensure quality education for teaching and learning?
2. What are the educators' skills to teach with information and communication technologies?
3. What ICT integration training did the educators acquire?
4. How willing are the teachers to integrate ICT into pedagogies?
5. What challenges are educators facing in integrating ICT into their pedagogy?

The data are drawn from the survey and in-depth interviews as outlined in Chapter Four. This chapter is divided into themed sections.

- The educator's skills to teach with ICT:
- ICTs integration training acquired by educators:
- Integrating ICT in a method of teaching and learning:
- Benefits of ICT integration:
- Challenges of ICT training:
- ICT Awareness:
- Conclusion of the chapter:

The first section presented findings from the survey (See Appendix A) that were carried out which had some open-ended questions, leads and prompts as to the phase that the educator is currently teaching, ICT competence, training, skills development, readiness to integrate ICT in the classroom and suggestions or advice on how to embrace ICT within a classroom environment to get a sense on the competence level of the educator that took part in the

study. Below is an outline of the responses to the questions that were posed, leading to the findings that were linked to the research questions:

- The phase the educator is currently teaching

The first theme in this section was the phase the teacher is teaching. The survey comprised one foundation phase teacher, two intermediate phase teacher, where one was the ICT champion and one senior phase teacher, which gave the researcher a variety of results from three different phases of teaching.

- The level of ICT competence acquired by the educator

The second theme revealed that two of the participants were at the beginner competency level stage one which was the foundation phase teacher and the other one an intermediate phase, whereas the other two participants were at a more intermediate stage when it comes to their level of competences. Findings also revealed that the beginner level educators were not introduced to how to work with the technological devices. The reasons for this was because most of the ICT knowledge was self-taught/module at university which were a bit different as opposed to the other two participants which were at an intermediated level that acquired their ICT competences through professional development by DBE in the specific ICT devices present at the school.

- Training acquired by educators and skills developed

The third theme showed that the two beginner educators found the training to be relevant in a sense of doing the basic stuff on the computer like using the Microsoft office packages and sending emails but expressed that it was not relevant within their classroom environment, whereas the other two intermediate educators where introduced to more subject specific and advanced training which provided them with the skill to use ICT for teaching because the training they received are relevant in their classroom practice.

- The readiness to integrate technology in teaching and learning

When this question was asked all the participants expressed their readiness to integrate ICT in their teaching and learning in their classrooms. The question on: Should more training be received and should a more stable Wi-Fi connection be introduced – participants rated them half ready in moving toward this new technological era. They felt that teachers should be equipped with these new technological innovations of teaching within an ICT fashion. The

next section presents the findings from the data collected with four purposively selected educators (See Appendix B).

4.2. HEME 1: THE EDUCATORS' SKILLS TO TEACH WITH ICT

Some interesting responses came to light while the educators were interviewed and this was evident from their feedback on the technological training they experienced in practice. On this question, these were some of the educators' responses:

Educator 001; "…to enhance teaching and learning…"

Educator 003; "Revealed … E-beam to record and stream all the writings and drawings on the interactive whiteboard supports visual learning…"

The researcher discovered a relatively stable pattern in the educators' technological knowledge, and it is evident that the training helped the educators significantly. One educator noted that the WCED should implement additional training like this because the educator knows how to integrate technology effectively.

Educator 001 expressed the following:

"After this training at CTLI, I discovered that technology ensures differentiation during the process of learning, and that is why I want to learn more…"

Educator 002 said*, "…training broadened my scope of ICT integration into teaching…"*

Integrating ICT in a method of teaching and learning

Pedagogical knowledge (PK) pertains to teaching methods and procedures such as assessment, classroom management, lesson plan creation, as well as student learning (Shulman, 1986). The data collected during the survey, followed by the interviews, showed that most participants still believed that the application of pedagogical knowledge should be part of their everyday life. However, the findings also show that combining the use of ICTs in classroom lessons is a new learning opportunity for teachers when it comes to applying pedagogy.

Educator 001 explained that:

"…classroom management because the learners are excited, which can sometimes make a noise, and that can influence learners' ability to learn…"

Educator 004 expressed the following:

"…to adapt to a new way of using your pedagogical knowledge to integrate technology can be a crisis…"

4.3. THEME 2: BENEFITS OF ICT INTEGRATION

How willing are the teachers to integrate ICTs into pedagogies?

A vital aspect of successful technology integration in education is empowering teachers to embrace technological developments in the teaching practice. Research indicated that education and professional improvement programmes played a pivotal role in equipping educators with the vital abilities and self-assurance to leverage technology effectively (Ali, 2020). Teachers who participated in these programmes reported feeling more prepared to use digital tools in their teaching practices. Participants expressed the importance of ongoing help and mentorship for instructors as they navigated the challenges of integrating generation into their classrooms. Providing educators with ongoing study possibilities and technical assistance was discovered to be vital in overcoming resistance to alternative ways of teaching and sustaining the development of technology integration in schools. Furthermore, educators' empowerment through technology integration extended beyond the classroom. Many researchers highlighted that digitally ready educators had been better positioned to assist learners in developing twenty-first-century skills, consisting of vital thinking, problem-solving, and digital literacy.

Advantages of using technology in the classroom

The value proposition lens was used to assess the benefits. The analysis shifted its focus from the outcomes to the outputs. Both are necessary, but for this study, the researcher wanted to focus on why instructors participate in certain activities and what benefit, if any, they receive. The findings only suggested external benefits for instructors.

Educator 001: *"…it has a way of broadening the learner's world by bringing the reality into the classroom and the children always find it exciting…."*

I agree with what educator 001 expressed that bringing technology into a classroom environment can be a life-changing experience for the learners because many learners can

experience more effective learning through what they see or experience rather than what they hear.

> Educator 002*: "…Technology is having a way of capturing and keeping the learners' attention, active learning takes place…"*

> Educator 003*: "…it gives the learners their freedom to do research on their tablets, especially helps with spelling being a big problem, and they can also allow them to find solutions for some complex problems…"*

> Educator 004*: "… ICTs lent themselves to the introduction of research, self-learning, blended learning, as well as a fun way of learning…".*

4.4. THEME 3: CHALLENGES OF ICT INTEGRATION

4.4.1. What challenges are educators facing in integrating ICTs into their pedagogy?

In today's culture, educators enjoy using technology; however, there are some factors that can be challenging not only for the educator but also for the learner. This is frustrating at times, particularly when it comes to the technical department of a technologically driven educator. Nath (2019) explored teachers' critiques on ICT amalgamation into the school curriculum and the challenges that hinder instructors from the usage of ICT in the classroom. It became evident that the mainstream educators do not have ICT skills, but are able to use technology at an elementary level, particularly for administrative documents. However, obstacles, including restricted access to computer systems, include loss of subsidy, abnormal power, and shortage of ICT-associated guidelines and schooling, which restricted the successful integration of ICT within the curriculum. Ahmed (2015) explains that the nonexistence of ICT abilities among stakeholders and education, in conjunction with a deficiency of ICT education and a lack of ICT rules and regulations, are prime factors that hinder the aggregate technique to use ICT for teaching and learning purposes.

4.4.1.1. Inadequate Infrastructure

When integrating ICTs, you need to be equipped with suitable infrastructure. This is crucial in creating a technological environment, for example, Educator 003 stated that a poor infrastructure can distract a learner's ability to learn.

> *"…the computer lab at my school's ceiling keeps on dumping, then it gets repaired again and again, so that makes it a bit difficult for me to integrate technology…."*

A revolution is taking place as districts of schools and councils of education approve a new form of classroom and pedagogy regarding mobile education. To be effective, the move to requires a strong technology foundation, particularly network infrastructure (Build the 21st Century Classroom, 2018).

Unstable connectivity

Below are extracts from the FGD/interviews conducted with educators who shared sentiments on the importance of having adequate connectivity to access teaching and learning resources.

> "*An overload of classes on the network, my learners struggle to get a good/fair internet connectivity, and it can be a contact time waster…."*

4.4.1.2. Lack of resources

By having access to offline resources, such as pre-downloaded educational materials and offline software applications, educators can maintain an effective and uninterrupted teaching process, ensuring that technology remains an integral part of the classroom experience despite connectivity challenges. As noted by Educator 001:

> "*… lack of offline educational programs and applications because every learner has a tablet from Grade 1-7 that can be used without Wi-Fi…."*

Educator training

It is critical to address this issue and ensure the successful integration of smart devices and technology in the classroom by providing thorough training and support for educators of all levels of experience.

Educator 002: *"I'm… a newly qualified teacher who started working in 2019. To be honest, I was not at this school when this training was presented. I would like to know how cool gadgets like the E-beam, Visualizer and all other equipment work…."*

Time constraints

Support personnel are responsible for ensuring the readiness of ICT equipment, such as charging technological equipment, among the different grades. However, this can get frustrating sometimes due to the loss of time of support personnel's morning meetings, which contribute to the late distribution and slow start-up of the devices. Another challenge is Wi-Fi instability in schools.

Educator 001 had this to say: "…morning meeting of the support personnel meetings can sometimes hold on longer than expected, then it can become a problem, especially due *to the loss of contact time whilst waiting on the tablets…".*

Educator mindset

The unfavourable views of older or technophobic instructors can lead to the spread of resistance and hostility in the utilisation of ICT in schools. Some educators at schools may not feel the need to attempt to embrace ICTs because no other educator at the school is engaging in this development. Furthermore, educators who are close to retirement see no benefit in using ICT in the classroom, and many of them still have a textbook mindset of teaching in schools.

Educator 004 had this to say: "…resistance to change where I was introduced to the old-fashioned way of teaching, and I find it very challenging to adopt *these new technologies…".*

Educator 002: *"…willingness to explore and adopt new digital tools and resources in my methods of teaching in the interest of my learners to create educational activities that are engaging…".,*

The results of this research show that instructors' resistance to using ICTs in the classroom may hamper the academic achievement of learners, based on the experiences and perspectives provided by some of the participants in this study. The ramifications for students

are that they may be denied the advantages received from their instructors' use of ICTs, even though ICT integration has been demonstrated to result in improvements in efficient classroom education and learning (Mukhari, 2016).

Load shedding

Educators feel demotivated in preparing ICT-created lessons because the load-shedding schedule for the school is continuously changing and is unpredictable.

> Educator 001: *"…I feel loadshedding is a disruption of the flow of lesson planning because I plan all my lessons relying on technology…".*
>
> Educator 004: *"Loadshedding is a term I don't want to hear …it is very difficult to prepare lessons, especially electronic lessons, during a time of loadshedding…".*

Factors such as loadshedding disrupted teaching and learning in schools. Learners experienced fear and other unpleasant emotions. Meanwhile, wealthy South African schools may have had the privilege of continuing with the curriculum with the use of technology. Those in historically poor regions lag behind in terms of having the means to continue teaching using ICTs during load shedding, aggravating the digital divide that still exists between affluent and low-income schools (Tiba, 2018).

4.5. THEME 4: ICT AWARENESS

The issue of ICT knowledge in schools has emerged as a significant concern, particularly in rural schools in the Western Cape region. These schools face a lack of support from the Department of Basic Education (DBE) in promoting the integration of ICT in classroom instruction. The researcher discovered that certain educational institutions lack awareness regarding a novel instructional approach involving technology. It is imperative to inform these schools about the potential modifications and advantages that the integration of Information and Communication Technology (ICT) can bring to the classroom. By incorporating ICT, educators can provide learners with practical real-world illustrations, while also benefiting from the ability to work remotely. Consequently, learners will likely exhibit heightened enthusiasm towards participating in this innovative digital learning paradigm. In this scenario, it is imperative to emphasise the significance of ICT awareness, as many educational institutions are currently transitioning to the digital realm. Consequently, the support of the

Department of Basic Education (DBE) becomes pivotal in terms of raising awareness and assisting schools in equipping learners with the necessary skills to effectively engage with digital platforms. Furthermore, the DBE's support is crucial in preparing schools, educators, and learners with the requisite knowledge on how this innovative teaching approach can yield benefits for both educators and learners in the foreseeable future. The statements made by Educator 004 and Educator 002 are as follows:

> Educator 004: "*…I am not aware of any effort made by the DBE to advance the issue except for the occasional circular announcing a workshop/short course being presented at some institution in the province…".*

> Educator 002: *"The schools are not doing enough to bring awareness to the importance of ICT, because a lot of schools still need training in ICT. There should be more courses made available for all schools and classes after school to improve the awareness of ICT".*

The above sentiment highlights a crucial element in the successful incorporation of ICT in educational environments. Insufficient provision of training and limited familiarity with technological advancements pose substantial obstacles to the effective integration of ICT inside educational institutions such as schools.

Not all educators and educational administrators possess a comprehensive understanding of contemporary technologies. The potential impediment to their capacity for proficiently utilising these technologies in educational or administrative contexts stems from their limited understanding of these innovative technologies. This may result in hesitance to embrace novel technology, as it may be viewed as more laborious than beneficial. Despite the motivation of school workers to acquire knowledge, their access to good training programmes may be limited. Continuous and comprehensive ICT training is necessary, encompassing both technical proficiencies and methodologies for effectively incorporating these tools into the educational curriculum.

4.6. CHAPTER SUMMARY

This chapter presented the findings of a study on the factors influencing teachers' preparedness to use ICT in the classroom. The findings focused on several key areas, including

the skills teachers possess, the training they receive, and the benefits and challenges of integrating ICT into teaching.

A central finding of the study is that while teachers have a positive attitude and have acquired basic ICT skills, they face significant obstacles. The benefits of using ICT, such as creating engaging lessons, preparing students for the 21st century, and allowing for personalized learning, were clearly identified by the participants. However, the full realization of these benefits is hampered by several systemic challenges. These include a lack of adequate infrastructure and resources, such as unstable Wi-Fi and limited access to devices, which make consistent and effective ICT use difficult. Additionally, a critical challenge is the nature of professional development; training sessions are often one-time events without the necessary follow-up or ongoing support, which leaves many educators unprepared to fully integrate new technologies. Other challenges identified were time constraints, a need for a change in mindset among some educators, and the significant disruption caused by frequent power outages (loadshedding).

In essence, the findings suggest a gap between teachers' willingness and the institutional support required for successful ICT integration. While teachers understand the value of technology in the classroom, they are held back by practical and logistical issues that need to be addressed to enhance both teaching and learning.

CHAPTER FIVE

DISSCUSION

5.1. INTRODUCTION

As mentioned in Chapter One, section 3.1, the study's goal was to identify the extent to which ICT has developed skills, prepared and enabled teachers to use ICT to sustain curriculum delivery, and what the benefits and challenges are that teachers experience when using ICT in curriculum delivery. Below, the researcher provides the main findings:

- Educator skills to teach with ICT
- ICTs integration training acquired by educators
- Integrating ICT in a method of teaching and learning
- Benefits of ICT integration
- Challenges of ICT training

5.2. EDUCATOR SKILLS TO TEACH WITH ICT

The participants were satisfied with the basic skills they received in terms of ICT training. When ICT integration training is introduced, the focus of this training is to equip educators with the necessary skills and competencies to be able to teach learners in the most technological way and make lessons innovative in the most technological fashion. However, in the survey and in-depth interviews, it became evident that the participants familiarised themselves with some exciting integration training experiences that could be an advantage in the future. In addition, this technological integration provides substantial hurdles, from the purchase of new technological equipment for the modification of the curriculum, and teaching techniques for integrating new educational materials that can enhance learning to its full potential (Johnson, et al., 2016).

5.3. ICT INTEGRATION TRAINING ACQUIRED BY EDUCATORS

The survey and the in-depth interview included questions on the technologies used by educators. The data shows that the core focus of the educators at the school under observation is on ICT integration since educators were focused on mastering the latest smart gadgets. According to Rotermund, De Rocje, and Ottem (2017), educational institutions

provide professional development in technology. The second most popular professional development topic was technology integration.

5.4. INTEGRATING ICT IN A METHOD OF TEACHING AND LEARNING

These educators really try to implement technology in an innovative way, yet in a way that enhances discipline and classroom management. I personally think this is a good strategy for integrating technology and working together to enhance the use of technology and implement classroom management and discipline. In addition, König et al. (2017) state that pedagogical knowledge includes broad principles and strategies of classroom management and organisation that appear to transcend subject matter, and moreover, information regarding students, as well as education, testing, and educational settings and goals. The teaching method is a craft that requires incredible work to master. The equivalent is valid for teaching methods in technological, technical, or advanced settings.

5.5. BENEFITS OF ICT INTEGRATION

ICT has the potential to significantly improve learning, as learners who incorporate technology into their academics may become active learners. They will understand the information that is required, why they need it, and how to obtain it. The goal of incorporating ICT into education and the curriculum as a whole is to increase the quality of teaching and learning while also increasing learners' comprehension of what is being taught. However, due to a lack of competence to facilitate the implementation of ICT for curriculum delivery, the promise of ICT to stimulate pedagogy has yet to be completely realised. The study's major subject was technological integration, as implied by the title. The dependent variance was defined. Throughout the interviews, a number of questions were posed to the participants. In 2020, Salazar-Concha et al. conducted research that found that teachers are more likely to plan to use mobile technology when they are aware of its value and advantages than when they are not. Other research showed that perspectives and attitudes among educators regarding the use of mobile devices in education were not significantly affected by perceived usefulness (Salazar-Concha et al., 2020).

Technology in the classroom creates a fun learning experience

According to the authors cited above, students opt for using technology to engage and learn and they specifically like the Internet and tablets. Subjects that scholars deem tough or boring can turn out to be interesting with digital classes, through a video, or while using a tablet.

Preparing learners for the future

This study revealed that the usage of technology in the classroom could assist in preparing learners for the virtual future. These twenty-first-century abilities are essential as they enable one to achieve success. Education is not just about memorising records and vocabulary words, it also involves collaborating with others to learn and being able to work in teams. Education technology can prepare students for the future.

Technology helps students learn at their own pace

Today's technology permits students to learn at their own pace. For example, almost all applications allow for individualised training. Students can examine their abilities and pursue their goals as they wish. This shape of teaching is also important for the teacher as it gives the learners the time to work at their own pace to create the opportunity for the learners who may be experiencing difficulties.

Students' use of technology

Technology occupies an important part of learners' lives. However, when learners are not at school, they are not able to engage with technology and this limits their use and understanding of ICT in an e-learning environment. By integrating technology into the classroom, teachers are changing the manner in which they used to teach and offer learners ways to succeed the 21st century. Technological modifications enable teachers to enhance the quality of teaching. Teachers need to prepare learners for this ever-changing global environment that we live in. While it is evident how integrating technology into the classroom has positive benefits, it is essential to observe that conventional learning strategies are also as critical to teaching and learning at schools. It is imperative that teachers take the time to understand every element of educational technology that can contribute to enhancing teaching and learning in the classroom. This will enable teachers to understand the value of incorporating technology and the impact it can have on learners in the classroom.

5.6. CHALLENGES OF ICT INTEGRATION

Inadequate Infrastructure

Infrastructure should be considered when selecting whether to purchase technology equipment, and how it will be utilised in the classroom is often disregarded. When creating these options, several factors ought to be addressed, for example, the gadget's bandwidth, length, and purpose. Incorporating technologies into education in a meaningful and advanced way remains an obstacle (Pittman & Gaines, 2015). Although educational institutions may have access to technological initiatives, there are several factors that impede successful technology implementation in classrooms, such as inadequate infrastructure.

Unstable connectivity

The successful integration of technology in the classroom requires a stable and robust Wi-Fi connection with sufficient bandwidth. Given the number of learners using their devices simultaneously in a school setting, a strong internet connection becomes essential to cater to their needs effectively and save time for both educators and students. According to Matthew Lynch (2017), it may seem like everyone has internet access; however, a shocking number of families lack fast or reliable internet connections. As reported by Matthew Lynch (2017), while it may appear that everyone has access to the internet, a staggering proportion of educators do not possess fast or stable internet connections. Furthermore, Audri Taylors, University Herald Reporter (2024), stated that poor broadband connection is detrimental to some children's education. For instance, participating educators agreed that the Wi-Fi connection is currently slow and inadequate for optimal teaching and learning experiences in their school. This is in line with Matthew Lynch (2017), who observed that lack or limited access to connectivity hinders the teacher’s ability to integrate technology effectively in their teaching and learning.

Lack of resources

The study's participants emphasise that resources play a crucial role in promoting the integration of ICT in a classroom setting. Resources assist educators in continuing their technological activities even when faced with unstable or no internet connectivity. According to the findings of a study by Jayakumar (2019), this avoidance might imply that if instructors do not use ICTs in their E-Learning classroom on a regular basis, they may lose interest completely, depriving them of their ability to learn and obtain new skills through the use of existing ICTs.

Educational training

Educator training in the use of available smart devices and equipment can be a significant challenge, particularly for novice instructors who joined the school system after the introduction of these gadgets and had no prior training on them. Lack of familiarity with these tools can make effective integration into the teaching and learning process challenging. Based on the findings, it became evident that the educators are not skilled enough to implement technology in the classroom; therefore, educator training in using technology in the classroom is needed. Several scholars have stated that when ICTs are implemented in schools, they should be supported with extensive teacher training and development programmes (Johnston, 2015; Umugiraneza et al., 2018). They believe that this kind of training should include instruction in the critical abilities for using technology as instruction in how to incorporate these technologies into teaching and learning. Therefore, Johnston (2015) contends that whereas it is self-evident that instructors cannot utilise ICTs unless they understand the technology, ICT training workshops are sometimes insufficient, owing to the fact that these sessions of teaching are one-time events without any follow-up sessions or assistance following the instruction. Similarly, De Silva (2015) and Tiba (2018) discovered that training programmes were only held once in several Western Cape schools, and that in schools, there was and continues to be no collaboration between instructors who came from training sessions, as well as teachers who did not attend the training. As a result, there appears to be a major demand for ongoing teacher training and support beyond such one-time training programmes to grow and improve their skills in the efficient application of ICTs for teaching and learning. According to Buzuzi (2020), even if instructors are educated in the usage of ICTs for curricular delivery, there is no guarantee that ICTs will be employed in their classrooms. The notion is that the capacity of teachers to use ICTs impacts their motivation to do so. Tiba (2018) noticed that since the training provided by the Khanya Project in the Western Cape was inadequate, certain educators were still hesitant about using their ICT knowledge and abilities in their subsequent teaching and learning training. Chigona et al. (2014) conducted a study on ICT and teachers and found that several teachers in the Western Cape were hesitant to include ICTs into their curriculum because the training they received did not effectively enable them to take advantage of implementing ICTs in their classrooms. In certain schools, there is also an inconsistency between the type of training and the quantity in terms of IT resources available. When students return to their individual schools, they frequently find it hard to put their ICT knowledge and abilities into effect, and in most cases,

this is due to a lack of or a severe shortage of ICT resources (Suryani et al., 2010; Umugiraneza et al., 2018; Anil et al., 2019) to meet the WCG and WCED's educational aims of increasing teaching and learning via the use of ICT. In addition to providing a restricted training programme on fundamental use, they must offer educators ICT skills. Continuing technological and pedagogical assistance in the construction of essential capabilities in ICT will be used to incorporate these abilities into their instruction (Makwela, 2019).

Time constraints

Time is valuable, especially when it comes to the distribution and setup of technology. In his study, Gunzo (2020) explains how time restrictions were shown to be the biggest obstacle to instructors integrating ICTs into their instructions in specific Eastern Cape educational institutions.

Educators' mindset

It is imperative to understand the educator's mindset on the incorporation of ICT in smart classrooms. Instructors who have started to use technology understand the potential of employing ICT in their teaching practice. The ramifications for students are that they may be denied the advantages received from their instructors' use of ICTs, despite the fact that ICT integration has been shown to result in improved classroom teaching and learning (Mukhari, 2016). Colleagues do not trust or assist one another in such an environment and educating and learning do not occur as efficiently as they could. Nevertheless, from the several studies that have been conducted, it has been found that following the use of ICT in the classroom, supported by the WCG through WCED, has resulted in a noticeable improvement in the culture of teaching and learning (Buzuzi, 2020; Madoda, 2018; Waghid & Waghid, 2018). As a result, both the current study's discoveries and the literature imply that there is a pressing necessity to modify elderly individuals' instructors' behaviours regarding the utilisation of ICT to educate both themselves and students using 21st-century ICT abilities.

Loadshedding

The Department of Education (DoE) appears unconcerned about the consequences of power disruptions on the effective employment of ICTs in classrooms. Not only do South Africa's persistent power outages impede technology development, but most schools have also been prohibited from properly incorporating ICTs. Makwela's (2019) research is noteworthy in that he discovered that instructors surveyed criticised the frequent electricity failures in classrooms as they severely hampered their usage of ICTs at their institution. The restoration

of Eskom's load-shedding in October 2019 coincided with the dates of South Africa's first Grade 12 tests in Computer Application Technology (CAT) and Information Technology (IT), both of which are dependent on a continuous power supply (Businesstech, 2019).

5.7. CHAPTER SUMMARY

This chapter discussed the findings of the study, which aimed to explore how ICT skills have prepared teachers to sustain curriculum delivery and to identify the benefits and challenges they experience. The study revealed that participating educators possess a solid foundation of basic ICT skills and are actively working to master new smart devices. They demonstrated a commitment to implementing technology in innovative ways that enhance lessons and support effective classroom management. The study identified several key benefits, including creating a more engaging and enjoyable learning environment for students, preparing them with essential 21st-century skills like collaboration, and allowing for personalised learning at an individual pace. These positive outcomes highlight the potential of ICT to improve the overall teaching and learning quality and make students more active and independent learners.

Despite the clear advantages, the study also uncovered several significant challenges that hinder the effective integration of ICT. A primary obstacle is inadequate infrastructure, including slow and unstable Wi-Fi connectivity that fails to support many simultaneous users. This is compounded by a general lack of resources, which makes it difficult for teachers to continue technological activities, especially when internet access is unavailable. Furthermore, the findings emphasised the need for more comprehensive and continuous training, as existing professional development programs are often one-time events without follow-up support. This leaves many educators, particularly those with less experience, feeling unprepared. Other challenges include time constraints for technology setup, a negative mindset among some educators, and, most critically, the frequent power outages caused by loadshedding, which severely disrupt all ICT-dependent activities. In conclusion, while educators are willing to embrace ICT, they face systemic and practical barriers that prevent them from fully realising its potential.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

This chapter represents the conclusion of the study exploring teachers' readiness to effectively use ICT for curriculum delivery in a public primary school in the Western Cape. The results show that teachers have the basic set of ICT skills and are very keen to learn, but there are a number of internal and external barriers that make them less confident and effective.

The study showed that when ICT is used correctly in the classroom, it can be a powerful tool for improving the learning experience. The participating teachers emphasised that the benefits were significant, such as making the classroom a more interesting and fun place to learn, which keeps students' attention. Using technology also helps learners learn important 21st-century skills like critical thinking, problem-solving, and working together. ICT also makes personalised learning possible, which lets students learn at their own pace and in a way that works best for them.

But the results also showed that there are a number of systemic problems that keep ICT from reaching its full potential. The main difficulties were not enough ongoing and adequate professional development, not enough technical support, an unreliable infrastructure with slow Wi-Fi, and not enough access to up-to-date resources. These internal problems are made worse by things that happen outside, like frequent power outages caused by loadshedding and vandalism, which make it very hard for ICT-dependent teaching methods to last. The study concludes that for ICT to be utilised confidently and effectively, these deeply entrenched and complex barriers must be tackled through a strategic and collaborative effort by all stakeholders.

6.2 RECOMMENDATIONS

Building upon the comprehensive findings and conclusions presented in this study, the following strategic and actionable recommendations are proposed to help school leadership and relevant stakeholders overcome the identified barriers and promote effective ICT integration within the educational system.

Enhancing Professional Development and Support

The research suggests that professional development for educators should move beyond the current one-off training model and involve a multi-phased strategy. The Western Cape Education Department and school principals should collaborate to design and implement long-term, sustained training programs that build on initial skills and foster a culture of continuous learning. The training should provide a strong foundational understanding of basic ICT skills before advancing to more complex concepts, ensuring teachers are comfortable with operational aspects of technology.

Continuous support from follow-up sessions and technical and pedagogical assistance is crucial for creating a robust feedback loop and enabling teachers to confidently apply and refine their knowledge. Practical, hands-on learning should be incorporated, equipping teachers with essential troubleshooting skills, fostering self-reliance, and minimising class time lost due to technical interruptions.

To address the practical constraints of busy school days, a strategic approach, such as using after-school sessions, should be considered. This would accommodate teachers' schedules and provide dedicated time for skill development and collaborative practice, maximising the effectiveness and return on investment of all training efforts.

Strengthening School Leadership and Policy

School leadership plays a crucial role in successful ICT integration, as principals are responsible for setting the vision, allocating resources, and fostering a supportive institutional culture. To ensure effective and sustainable ICT integration, principals should adopt a proactive and visible role as ICT champions. This can be achieved by creating and funding an internal ICT support team composed of digitally literate teachers, who can provide immediate, context-specific technical assistance to colleagues. This approach is cost-effective and builds internal capacity by retaining technological expertise within the school system. A peer-to-peer support system provides a trusted resource for teachers, minimising downtime and frustration during lessons.

Principals should involve all teaching staff in the design and review of the school's ICT policies, ensuring they are realistic and aligned with teachers' needs and skill sets. This collaborative process increases teachers' buy-in and compliance.

A principal's mindset is a powerful determinant of success, as they must lead by example and demonstrate a positive attitude toward technology. This role-modelling encourages a culture

of continuous learning and collaboration among teaching staff, mitigating teacher resistance and fostering confidence in embedding technology into the teaching and learning process.

Upgrading Infrastructure and Resources

The study found that outdated infrastructure and a lack of reliable resources were major sources of operational frustration for teachers, impacting teaching efficacy. To improve teaching efficiency, it is recommended that schools and the WCED prioritise modernising educational tools by regularly updating devices and software. This will prevent wasted instructional time and enhance teacher confidence. A stable internet connection is also crucial for modern teaching, as it can support multiple devices and classrooms simultaneously. A stable network is essential for interactive, technology-rich lessons relying on online content, research, or collaborative applications.

Another barrier identified is loadshedding, which can be mitigated by investing in solutions for loadshedding, such as uninterruptible power supplies (UPS) for critical devices or exploring alternative power solutions like solar energy. These investments are crucial for making the school's ICT infrastructure resilient and ensuring that technology usage is not dictated by an unreliable power grid. Overall, these recommendations aim to improve teaching efficiency and reduce the impact of power outages on students.

To sum up, this study has brought attention to how important it is to integrate ICT in primary schools in a comprehensive way. Schools can better empower teachers and guarantee that all students are ready for a technologically advanced future by tackling the systemic barriers pertaining to infrastructure, policy, leadership, and training. Educational institutions and important stakeholders, especially the Western Cape Education Department, can use the research's unique insights as a guide to help them design and implement more sustainable and successful e-learning programs.

REFERENCES

Department of Communication. 2013. *South Africa Connect: Creating Opportunities, Ensuring Inclusion: South Africa's Broadband Policy.* Available at: https://www.gov.za/documents/electronic-communications-act-south-africaconnect-creating-opportunity-ensuring-inclusion

(DTPS), 2016. *National Integrated ICT Policy White Paper.* [Online] Available at: https://www.gov.za/documents/electronic communications-act-national-integrated-ict-policy-white-paper-3-oct-2016-0000

[WCG], Western Cape Government, n.d. *WCG Game Changers.* [Online] Available at: https://www.westerncape.gov.za/game-changers/game-changers/elearning [Accessed 01 June 2024].

Adarkwah, M. A., 2021. I'm not against online teaching, but what about us? ICT in Ghana post Covid-19. *Education and information technologies,* 26(2), pp. 1665-1685.

Adukaite, A., Van Zyl, I., Er, Ş. & Cantoni, L., 2017. Teacher perceptions on the use of digital gamified learning in tourism education: The case of South African secondary schools. *Computers and Education,* p. 172–190. https://doi.org/10.1016/j.compedu.2017.04.008

Ahmed, H. & Kurshid, F., 2015. Use of information and communication technology (ICT) among public and private sector universities in the teaching and learning process. *Scholedge International Journal of Multidisciplinary & Allied Studies,* 2(4), pp. 25-36.

Alba-Juez, L., 2009. *Perspectives on Discourse Analysis: Theory and Practice, Newcastle upon Tyne, Cambridge Scholars Publishing.*

Ali, W., 2020. Online and Remote Learning in Higher Education Institutes. A Necessity in Light of the COVID-19 Pandemic. *Higher Education Studies,* Volume 10, pp. 16-25. DOI: https://doi.org/10.5539/hes.v10n3p16

Almanthari, A., Maulina, S. & Bruce, S., 2020. Secondary school mathematics teachers' views on e-learning implementation barriers during the COVID-19 pandemic: The case of Indonesia. *Eurasia journal of mathematics, science and technology education,* 16(7). DOI: https://doi.org/10.29333/ejmste/8240

Almazova, N., Krylova, E., Rubtsova, A. & Odinoka, M., 2020. Almazova, N., Krylova, E., Rubtsova, A., & Odinokaya, M. (2020). Challenges and opportunities for Russian higher education amid COVID-19: Teachers' perspective. *Education Sciences,* 10(12), p. 368. https://doi.org/10.3390/educsci10120368

Amakali, L., 2013. Human resources capacity in the Ministry of Health and Social Services in Namibia. Unpublished Magister Technologiae thesis. Pretoria: University of South Africa.

Anil, A. & Jayakumar, M. S., 2019. ICT integration in education: The case of secondary schools in Kerala. *International Journal of Social Sciences,* 4(3), pp. 1948-1962.

Anon., 2017. *Department of Basic Education.* Available at: http://pmg-assets.s3-website-eu-west-1.amazonaws.com/180126draftruraledupolicy.pdf [Accessed 25 March 2021].

Arifin, S. R., 2018. Ethical Considerations in Qualitative Study. *International Journal of Care Scholars. DOI: https://doi.org/10.31436/ijcs.v1i2.82*

Azhari, B. & Fajri, I., 2022. Distance learning during the COVID-19 pandemic: School closure in Indonesia. *International Journal of Mathematical Education in Science and Technology,* 53(7), pp. 1934-1954. https://doi.org/10.1080/0020739x.2021.1875072

Babbie, E. & Mouton, J., 2015. *The Practice of Social Research. South African Edition.* 16th ed. Cape Town: Oxford University Press.

Babbie, E. & Mouton, J., 2001. *The Practice of Social Research.* Cape Town: South Africa, Oxford University Press.

Bala, T. et al., 2023. Barriers to information and communication technology utilization in basic education in Kano, Nigeria. *Billiri Journal of Education Studies,* 1(1), pp. 120-125.

Barakabitze, A. A. et al., 2019. Transforming African education systems in science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. *Education Research International,2019. https://doi.org/10.1155/2019/6946809*

Bariu, T. N., 2020. Status of ICT infrastructure used in teaching and learning in secondary schools in Meru County, Kenya. *European Journal of Interactive Multimedia and Education,* 1(1), p. e02002. https://doi.org/10.30935/ejimed/8283

Barnham, C., 2015. Quantitative and Qualitative Research: Perceptual Foundations. *International Journal of Market Research,* Volume 57, pp. 837-854. https://doi.org/10.2501/ijmr-2015-070

Barreh (2013). A Framework for Mobile Learning for Enhancing Learning in Higher Education. *Malaysian Online Journal of Educational Technology,* 3(3).

Baticulon, R. E. et al., 2021. (2021). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Medical science educator,* Volume 31, pp. 615-626. https://doi.org/10.1007/s40670-021-01231-z

Baxter, J. & Eyles, J., 1997. Evaluating qualitative reseacher in social geography: Establishing 'rigour' in interview analysis. *Transaction of the Institute of British Geograph,* 22(4), pp. 505-525. https://doi.org/10.1111/j.0020-2754.1997.00505.x

Bice, H. & Tang, H., 2022. Teachers' beliefs and practices of technology integration at a school for students with dyslexia: A mixed methods study. *Education and information technologies,* 27(7), pp. 10179-10205. https://doi.org/10.1007/s10639-022-11044-1

Bilyalova, A., 2017. ICT in Teaching a Foreign Language in High School. *Procedia - Social and Behavioral Sciences 237(June 2016),* p. 175–181. https://doi.org/10.1016/j.sbspro.2017.02.060

Bitsch, V., 2005. Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness,* 23(1), pp. 75-91.

Blaskó, Z., 2022. Learning losses and educational inequalities in Europe: Mapping the potential consequences of the COVID-19 crisis. *Journal of European Social Policy,* 32(4), pp. 361-375. https://doi.org/10.1177/09589287221091687

Botha, A., Herselman, M., Rametse, S. & Maremi, K., 2017. Barriers in Rural Technology Integration: A Case Study from the Trenches. https://doi.org/10.23919/istafrica.2017.8102349

Brinkley-Etzkorn, K. E., 2018. Learning to teach online: measuring the influence of faculty development training on teaching effectiveness through a TPACK lens. *Internet High. Educ. ,* Volume 38, p. 28–35. https://doi.org/10.1016/j.iheduc.2018.04.004

Brooks, D. C. & McCormack, M., 2020. *Driving Digital Transformation in Higher Education.* [Online] Available at: https://library.educause.edu/-/media/files/library/2020/6/dx2020.pdf?la=en&hash=28FB8C377B59AFB1855C225BBA8E3CFBB0A271DA [Accessed 15 08 2024].

Businesstech, 2019. *This is what happens when load shedding hits during a matric exam.* Available at: https://businesstech.co.za/news/government/346900/thisis-what-happens-when-load-shedding-hits-during-a-matric-exam/ [Accessed 01 June 2024].

Buzuzi, A. N., 2020. *Mathematics teachers' integration of technology for pedagogical use in a less affluent high school in the Western Cape. MEd thesis, Cape Peninsula University of Technology.* Cape Town: s.n. https://doi.org/10.24818/beman/2022.12.3-02

Cachia, R. et al., 2021. *Emergency remote schooling during COVID-19: A closer look at European families.* https://publications.jrc.ec.europa.eu/repository/handle/JRC125787 [Accessed 10 08 2023].

Caldwell, M., 2020. An investigation into the perceptions of Japanese university educators on the use of ICT in an EFL tertiary setting. *Computer-Assisted Language Learning Electronic Journal,* 21(2), pp. 1-16.

Cha, H., Park, T. & Seo, J., 2020. *What Should Be Considered when Developing ICT-Integrated Classroom Models for a Developing Country? https://doi.org/10.3390/su12072967*

Chigona, A., Chigona, W., Kausa, M. & Kayongo, P., 2010. An Empirical Survey on Domestication of ICT in Schools in Disadvantaged Communities in South Africa. *International Journal of Education and Development Using ICT,* 6(2).

Chipangura, S., 2013. An investigation into the manifestation of stigma and discrimination and its consequences on HIV/AIDS prevention and treatment efforts amongst people living with HIV/AIDS. Unpublished MPhil thesis. Cape Town: University of Stellenbosch. https://doi.org/10.1007/978-94-007-6324-1_2

Chisango, G. & Lesame, C., 2019. *Exploring accessibility to information and communication technology (ICT) at disadvantaged secondary schools in Gauteng Province – South Africa. 11th International Conference on Education and New Learning Technologies: 1-3July.* Palma, Spain, s.n. https://doi.org/10.21125/edulearn.2019.0178

Christensen, L. B., Johnson, B., Turner, L. A. & Christensen, L. B., 2011. *Research methods, design, and analysis.* 11th ed. New York: Pearson.

Cohen, L., Manion, L. & Morrison, K., 2007. *Research methods in education.* 6th ed. New York: Routledge.

Cohen, L., Manion, L. & Morrison, K., 2011. *Research methods in education.* 7 ed. New York: Routledge.

Collins, J. & Hussey, R., 2003. *Business Research. A Practical Guide for Undergraduate and Postgraduate Students.* s.l.:Polgrave Macmillan.

Connelly, L., 2016. Trustworthiness in qualitative research. *Medsurg Nursing,* 25(6), pp. 435-436.

Costa , P., Castaño-Muñoz , J. & Kampylis , P., 2021. Capturing schools' digital capacity: Psychometric analyses of the SELFIE self-reflection tool. *Computers & Education,* p. 162:104080. https://doi.org/10.1016/j.compedu.2020.104080

Cox, M., Preston, C. & Cox, K., 1999. *What factors support or prevent teachers from using ICT in their classrooms? Paper presented at the British Educational Research Association Annual Conference.* Brighton, University of Sussex.

Creswell, J. W., 2007. *Qualitative inquiry and research design: Choosing among five approaches.* 2nd ed. s.l.:Sage Publications, Inc.

Creswell, J. W., 2009. Editorial: Mapping the field of mixed methods research. *Journal of Mixed Methods Research,* 3(2), pp. 95-108. https://doi.org/10.1177/1558689808330883

Creswell, J. W., 2012. *Education Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research.* 4th ed. USA: Pearson.

Creswell, J. W., 2014. *Research Design: Qualitative, Quantitative and Mixed Methods Approaches.* 4th ed. Thousand Oaks: CA: Sage. https://doi.org/10.5539/elt.v12n5p40

Creswell, J. W. & Guetterman, T. C., 2019. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* 6th ed. New York: Pearson.

Creswill, J. W., 2013. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 4th ed. London: SAGE Publications, Inc.

Çuhadar, C., 2018. Investigation of Pre-service Teachers' Levels of Readiness to Technology Integration in Education. *Contemporary Educational Technology,* Volume 9, pp. 61-75. https://doi.org/10.30935/cedtech/6211

Davidovitch, N. & Yavich, R., 2018. The Impact of Mobile Tablet Use on Students' Perception of Learning Processes. *Problems of Education in the 21st Century,* Issue 1, pp. 29-42. https://doi.org/10.33225/pec/18.76.29

De Silva, C. R., 2015. *Technology integration: Tracing in-service primary teachers' technological, pedagogical and content knowledge development. PhD thesis. Cape Peninsula University of Technology.* Cape Town: s.n.

Delcker, J. & Ifenthaler, D., 2021. Teachers' perspective on school development at German vocational schools during the Covid-19 pandemic. *Technology, Pedagogy and Education,* 30(1), p. 125–139. https://doi.org/10.1080/1475939x.2020.1857826

Denzin, N. & Lincoln, Y., 2000. *The Discipline and Practice of Qualitative Research. In:Denzin, N.K. and Lincoln, Y.S., Eds., Handbook of Qualitative Research.* Thousand Oaks,1-32: Sage. https://doi.org/10.1177/1094428109332198

Di Pietro , G. et al., 2020. The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets. *Publications Office of the European Union.*

Diamah, A. et al., 2022. Evaluating the effectiveness of technological pedagogical content knowledge-based training program in enhancing pre-service teachers' perceptions of technological pedagogical content knowledge. *Front. Educ. 7:7447.* *https://doi.org/10.3389/feduc.2022.897447*

Drajati, et al., 2018. Investigating English Language Teachers in Developing TPACK and Multimodal Literacy. *Indonesian Journal of Applied Linguistics,* pp. 575-582. https://doi.org/10.17509/ijal.v7i3.9806

Drent, M. & Meelissen, M., 2008. Which factors obstruct or stimulate teacher educators to use ICT innovatively? *Computers & Education,* pp. 187-199. https://doi.org/10.1016/j.compedu.2007.05.001

Egede, B., 2021. Student Teachers' Readiness to use Information and Communication Technology (ICT) to teach: Exploring the influence of Gender. *Academia Letters,* p. 2. https://doi.org/10.20935/al491

Ekayati, R., 2019. Study of Blended-Learning Method Assisted By Edmodo in Teaching English at State Vocational School in Deli Serdang. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal,* 2(3), pp. 18-26. https://doi.org/10.33258/birle.v2i3.348

European Commission, 2020. *Digital Education Action Plan 2021 – 2027. Resetting education and training for the digital age.* https://ec.europa.eu/education/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf [Accessed 15 08 2024].

Farias-Gaytan, S., Aguaded, I. & Ramirez-Montoy, M. S., 2023. Digital transformation and digital literacy in the context of complexity within higher education institutions: a systematic literature review. *Humanit. Soc. Sci. Commun.,* Volume 10, p. 386–311. https://doi.org/10.1057/s41599-023-01875-9

Flick, U., 2014. *The SAGE Handbook of Qualitative Data Analysis.* London: SAGE Publication Ltd.

Fontana, A. & Frey, J. H., 2005. *The Interview: From Neutral Stance to Political Involvement. In: Denzin, N.K. and Lincoln, Y.S., Eds., The Sage Handbook of Qualitative Research.* 3rd ed. London: Sage Publication.

Gaya, S. I. G. S. I. et al., 2023. (2023). Barriers to information and communication technology utilization in basic education in kano, Nigeria. *Billiri Journal of Education Studies,* 1(1), pp. 120-125.

Gess-Newsome, J., 2015. A model of teacher professional knowledge and skill, including PCK: Results of the thinking from the PCK summit. In Berry, P. Friedrichsen, & J. Loughran (Eds.). *Re-examining of pedagogical content knowledge in Science.* pp. 28-42 Routledge. https://doi.org/10.4324/9781315735665-8

Gess-Newsome, J. & Carlson , J., 2013. *The PCK summit consensus model and definition of pedagogical content knowledge. In: The Symposium "Reports from the Pedagogical Content Knowledge (PCK) Summit, ESERA Conference 2013,* s.l.: s.n. https://doi.org/10.4324/9781315735665-8

Gilbert, N., 2008. *Research, theory and method. In N. Gilbert (Eds.), Researching social life.* 3rd ed. Thousand Oaks: CA: Sage:21-40.

Gökmen , Ö. F., Duman, I. & Akgün, Ö. E., 2018. *Malaysian Online Journal of Educational Technology,* 6(2), pp. 21-37.

Graneheim, U. H. & Lundman, B., 2004. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse education today,* 24(2), p. 105–112. https://doi.org/10.1016/j.nedt.2003.10.001

Graneheim, U. H. & Lundman, B., 2004. Qualitative Content Analysis in Nursing Research:Concepts, procedures and measures to achieve trustworthiness. *Nurse education today,* 24(2), pp. 105-112. https://doi.org/10.1016/j.nedt.2003.10.001

Grbich, C., 2007. *Qualitative data analysis: An introduction.* London: Sage: Thousand Oaks; New Delhi.

Gunzo, F. T., 2020. *Teachers' perceptions, experiences and challenges related to using ICTs in teaching Social Sciences in marginalised classrooms in the Eastern Cape Province, South Africa. PhD thesis, Rhodes University.* Grahamstown: s.n.

Gunzo, F. T., 2020. Teachers' perceptions, experiences and challenges related to using ICTs in teaching Social Sciences in marginalised classrooms in the Eastern Cape Province, South Africa. PhD thesis, Rhodes University, Grahamstown.

Hammarberg, K., Kirkman, M. & de Lacey, S., 2016. Qualitative research methods: when to use them and how to judge them. *Human Reproduction,* 31(3), pp. 498-501. https://doi.org/10.1093/humrep/dev334

Henning*, M. B. & Yendol-Hoppey, D., 2004. Context in methods course learning: Lessons for partnership work. *Teaching Education,* 15(4), pp. 401-416. https://doi.org/10.1080/1047621042000304529

Hero, J. L., 2019. The impact of technology integration in teaching performance. *International Journal of Sciences: Basic and Applied Research (IJSBAR),* 48(1), pp. 101-114.

Hossain, M. A., Salam, M. A., Shilpi, F. & Officer, A. D., 2016. Readiness and Challenges of Using Information and Communication Technology (ICT) in Higher Education in Bangladesh. *The Online Journal of New Horizons in Education,* 6(1), pp. 123-132.

Imran, Q., Kazimi, A. B. & Lashari, A. A., 2022. Examining the impact of extrinsic and intrinsic barriers to adopting information communication technology in classroom teaching in intermediate (K 12) colleges of Karachi, Pakistan. *Journal of Positive School Psychology,* pp. 2458-2478.

Jayakumar, M. S., 2019. ICT INTEGRATION IN EDUCATION: THE CASE OF SECONDARY SCHOOLS IN KERALA. PEOPLE. *International Journal of Social Sciences,* 4(3), pp. 1948-1962. https://doi.org/10.20319/pijss.2019.43.19481962

JISC, 2020. *What is digital transformation?.* [Online] Available at: https://www.jisc.ac.uk/guides/digital-strategy-framework-for-university-leaders/what-is-digital-transformation [Accessed 15 08 2024].

Johnson, L. et al., 2016. *NMC Horizon Report: 2016 Higher Education Edition.,* Texas: The New Media Consortium: Austin.

Johnson, R. B. & Christensen, L. B., 2012. *Educational Research: Quantitative and Mixed Approaches.* 4th ed. London: SAGE.

Johnston, T., 2015. Training teachers to bridge the digital divide. *The William & Mary Educational Review,* 3(2), pp. 14-17.

Kaur, K., 2023. Teaching and Learning with ICT Tools: Issues and Challenges. *International Journal on Cybernetics & Informatics.*

Kennedy, G. M., 2023. Challenges of ICT integration in teachers' education: A case study of the College of Education, University of Liberia. *International Journal of Social Science and*

Education Research Studies, 3(5), pp. 860-870. https://doi.org/10.55677/ijssers/v03i5y2023-15

Keramati, A., Afshari-Mofrad, M. & Kamrani, A., 2011. 'The role of readiness Factors in E-Learning outcomes: An empirical study'. *Computers & Education,* Volume 57, pp. 1919-1929. https://doi.org/10.1016/j.compedu.2011.04.005

Koh, J. H. L. 2020. Three approaches for supporting faculty technological pedagogical content knowledge (TPACK) creation through instructional consultation. *Br. J. Educ. Technol,* Volume 51, p. 2529–2543. https://doi.org/10.1111/bjet.12930

König , J., Jäger-Biela , D. J. & Glutsch , N., 2020. Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education,* 43(4), pp. 608-622. https://doi.org/10.1080/02619768.2020.1809650

König, J., Ligtvoet, R., Klemenz, S. & Rothland, M., 2017. Effects of opportunities to learn in teacher preparation on future teachers' general pedagogical knowledge: Analysing program characteristics and outcomes. *Studies in Educational Evaluation,* 53(2017), pp. 122-133. https://doi.org/10.1016/j.stueduc.2017.03.001

Kovacs, H., Pulfrey, C. & Monnier, E. C., 2021. Surviving but not thriving comparing primary, vocational and higher education teachers' experiences during the COVID-19 lockdown. *Educ. Inf. Technol,* Volume 26, p. 7543–7567. https://doi.org/10.1007/s10639-021-10616-x

Kurt, S., 2018. *Tpack: Technological pedagogical content knowledge framework - educational technology.* https://doi.org/10.4018/978-1-5225-1621-7.ch001

Lincoln, Y. S. & Guba, E. G. 1985. *Naturalistic Inquiry.* Beverly Hills, Calif: SAGE.

Madoda, P., 2018. *The adoption and use of information and communication technologies in private high schools in the Western Cape. MEd thesis. Cape Peninsula University of Technology.* Cape Town: s.n.

Mafenya, N. P., 2022. Exploring technology as an enabler for sustainable teaching and learning during COVID-19 at a university in South Africa. *Perspectives in Education,* 40(3), pp. 212-223. https://doi.org/10.18820/2519593X/pie.v40.i3.14

Makwela, V. N., 2019. *Paperless classroom experiences in Grade 7 Science in township schools. MEd thesis. University of Pretoria.* Pretoria: s.n.

Matthew , L., 2017. *THE ABSENCE OF INTERNET AT HOME IS A PROBLEM.* [Online] Available at: https://www.theedadvocate.org/the-absence-of-internet-at-home-is-a-problem-for-some-students/ [Accessed 2021 January 19].

Miller, L., Naidoo, M., Van Belle, J. P. & Chigona, W., 2006. School-level ICT Adoption Factors the Western Cape Schools. *Proceedings of IEEE 4th International Workshop on Technology for Education in Developing Countries,* pp. 57-61.

Mishra, P. & Koehler, M., 2006. Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record,* 108(6), pp. 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mukhari, S. S., 2016. *Teachers' experience of information and communication technology use for teaching and learning in urban schools. PhD thesis. University of South Africa.* Pretoria: s.n.

Mwapwele, S. D., Marais, M., Dlamini, S. & Van Biljon, J., 2019. Teachers' ICT adoption in South African rural schools: A Study of Technology Readiness and Implications for the South Africa connect broadband policy. The African Journal of Information and Co. *Mwapwele, S.D., Marais, M., Dlamini, S. & Van Biljon, J. https://doi.org/10.23962/10539/28658*

Myers, M. & Newman , M., 2007. The Qualitative Interview in IS Research. *Examining the Craft. Information and Organization,* Volume 2-26, p. 17. https://doi.org/10.1016/j.infoandorg.2006.11.001

Nath, S., 2019. ICT integration in Fiji schools: A case of in-service teachers. *Education and Information Technologies,* 24(2), pp. 963-972. https://doi.org/10.1007/s11423-018-9615-z

Nghaamwa, T., 2013. The perceptions of Students about risky behaviour that could make them vulnerable to HIV Infection. Thesis (MPhil) Stellenbosch University.

Octaberlina, L. R. & Muslimin, A. I., 2020. EFL students perspective towards online learning barriers and alternatives using Moodle/Google Classroom during COVID-19 pandemic. *International Journal of Higher Education,* 9(6), pp. 1-9. https://doi.org/10.5430/ijhe.v9n6p1

OECD, 2021. *OECD Digital Education Outlook 2021: Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots.* [Online]

Available at: https://www.oecd-ilibrary.org/education/oecd-digital-education-outlook-2021_589b283f-en [Accessed 15 08 2024].

OECD, 2021. *OECD Digital Education Outlook 2021: Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots.* [Online]
Available at: https://www.oecd-ilibrary.org/education/oecd-digital-education-outlook-2021_589b283f-en [Accessed 15 08 2024].

Okoye, K. et al., 2023. Impact of digital technologies upon teaching and learning in higher education in Latin America: an outlook on the reach, barriers, and bottlenecks. *Education and Information Technologies,* 28(2), pp. 2291-2360. https://doi.org/10.1007/s10639-022-11214-1

Padilla-Díaz, M., 2015. Phenomenology in Educational Qualitative Research: Philosophy as Science or Philosophical Science? *International Journal of Educational Excellence,* 1(2), pp. 101-110 . https://doi.org/10.18562/ijee.2015.0009

Pakdaman-Savoji, A., Nesbit, J. C. & Gajdamaschko, N., 2019. The conceptualisation of cognitive tools in learning and teachnology: A review. *Australasian Journal of Educational Technology,* 35(2), pp. 1-24. https://doi.org/10.14742/ajet.4704

Patton, M. Q., 2015. *Qualitative research and evaluation methods.* 3rd ed. Thousand Oaks: CA: Sage Publications.

Pettersson, F., 2021. Understanding digitalization and educational change in school by means of activity theory and the levels of learning concept. *Education and Information Technologies,* 26(1), p. 187–204. https://doi.org/10.1007/s10639-020-10239-8

Pittman, T. & Gaines, T., 2015. Technology integration in third, fourth and fifth grade classrooms in a Florida school district. *Educational Technology Research and Development,* Volume 63, pp. 539-554. https://doi.org/10.1007/s11423-015-9391-8

Player-Koro, C., 2012. Factors influencing teachers use of ICT in education. *Education Inquiry,* 3(1), pp. 93-108. https://doi.org/10.3402/edui.v3i1.22015

Pongsakdi, N., Kortelainen, A. & Veermans, M., 2021. Pongsakdi, N., Kortelainen, A., and Veermans, M. The impact of digital pedagogy training on in-service teachers' attitudes towards digital technologies.. *Educ. Inf. Technol,* Volume 26, p. 5041–5054. https://doi.org/10.1007/s10639-021-10439-w

Pultoo, A. et al., 2020. CLASSE21: Educators' acceptance of technology-enhanced classroom using the UTUAUT model. *Journal of Education and Social Sciences,* 14(1), pp. 39-48.

Ragin, C., 1994. *Constructing Social Research: The Unity and Diversity of Method.* Pine Forge Press, Sage.

Rahiem , M., 202a. Technological barriers and challenges in the use of ICT during the COVID-19 emergency remote learning. https://doi.org/10.13189/ ujer.2020.082248

Ravishankar, K. & Wase, D. M., 2024. Change and Challenges of ICT Use in Secondary Schools.. *International Journal of Education and Development using Information and Communication Technology,* 20(1), pp. 107-118.

Roblin, N. P. et al., 2018. Practical considerations informing teachers' technology integration decisions: the case of tablet, PCs. *Technology, Pedagogy, and Education,* 27(2), pp. 165-181.

Rotermund, S., DeRoche, J. & Ottem, R., 2017. *Teacher professional development by selected teacher and school characteristics: 2011-12 [Stats in Brief]. NCES 2017-200. National.* [Online]
Available at: https://nces.ed.gov/pubs2017/2017200.pdf.

Roth, W. M., 1999. Autobiography and Science Education: An Introduction. *Research In Science Education,* 30(1), pp. 1-12.

Rott, B. & Marouane, C., 2018. *Digitalization in schools–organization, collaboration and communication. In Digital Marketplaces Unleashed (pp. 113–124).* Springer: Berlin ,Heidelberg. https://doi.org/10.1007/978-3-662-49275-8_14

Rubin, H. J. & Rubin, I. S., 1995. *Qualitative Interviewing: The Art of Hearing Data.* 2nd ed. London: Sage Publications. https://doi.org/10.4135/9781452226651

Salam, S. et al., 2017. Impediments to the integration of ICT in public schools of contemporary societies: A review of literature.. *Journal of Information Processing Systems,* 14(1), pp. 252-269.

Salazar-Concha, C., Ficapal-Cusí, P. & Boada-Grau, J., 2020. Tecnoestrés. Evolución del concepto y sus principales consecuencias. TEUKEN BIDIKAY. *Revista Latinoamericana de Investigación en Organizaciones, Ambiente y Sociedad,* 11(17), pp. 165-180. https://doi.org/10.33571/teuken.v11n17a9

Scherer, R., Tondeur, J., Siddiq, F. & Baran, E., 2018. The importance of attitudes toward technology for pre-service teachers' technological, pedagogical, and content knowledge: Comparing structural equation modeling approaches. *Computers in Human Behavior,* Volume 80, p. 67–80. https://doi.org/10.1016/j.chb.2017.11.003

Shenton, A. K., 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information,* Volume 22, pp. 63-75. https://doi.org/10.3233/efi-2004-22201

Sherry, L. & Gibson, D., 2002. The Path to Teacher Leadership in Educational Technology. *Contemporary Issues in Technology and Teacher Education,* p. 2.

Shulman, L. S., 1986. *Paradigms and research programs for the study of teaching In M.C. Wittrock (Ed.).* 3rd ed. New York: Macmillan.

Sunday Times, 2020. *Smart Boards and computer classes may be affected by loadshedding, but teaching continues.*[Online]
Available at: https://www.timeslive.co.za/news/south-africa/2020-02-04-smartboards-andcomputer-classes-may-be-affected-by-load-shedding-but-teaching-continues/
[Accessed 21 June 2024].

Suryani, A., 2010. ICT in education: Its benefits, difficulties, and organisational Issues. *Journal Sosial Humaniora,* 3(1), pp. 106-123.

Taylors, A., 2024. *How Slow Internet Speed Affects Children's Education in Rural Areas.* [Online] Available at: https://www.universityherald.com/articles/61761/20170125/slow-internet- [Accessed 01 June 2024].

Tedla, B. A., 2012. Understanding ICT's Importance, Impacts and Barriers on Teaching and Learning in East African Countries. *International Journal for e-Learning Security (IJeLS),* 2(2). https://doi.org/10.20533/ijels.2046.4568.2012.0025

Thorne , S., Stephens , J. & Truant , T., 2016. Building qualitative study design using nursing's disciplinary epistemology. *Journal of Advanced Nursing,* 72(2), pp. 451-460. https://doi.org/10.1111/jan.12822

Tiba, C. A., 2018. *The ability of newly qualified teachers to integrate technology into their pedagogical practice. PhD thesis, Cape Peninsula University of Technology.* Cape Town: s.n.

Tiba, C. A., 2018. The ability of newly qualified teachers to integrate technology into their pedagogical practice. PhD thesis, Cape Peninsula University of Technology, Cape Town.

Tobin, G. A. & Begley, C. M., 2004. Methodological rigour within a qualitative framework. *Journal of Advanced Nursing,* 48(4), pp. 388-396. https://doi.org/10.1111/j.1365-2648.2004.03207.x

Tunjera, N. & Chigona , A. 2020. Teacher Educators' appropriation of TPACK-SAMR models for 21st century pre-service teacher preparation. *International Journal of Information and Communication Technology Education (IJICTE),* 16(3), pp. 126-140. https://doi.org/10.4018/ijicte.2020070110

Tsybulsky, D. & Levin, I., 2019. Science teachers' worldviews in the age of the digital revolution: Structural and content analysis. *Teaching and Teachers Education,* Volume 86, pp. 1-12. https://doi.org/10.1016/j.tate.2019.102921

Umugiraneza, O., Bansilal, S. & North, D., 2018. Exploring teachers' use of technology in teaching and learning Mathematics in KwaZulu-Natal schools. *Pythagoras,* 39(1), pp. 1-13. https://doi.org/10.4102/pythagoras.v39i1.342

Van Zyl, I. & Sabiescu, A., 2016. Symbolic narratives and the role of meaning: Encountering technology in South African primary education. *The African Journal of Information and Communication,* Volume 18, pp. 95-115. https://doi.org/10.23962/10539/21654

Vasileiou, K., Barnett, J., Thorpe, S. & Young, T., 2018. Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology,* 18(1). https://doi.org/10.1186/s12874-018-0594-7

Waghid, Z. & Waghid, F., 2018. *[Re]examining the role of technology in education through a deliberative decision-making approach: In the quest towards democratic education in South African schools. In Y. Waghid & N. Davids (Eds.), African democratic citizen education revisited.* New York: Palgrave Macmillan:133-156. https://doi.org/10.1007/978-3-319-67861-0_7

Washington, M. C., 2017. The Impact of Laptops in the classroom: An assessment of Participation, Motivation and Student Learning. *International Journal of Business, Humanities and Technology,* 7(2), pp. 35-37.

Wyk, B. V., Mooney, G., Duma, M. & Faloye, S., 2020. Emergency Remote Learning in the Times Of COVID: A Higher Education Innovation Strategy. Kidmore End.

Xie, B. et al., 2020. Global health crises are also information crises: A call to action—Journal *of the Association for Information Science and Technology.*

Yang, S. et al., 2020. *The use of ICT during COVID-19. Proceedings of the Association for Information Science and Technology..* [Online]

Available at: https://asistdl.onlinelibrary.wiley.com/doi/full/10.1002/pra2.297 [Accessed 2021 March 2].

Yilmaz, K., 2013. Comparison of Quantitative and Qualitative Research Traditions: Epistemological, Theoretical, and Methodological Differences. *European Journal of Education,* Volume 48, pp. 311-325. https://doi.org/10.1111/ejed.12014

Yin, R. K., 2018. *Case Study Research and Applications: Design and Methods.* 6th ed. Thousand Oaks: CA: Sage.

Yusrizal, Y., Hajar, I. & Tanjung, S., 2019. Analysis of Elementary School Teachers' Ability in Using ICT Media and Its Impact on the Interest to Learn of Students in Banda Aceh. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal,* 2(3), pp. 45-57. https://doi.org/10.33258/birle.v2i3.352

Zhang, X. 2021. *Perceived obstacles by ESL instructors and required support for integrating educational technology,* Issue (Publication No. 28543587) [Doctoral Dissertation. ProQuest Dissertations and Theses Global.

Zhao, Y., Llorente, A. & Gómez, M. 2021. Digital competence in higher education research: a systematic literature review. *Comput. Educ,* p. 168:104212. https://doi.org/10.1016/j.compedu.2021.104212

- **APPENDIX A: SURVEY**

SURVEY

Phase: Foundation ☐ Intermediate ☐ Senior ☐

---

1. What is your ICT level of competence?

Expert ☐ Intermediate ☐ Beginner ☐ None ☐

2. Where did you acquire your ICT competences?

Professional Development ☐ Module taught at university ☐ Self-taught ☐

3. Was the training relevant to your classroom practice?

Yes ☐ No ☐ Sort of ☐ Not Quite ☐

4. What topics did the training cover? Tick all that apply

Office Packages ☐ Internet & email ☐ Using ICT for teaching ☐

5. How long were you trained?

Less than a week ☐ Less than a month ☐ More than a month ☐ A Year ☐

6. Rate the training?

Excellent ☐ Very Good ☐ Good ☐ Not so good ☐ Bad ☐

7. To what extent has ICT training developed skills?

Exceptional ☐ Very Good ☐ Fair ☐ Poor ☐ Very Poor ☐

8. How often do you use ICTs in your classroom practice?

Often ☐ Sometimes ☐ Seldom ☐ Never ☐

9. On a scale from 1-5 (5 being very ready) if you should rate yourself how ready do you think you are to integrate technology into your pedagogy?

5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐

10. Are there any suggestions/advice you could share to other teachers on how to embrace the use of ICTs in their classroom?

Thank you for your participation. It is much appreciated!!!

- **APPENDIX B: IN-DEPTH INTERVIEW SCHEDULE**

IN-DEPTH INTERVIEWS WITH PRIMARY SCHOOL TEACHERS' READINESS TO INTEGRATE INFORMATION AND COMMUNICATION TECHNOLOGY INTO TEACHING AND LEARNING

The main research question of the study:

What are the factors that influence teachers' preparedness to use ICTs during COVID-19?

Purpose:

The in-depth interviews will include 4 participants. The purpose of this data collection method is to find a variety of experiences of educators' readiness to merge ICT into their pedagogy in their classroom, rather than just an individual point of view. Such situations may reveal a variety of different experiences and responses on the readiness of teachers to take on this new digital teaching frontier, but it can also help educators to realise how ICT can help them in presenting lessons more innovatively.

Research question	QUESTIONS	COMMENTS
	Training	
To what extent has the ICT training developed skills, prepared, and enabled teachers to use ICTs to sustain curriculum delivery during COVID-19?	● What ICT integration training did you receive? If any, how did it help you? ● Did you get the training as a Professional Development or module taught at a university? ● Tell us about your experience in using technology? ● Evaluate your own ICT skills on a scale of 0 - 10	
	Benefits	
What are the benefits and challenges that teachers experienced when using ICT for curriculum delivery during COVID-19?	● What are the benefits in integrating technology in your classroom? ● Are there any other benefits of integrating ICT in your pedagogy?	
	Challenges	
	● What challenges are you facing in implementing technology in your classroom? ● What can you do to overcome these challenges? ● Are there any other obstacles preventing you from integrating ICT in your pedagogy?	
	General	

Follow-up questions	● On a scale from 1-10 if you should rate yourself how ready do you think you are to integrate technology into your pedagogy? ● Is there anything you would like to contribute or ask?	

APPENDIX C: CONSENT FORM

Title of research project

Primary school teachers' readiness to integrate information and communication technology into their teaching and learning

I am **Gilroy Waldo Francis**, an active Education Master's student at the Cape Peninsula University of Technology (CPUT), specialising in the area of Information and Communication Technology (ICT).

My research aims to investigate how instructors use ICTs for both teaching and learning. The results of this study may enhance how well teachers apply technology in their way of teaching to enhance teaching and learning.

I will be conducting one-on-one interviews. The interviews will take place on any day during the month of September (Term 3). Your participation in this research will be entirely voluntary. If you choose not to participate, there will be no questions asked, and you have the right to withdraw at any time. I declare that you will remain anonymous, and the information collected from you for my research project will be kept private. Any information you volunteer or contribute during our one-on-one interviews will be recorded under a fake name instead of your real name. After my write-up, all information that I have collected will be kept electronically on the Google Drive.

I _____ (participant name)

☐ I have been given, and have understood, a description and an explanation of this research study.

☐ I agree to take part in the research.

☐ I understand that any information I provide will be done so anonymously, and I will not be identified in any of the analyses or reports resulting from data collection.

Names and Surname: _____

Date: _____

Signature: _____

APPENDIX D: PERMISSION LETTER TO CONDUCT RESEARCH FROM WCED

Directorate: Research

meshack.kanzi@westerncape.gov.za

Tel: +27 021 467 2350

Fax: 086 590 2282

Private Bag x9114, Cape Town, 8000

wced.wcape.gov.za

REFERENCE: 20220822-5469

ENQUIRIES: Mr M Kanzi

Mr Gilroy Francis

11 Mendelsohn Street

Dalvale

Paarl

7646

Dear Gilroy Francis,

RESEARCH PROPOSAL: Primary School Teachers' Readiness to Merge Information and Communication Technology into Their Pedagogy During The COVID-19 Pandemic.

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved, subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **29 August 2022 till 31 March 2023.**

6. No research can be conducted during the fourth term as schools are preparing and finalising syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Mr M Kanzi at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

The Director: Research Services

Western Cape Education Department

Private Bag X9114

CAPE TOWN

8000

We wish you success in your research.

Kind regards,

Meshack Kanzi

Directorate: Research

DATE: 29 August 2022

1 North Wharf Square, 2 Lower Loop Street, Private Bag X 9114, Cape Town, 8000

Foreshore, Cape Town 8001 Safe Schools: 0800 45 46 47 tel: +27 21 467 2531

https://wcedonline.westerncape.gov.za

APPENDIX E: ETHICS CLEARANCE CERTIFICATE (CPUT)

Faculty of Education

Highbury Road

Mowbray

7700

Tel: +27 21 959 6583

FACULTY OF EDUCATION

On 22 August 2022, the Chairperson of the Faculty of Education Research Ethics Committee (FREC) of the Cape Peninsula University of Technology granted ethics approval **(EFEC 1-08/2022)** to **G. Francis** for an **MEd degree**.

Title:	**Primary school teachers' readiness to merge information and communication technology into their pedagogy during the COVID-19 pandemic**

Comments:

The FREC unconditionally grants ethical clearance for this study. This clearance is valid until **31st December 2024**. Permission is granted to conduct research within the **Faculty of Education only**. Research activities are restricted to those details in the research project as outlined by the Ethics application. Any changes wrought to the described study must be reported to the Ethics committee immediately.

_____ Date: 22 August 2022

Prof. Zayd Waghid

Chair of the Faculty Research Ethics Committee

Faculty of Education efec@cput.ac.za

APPENDIX F: EDITING CERTIFICATE

NERESHNEE GOVENDER COMMUNICATIONS (PTY) LTD

REGISTRATION NUMBER: 2016/369223/07
DR NERESHNEE GOVENDER (PhD)
neresh@ngcommunications.co.za
0847022553
WRITING PRACTITIONER • EDITOR • COPYWRITER • TRAINER

PhD-Management Sciences: Marketing (gender and media); *PG DIP - Higher Education - Academic Developers (Cum laude;)* M-Tech Public Relations; B-Tech Public Relations *(Cum laude);* B-Tech Journalism *(Cum laude); N-Dip Journalism*

12/11/2024

GILROY WALDO FRANCIS
CPUT
Supervisors:
Prof Agnes Chigona
Dr Nyarai Tunjera

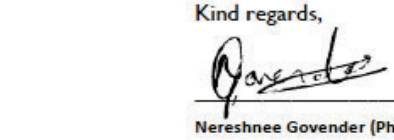
RE: EDITING CERTIFICATE

FOCUS AREA: PRIMARY SCHOOL TEACHERS' READINESS TO INTEGRATE INFORMATION AND COMMUNICATION TECHNOLOGY INTO THEIR TEACHING AND LEARNING

Thesis submitted in fulfilment of the requirements for the degree of Master of Education in the Faculty of Education and Social Sciences at the Cape Peninsula University of Technology.

This serves to confirm that this research has been edited for clarity, language and layout.

Kind regards,



Nereshnee Govender (PhD)