

**Exploring challenges in the use of the provided information
communication technology in schools of Seplan: A case study**

by

HONEST MUNZWA

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DECLARATION

Name: Honest Munzwa

Student Number: 47323582

Course: Master of Education

I declare that the mini dissertation (Exploring challenges in the use of the provided information communication technology in schools of Seplan: A Case Study) is my work and that I have acknowledged sources using completed references.

I further declare that I submitted the dissertation to originality checking software.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA and to other higher education institutions for another qualification.



Signature

10/08/2024

Date

DEDICATION

This dissertation is dedicated to my wife

Noreen Munzwa

For **her** constant support during the long night hours of study,

My dedication extends further to my brothers **Tichaona** and **Tonderai**

For their motivation and support and my family at large

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ABSTRACT

This study aimed to explore the challenges in the use of provided ICT equipment in the schools of Seplan Circuit. The DBE initiated numerous programmes of providing ICT equipment in schools of Seplan Circuit for over a decade now. Furthermore, it has partnered with numerous stakeholders to ensure that every school should be provided with ICT equipment and that every teacher must have their laptop. However, some identified schools have shown that the provided ICT equipment have not been used. That constituted the central problem to be addressed by this study because there is a need to establish why schools do not use the provided ICT equipment when global acknowledgments agree that the use of ICT equipment in schools is significant in transforming the education of a nation. A qualitative research approach was implemented to explore the challenges. A case study design involving four secondary schools from the Seplan Circuit was considered appropriate for this study. The qualitative research tool that was adopted was semi-structured interviews, while non-participant observation was employed to check the status of ICT equipment. From each school, four teachers and the principal were considered for the structured interviews. Analysis of the data responses was performed using content analysis. Empirical evidence from this study revealed that most secondary schools did not use the provided ICT equipment. It emerged that although schools were provided with a lot of ICT equipment, they had very limited exposure and training on how to use them; others pointed out that traditional methods of teaching were the best, hence, their limited implementation thereof. School principals further pointed out the extra burden that arises from the use of provided ICT equipment in terms of security, and extra costs to the school for maintenance and accountability. Based on the literature review and findings, the study recommends the collaborative design of an improved ICT training programme is important both at the school level and Departmental level. The study also recommends that more financial resources need to be allocated to ICT equipment so that schools will be able to repair and maintain their ICT equipment. Further study can be conducted while teachers are performing lesson presentation.

Keywords: ICT skill, high school, challenges circuit, provision of ICT, training, lesson preparation, communication, load-shedding, teacher, and Department of Education

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LIST OF ACRONYMS

CHEED	Chris Hani East Education District
COVID-19	Coronavirus disease 2019
CPU	Central processing unit
DBE	Department of Basic Education
DoE	Department of Education
DTPS	Department of Telecommunications and Postal Services
FET	Further Education and Training
ICASA	Independent Communications Authority of South Africa
ICT	Information and communication technology
HS	High school
MOOC	Massive Open Online Courses
MTN	Mobile Telephone Network
PLC	Professional Learning Communities
SGB	School Governing Body
SMT	School management team
UK	United Kingdom
Unisa	University of South Africa
USA	United States of America

CHAPTER 1: Chris Hani East Education District Orientation

1.0 INTRODUCTION

This study explores the experiences in the use of the provided information communication technology (ICT) equipment in high schools. The focal point of the study is some identified high schools of the Seplan circuit, Chris Hani East District (CHE District) in the Eastern Cape province, South Africa. As classroom technology continues to develop rapidly in recent years, new technologies have found their way into the classroom (Reddy, 2020:187). High schools in the Seplan circuit were provided with a wide range of ICT equipment devices such as laptops, whiteboards, and telematics by the Department of Basic Education (DBE), the Eastern Cape provincial Department of Basic Education, Vodacom, MTN South Africa and other stakeholders. There does not seem to be enough use of the provided ICT devices in schools. This is in line with Curtis's (2019:254) assertion that "there is a lack of robust technology integration in high schools" yet secondary schools were provided with ICT devices during the roll-out from the various stakeholders.

Gamede (2021:10) states that a knowledgeable community includes an association of individuals who allow learning amongst amongst its members. A knowledgeable community needs to ensure that information sharing is effective amongst amongst its members by creating and maintaining effective communication platforms that are solid. Moving to education, the same principles must apply, and teachers must strive to create learning communities using the provided ICT equipment. ICT is constantly changing, and the education sectors across the globe need to find ways of adapting to the ever-changing technology, while at the same time embracing the benefits of ICT. African countries are not spared from the global trends. South Africa, being a developing country, suffers similar challenges that include amongst others, lack of sufficient ICT infrastructure, the digital divide¹, and lack of proper teacher skills and knowledge in the effective use of ICT equipment in the classroom, as compared to developed nations such as the United States of America (USA) and the United Kingdom (UK), which are highly advanced in the use of ICT (Reddy, 2020:32). Efforts from the DBE to provide ICT devices to the South African schools is for teachers and principals to be able to provide the best education that is on par with other countries, which are knowledgeable societies.

¹ The digital divide is the gap between those who have access to technology, the Internet and digital literacy training and those who do not. It affects all generations – both rural and urban communities – and a wide variety of industries and sectors.

This study discusses the challenges of using the provided ICT equipment to enhance teaching. The study further explores whether teachers are aware of the purpose of the provided ICT equipment. Furthermore, the study highlights suggestions that can be implemented to make good use of ICT equipment that is provided

This chapter covers the background of the study, the rationale of the study, the problem statement, the aims and objectives, the research question, the theoretical framework, literature review, research methodology and design, data analysis and interpretation, research as well as division of chapters, and the conclusion.

1.1 Background

The invention of modern, state-of-the-art technology in the 21st century has inevitably made the use of ICT a lifeline for most schools in the world (Curtis, 2019:146). This entails the extensive use of ICT equipment in teaching and preparing learners who can meet the needs of current and future professional innovations (Chisango & Marongwe, 2021:146). Furthermore, the global outbreak of the Coronavirus disease 2019 (COVID-19) pandemic combined with its challenges between the years 2020 and 2021, has resulted in a global explosion in the use of ICT equipment to meet physical distance regulations (Firomumwe, 2022:76). Social media networks, online teaching, class blogs, homeschooling, and mobile devices were extensively used during the COVID-19 pandemic period.

Global acknowledgments between nations all point to the significant use of ICT in transforming, enhancing, and developing the education of a nation (Reddy, 2020:34). In alignment with global acknowledgments, since the dawn of democracy in 1994, the DBE has continuously been rolling out numerous programmes that support and implement the use of ICT in the classroom (Chisango & Marongwe, 2021:56). The DBE embarked on extensive consultation, and in 2004 it published a White Paper on e-education (DOE, 2004:17). The strategic goal for publishing the White Paper on e-education was to create and promote equal access to the use of ICT in all schools across South Africa (DOE, 2004:17). The White Paper on e-education is an official policy document governing the application of ICT in all schools. Departmental officials, managers, principals, and teachers use this policy to encourage effective use of technology in the classroom (DOE, 2004:17).

In 2007, the DBE moved a step further when they developed guidelines to improve the knowledge, skills, and values needed by teachers to use ICT to implement the National Curriculum Statement (NCS) effectively (DBE, 2012:23). As part of teacher development and to adopt the new guidelines, teacher training and workshops were rolled out across South African schools. Furthermore, the DBE developed the Thutong, a software program known as “place of learning” portal (ITWeb, 2005:15) in a bid to provide more access to online ICT resources to principals, teachers and learners. This agrees with Sethosa (2021:55), when she mentions that it is paramount that teachers must: possess relevant skills in ICT for them to be able to teach in an ever-changing technological environment.

Leading the initiative on the roll-out of ICT equipment in schools across schools in 2014, the Department of Education (DoE) partnered with various stakeholders that included MTN South Africa, Vodacom, the Department of Telecommunications and Postal Services (DTPS), and the Independent Communications Authority of South Africa (ICASA). Each stakeholder played a role in ensuring that ICT equipment was made available and was to be used effectively. MTN South Africa contributed ICT equipment to the value of R27 million in support of the 13 broadcasting studios in centres that are spread across the education districts of the Eastern Cape province; this is according to MTN South Africa’s annual report (MTN, 2019:145). This enabled teachers to access and make use of the free content on e-School, while ICASA developed guidelines that enabled them to monitor compliance on hardware, software, connectivity, and training.

In the period between 2010 and 2015, the DBE developed and implemented a framework to ensure that all schools, either rural or urban, had access to ICT by 2020. In the same endeavour, it rolled out laptops to every teacher per school and a laptop for each department. In fulfilling its obligations with the DoE, MTN South Africa further supplied a total of R34,6 million in educational programmes (MTN, 2019:33). In 2016 and 2017 most stakeholders that had partnered with the DoE in supplying ICT equipment to schools had met their obligations, thus resulting in schools being provided with more ICT equipment that included more laptops, trolleys with tablets, Wi-Fi routers, interactive whiteboards, projectors and the installation of telematics. Schools in the Seplan circuit, Eastern Cape, also benefited from this programme (DBE, 2016:8:2).

The implementation of the framework on equal access to ICT across all schools by 2020 was

interrupted by the outbreak of the COVID-19 pandemic in 2020. In dealing with the restrictions of the COVID-19 pandemic, the DoE introduced distance learning and homeschooling. To adapt to these changes, more ICT was provided in schools. The high schools of the Seplan Circuit were provided with state-of-the-art ICT that included laptops, tablets, telematics, Wi-Fi, and data projectors. This was very important in ensuring that teachers could adapt to new teaching methods that supported physical distancing while using ICT.

A data survey conducted by the DoE in 2014 showed that 26% of the teachers in South Africa have basic ICT skills, while 7% have intermediate skills. These data show that 63% of South African teachers lack skills in the use of ICT. The DoE had to develop a strategy to train and equip the teachers with the skills necessary to use ICT. With the help of the Intel Corporation, training of 1,783 teachers from schools in eight districts across all provinces in South Africa was provided (DBE, 2012:14). To increase teacher training and support, the DoE has partnered with various stakeholders. Vodacom has established 149 teacher centres in collaboration with the DoE, and teacher training is in progress.

The narrative above shows that the use of ICT in high schools has found its way into the deep rural parts of South Africa and the rural teacher has also undergone substantial changes and now has a reliable means of support in the classroom (Guo, Meadows, Duan & Gao, 2020:166). It is claimed that the use of ICT in schools is limited to typing, printing and photocopying (Chisango & Marongwe, 2021:56). It is from this perspective that I have decided to focus and explore what the challenges are in the use of the provided ICT equipment in high schools.

1.2 The rationale of the study

The rationale for the research study highlights how the researcher developed an interest in conducting the research for a particular topic. Furthermore, it confirms the reason why the researcher believed that the research was worth conducting (Creswell, 2021:67). The rationale of this case study emanates from the fact that the DoE and other stakeholders had embarked on the rollout of ICT in high schools (Sethosa, 2021:54).

The researcher believed that the provided ICT equipment was not being used efficiently due to various constraints, hence the study: exploring challenges in the use of the provided ICT equipment in high

schools in the Seplan Circuit of CHE District. The study aimed to establish if teachers are familiar with the primary purpose of using the provided ICT equipment. In the same context, some researchers mention that the challenges in the use of the provided ICT equipment were a result of a lack of continual technical support and training (Sethosa, 2021:34). This study will help to address these challenges and provide recommendations on how best these challenges can be overcome.

1.3 The problem statement

The central problem to this research emerged from the fact that the high schools in the Seplan Circuit of the CHE District were provided with ICT equipment such as the state-of-the-art overhead projectors and interactive whiteboards have been installed in schools in the Seplan Circuit, while teachers were provided with laptops and a data network. Furthermore, MTN and Vodacom have rolled out Wi-Fi routers, tablets, servers, and telematics centres in schools across South Africa (Chisango & Marongwe, 2021:68). However, Gamede (2021:87) argues that the use of ICT in high schools is still in its infancy. Observations and existing research suggest that ICT usage in these schools is largely confined to basic administrative tasks that include photocopying, typing, and printing (Gamede, 2021:87). This limited utilisation contrasts with the potential of ICT to transform educational practices (Chisango & Marongwe, 2021:56), More research needs to be conducted to identify the problems that are encountered in the use of the provided ICT in high schools. Hence, the research study aims to explore what the challenges are in the use of ICT that is provided in the high schools of the Seplan Circuit, CHE District, Eastern Cape.

1.4 The aim of the study

The study aimed to explore the challenges in the use of the provided ICT in the high schools of the Seplan Circuit, CHE District, Eastern Cape.

1.5 Objectives of the study

Based on the problem statement above, the objectives of this study were: -

1. To establish the primary purpose of using the provided ICT equipment in high schools of the Seplan Circuit, CHE District, as a tool for improving teaching.
2. To explore the causes of challenges in the use of provided ICT equipment in high schools of

- the Seplan Circuit, CHE District, Eastern Cape, in enhancing teaching.
3. To explore how effective has been the strategies used in addressing the challenges related to the use of ICT in high schools in the Seplan Circuit, CHE District, Eastern Cape, as a tool to enhance teaching.
 4. To provide recommendations on the use of provided ICT equipment in high schools of the Seplan Circuit, CHE District, as a tool to enhance teaching.

1.6 The research question

Based on the research objectives above, the researcher was aware of the provided ICT equipment in the high schools of the Seplan Circuit. Teachers were provided with laptops, printers, tablets, and data projectors, as well as network providers including amongst others, MTN and Vodacom, which had provided a variety of ICT equipment that range from Wi-Fi routers, interactive whiteboards, servers, and telematics centres. The researcher believes that most of these state-of-the-art technologies were not being used.

The researcher asked: is this because the teachers do not know the primary purpose of ICT? Could it be because the DBE and all stakeholders involved did not go through the process of training teachers and principals in the use of ICT?

1.6.1 Main research question

The main research question is: What are the challenges in the use of the provided ICT equipment in the Seplan Circuit of the CHE District?

1.6.2 Secondary research questions

The following are the secondary research questions:

1. What is the primary purpose of using ICT equipment that is provided in the high schools of the Seplan Circuit in the CHE District as a tool to enhance teaching?
2. What are the causes of challenges in the use of the provided ICT equipment in the high schools of the Seplan circuit in the CHE District, Eastern Cape, as a tool to enhance teaching?
3. What strategies have been used in addressing the challenges related to the use of ICT equipment in high schools in the Seplan Circuit, CHE District, Eastern Cape, as a tool to enhance teaching?

4. What recommendations can be made to improve the use of ICT equipment in high schools of the Seplan Circuit, CHE District, as a teaching tool to enhance teaching?

1.7 Theoretical framework

The theoretical framework that was used in this research is Siemens` Connectivism Theory. Connectivism Theory clarifies that human beings construct knowledge; they do not passively take in information, but rather through the interaction of experiences and ideas in the creation of new knowledge. As people experience the world and reflect upon those experiences, they build their representations and incorporate new information into their pre-existing knowledge. This theory was suitable for the study because it gives a clear understanding of the use of the provided ICT equipment to enhance teaching. Teaching not only takes place in the classroom but everywhere involving many channels that include social networking (Siemens, 2020:87). The theoretical framework is further discussed in Chapter 2 Section 2.1.1

1.8 Literature review

A literature review assesses the body of knowledge that has been established and the conclusions made by other researchers regarding the subject of the study that the researcher is interested in (Creswell, 2021:43). A researcher can identify research gaps in the literature by reviewing recent findings in conjunction with prior findings. In addition, it breaks down the fundamental presumptions and defences of the phenomena being examined. McMillan and Schumacher (2014:24) state unequivocally that the goal of writing a literature review is to create a framework for connecting new research findings to previous studies. Furthermore, a literature review looks back at what other scholars have studied, which can help the researcher to determine whether other researchers have already addressed and answered the researcher`s research questions (Paré & Kitsiou, 2017).

The purpose of this study`s literature review was to explore the challenges associated with using the provided ICT equipment in high schools. The literature review assisted the researcher in gaining insight into the existing body of knowledge and determining the primary purpose of using the provided ICT equipment in the educational context. Furthermore, it clarified existing knowledge in addressing the challenges associated with the use of ICT equipment in high schools, as well as recommendations from previous studies. In this case, the literature review helped to identify gaps,

thereby establishing the study's boundaries.

The study's key literature review characteristics included exploring the challenges associated with the use of provided ICT equipment in high schools around the world, in Africa, and in South Africa in particular. To unpack the existing body of knowledge, the chapter will look at the provision of ICT in high schools around the world, considering the efforts of those countries to train their teachers so that they can use the provided ICT equipment effectively. Furthermore, the literature should investigate the primary purpose of using ICT. The literature is discussed in greater depth in Chapter 2, Sections 2.2 to 2.4.

1.9 Research methodology and design

A research methodology encompasses specific procedures and techniques that are applied to identify and select participants, furthermore, it includes the processes that are critically applied to analyse information about a topic (Bhandari, 2023:118). It allows the reader to critically evaluate a study's overall validity and reliability (McMillan & Schumacher, 2014:37). Moreover, it describes the research strategy in totality and the skills applied in participant selection, data collection, and analysis (Creswell, 2021:87), thus assisting with the authentication of the study.

In exploring the challenges in the use of the provided ICT equipment in the high schools of the Seplan Circuit, the researcher addressed the following elements: the research method, the research paradigm, the research design, the research population, the research sample, and the data collection techniques.

1.10 Research method

Although different scholars attach different meanings, in essence, research methods are the techniques, strategies, and processes that are used during the data collection process (Abutabenjeh & Jaradat, 2018:240). While describing their problem and objectives and presenting their findings based on the data gathered during the study period, a research method is a route that researchers must take to conclude their study (McMillan & Schumacher, 2014:18). There are three primary research methods, namely: qualitative, quantitative and mixed methods (Creswell & Poth, 2017:19).

A qualitative research method was used in this study. The qualitative research method was deemed

most acceptable for this study because it gives a complete description of the teacher participants for exploring the challenges in the use of the provided ICT equipment in the high schools of the Seplan Circuit. The participant's responses to the interview create a wider understanding of the nature of the challenge, hence, the qualitative research approach elaborates abundant real-life data and is not limited to objectivity and precision.

Data instruments that include semi-structured interviews and non-participant observations were used to collect data from participants in their natural settings. It provides an in-depth description of the nature of the challenges encountered by principals and teachers in their natural setting. The data that were generated from this study were in real-time and specific because they were gathered on-site, which helped to answer how those challenges occurred.

1.10.1 Research paradigm

According to Williams (2007:8), a paradigm is a comprehensive belief system that also serves as a framework for research and practice. The research paradigm is a set of ideas, beliefs, and understandings that allow theories to be put into practice; it is also distinguished by a specific ontology, epistemology, and methodology (Silverman, 2021:16), and several research paradigms can be used, including the positivism paradigm, pragmatic, transformative, and interpretive paradigms, amongst others.

This study, which explores the challenges of using the provided ICT equipment in high schools, is centred on the interpretive paradigm. According to the interpretivism paradigm, teachers faced real, ontological challenges when using the ICT equipment that was provided. This was only determined through teacher interviews, which is how reality is depicted using in-person interviews to hear teachers' expressions (Silverman, 2021:12). In my role as a researcher, I adopted an interpretive viewpoint as a non-participant observer by gathering and evaluating data and presenting the participants' natural environment (Creswell, 2021:24).

According to Su (2017:56), there are different paradigms of academic inquiry that include amongst others positivism, constructivism, and interpretivism; moreover, it shows a contemporary worldview held by a group of people cooperatively. The interpretive paradigm is pertinent to this research since

it focuses on comprehending the challenges that teachers face, which is the subjective experiences of individuals, and it uses oriented methodologies that include interviewing and non-participant observation (Pringle & Booyesen, 2018:123).

1.10.2 Research design

McMillan and Schumacher (2014:166) define research design as a strategy for selecting subjects, research sites, and data collection procedures to address research questions. Furthermore, a sound research design aims to produce credible results (Lichtman, 2023:89). It is a framework that guides steps to be taken and acts as a link between research questions and research strategy implementation (Creswell, 2021:68).

A case study was used to explore the challenges in using the provided ICT equipment in high schools of the Seplan Circuit in the Eastern Cape province. Hennink, Hutter and Bailey (2020:16) defines a case study as an in-depth analysis of a case that describes and explains the phenomenon of interest. It analyses data collected over a specific period to provide an analysis of the context and processes that highlight the theoretical topic under study (Creswell, 2021:68). The researcher used a case study to explore the issues associated with the use of provided ICT equipment in high schools because it allows for the collection of much richer and more in-depth information from participants. The researcher believed that an in-depth analysis of participants would help to achieve the study's objectives.

In this research, a case study is applicable because the principals and teachers included in the study are living beings and the study reflected on their backgrounds, level of education, and experiences. This helped to reveal what caused the challenges because the semi-structured interviews and direct observation of the participants involved gave verifiable data. It provided facts to study because a case study turns the researcher's opinions into information that can be verified (Sethosa, 2021:36). In this research, the researcher gathered data on whether teachers knew the purpose of using the provided ICT equipment.

A case study is cost-effective and less expensive compared to other research methods. At the same time, it uses several different methodologies (Thomas. G, 2017:15). In this research, the researcher

used interviews and non-participant observation. A case study is relevant to all parties participating; for example, if challenges arise from poor policy formulation, there will be a need to reformulate the policy and workshop with the parties concerned. A case study was a suitable method for exploring the challenges in the use of the provided ICT equipment. It allowed data collection in a natural setting where the participants experienced the challenges (Goodrick, 2020:34). The data generated from this study were real-time and specific because they were gathered on-site, which helped to answer how those challenges happened.

1.10.3 Research population and sample

This section is divided into two sub-sections. The first sub-section addresses the population of the study and the second addresses the sample of the study. The two terms are defined, and their aims are presented in the research. Lastly, the terms ‘population’ and ‘sample’ are respectively described for the study. However, detailed descriptions of the terms population and sample are presented in Chapter 3 on research methodology and design.

1.10.3.1 Research population

In research, the population is defined as a comprehensive group of individuals and objects that share common characteristics and are of interest to a researcher (Creswell, 2021:117). Moreover, the research population has common characteristics that distinguish it from other subjects and objects (McMillan & Schumacher, 2014:22). The population is well-defined, with explicit inclusion and exclusion criteria (Creswell, 2021:148). Furthermore, it represents the totality of all the objects, subjects, and participants that align to a set of specifications under study (Lichtman, 2023:58). The population need not consist only of people; thus, we can have a population of either professional academic levels of teachers or a population of learner performance achievement outcomes.

In selecting the population for the study, their common characteristics in the use of provided ICT equipment in the schools’ environment were considered. It is important to note that the level of knowledge and skills of the participants is not the same, during their time at the tertiary level some participants might have received ICT training, whilst others might have attended workshops provided by the DoE.

In selecting the population for this study, (high schools from the Seplan Circuit), I had chosen high schools in the circuit because of the high level of use of ICT equipment in high schools, in this case, Grade 8 teachers have been explicitly selected because they still have a lot of time with learners at school, hence more time to conduct prolonged and persistent fieldwork and principals were also selected. Moreover, their academic demand is not as high as Grade 12. The principals were a suitable population because they are the managers of schools and are responsible for ensuring that all teaching materials available in their schools are utilised for the benefit of the learners. Furthermore, teachers are the drivers of the curriculum. Currently, the DoE has rolled out robotics in Grade 8 (DBE, 2012:4). This group of the research population is a homogenous group of black people who mostly reside in rural areas and are isiXhosa-speaking. Further elaboration on the research population is discussed in Chapter 3 of this study.

1.10.3.2 Research sample

A research sample can be explained as the miniature portion of a population that is selected for a particular study. The sample should represent the traits of the intended population. According to Creswell (2021:118), it is a cross-selection of the entire population from which the sample is derived. This can be conducted through a sample survey. Two sampling methods that can be applied in a research study, are non-probability sampling and probability sampling methods (McMillan & Schumacher, 2014:18). Non-probability sampling involves the selection of participants from a population using a subjective, furthermore it does not require a complete survey frame, is fast, and inexpensive, whilst probability sampling involves randomly selecting a small group of participants from a larger population, and then predicting the chance that all their responses put together will match those of the overall population. Lichtman (2023:69) argue that probability sampling allows every participant from the population to have an equal chance of presence in the sample. This means that there were no outliers because all participants had equal opportunity to be represented in the research.

In this research, purposive sampling, a non-probability sampling method was applied. Four high schools were purposively selected from the Seplan Circuit. According to McMillan and Schumacher (2014:18), this sampling strategy is best suited for this study because it involves all participants in the entire group and allows the use of criteria that ensure that there is no possible loss of variation.

At each selected school, one principal and four Grade 8 teachers were chosen. In totality, the research sample comprised twenty participants selected from four schools. The four high schools were studied, one high school at a time, through a school visit. The research sample is discussed further in the subsequent sections.

1.10.4 Data collection techniques

Data collection involves purposefully identifying the selected sites and individuals for the proposed study (Lichtman, 2023:75). According to Creswell (2021:67), data collection techniques must show clearly where the research will be conducted, who will be interviewed and what the participants will be observed or interviewed doing. Moreover, the selected participants will help the researcher understand the challenges they face. Thus, data collection techniques will discuss the strategies that will be used to recruit individuals to the study and discuss ways to provide incentives for individuals to participate (McMillan & Schumacher, 2014:17). Qualitative data collection techniques include observations, interviews, documents, and digital materials (Lichtman, 2023:38).

The data collection techniques that were used in this case study were semi-structured interviews and non-participant observation. I was very careful during data collection to ensure the reliability and validity of my findings. During the interviews, I also asked probing questions as a method to clarify the understanding of the participants on the question at hand. The questions were precise and structured. During the interview process participants were first informed about their content and were reminded that they had a right to withdraw if they were not comfortable. I avoided long time-consuming questions and only asked questions that were relevant to the study.

1.11 Data analysis and interpretation

Qualitative data analysis and interpretation is an inductive or deductive process of organising data into categories and identifying patterns and relationships amongst the categories, to give descriptions of a single phenomenon of interest to the researcher (McMillan & Schumacher, 2014:395). Qualitative data analysis and interpretation involve standard procedures that include arranging or organising data followed by transcribing data into different segments, coding, categorising, and lastly, there must be the development of patterns of the phenomenon.

Several styles can be used for qualitative data analysis, including quasi-statistical style, editing analysis and crystallisation style. According to McMillan and Schumacher (2014:396), the continuum of styles starts from quasi-style, which is prefigured, and the researcher decides on the categories in advance, and extends to crystallisation style which is emergent and is characterised by extensive long periods of immersion in the data. Qualitative data analysis can be performed using computer software or can be coded manually.

In my opinion, the information gathered from reliable and pertinent sources made the content analysis of the qualitative research study valuable. Bengtsson (2016:10) defines content analysis as an approach that primarily uses detailed readings of raw data to derive themes and sub-themes. Using the content analysis method, data were decontextualised, recontextualised, categorised, compared and analysed (Bengtsson, 2016:10). In terms of overall findings, the question “Exploring the challenges in the use of the provided ICT equipment in the high schools of the Seplan Circuit, Eastern Cape?” should be answered at the end of data analysis. The interpretation and summary of the overall findings is discussed further in Chapter 4.

1.12 Measures of reliability, validity, and trustworthiness

1.12.1 Reliability

Reliability is the consistency of measurement (Lichtman, 2023:47), the extent to which the results are similar over different data collection periods and across different researchers and amongst different projects (McMillan & Schumacher, 2014:195). Furthermore, reliability can be achieved by cross-checking codes developed by other researchers and comparing results that are derived (Creswell, 2021:105).

In ensuring the reliability of the study, the researcher guarded against drifting in the definition of codes and shifting in the meaning of the codes during the process of decontextualisation and recontextualisation of participants. To achieve this, data were continually compared with the codes and by writing memorandums about the codes and their definitions timeously. The researcher documented the procedure of the case study and the steps that were followed during data collection. The researcher proofread the participants’ transcripts to ensure that they did not contain obvious mistakes and omissions. I used the services of another person, to cross-check that there were no errors

on the codes and the transcripts.

1.12.2 Validity

Validity is the process of determining and establishing whether the research findings are accurate from the researcher`s perspective, the participant`s, and the readers` (Creswell, 2021:103).

To ensure the validity of the research study, the researcher conducted prolonged fieldwork, thus developing an in-depth understanding of the challenges in the use of the provided ICT equipment and conveying details about the participants. The second method that was applied to increase validity is triangulation, this was achieved by non-participant observation. As a different data source, I would observe the participants and check if what they said was coherent with the themes (Lichtman, 2023:99). Furthermore, validity was achieved by giving some of the descriptions and themes back to participants so that they will check their accuracy (McMillan & Schumacher, 2014:196). The research contained comments by the researcher about how their interpretation of the findings was shaped by their background, such as their experience, level of education, and socioeconomic origin (Creswell, 2021:274).

1.12.3 Trustworthiness

To ensure the trustworthiness of the study, the collected data were analysed using the criteria identified by Guba and Lincoln (1989), that is credibility, transferability, dependability, and confirmability. Trustworthiness is the level of confidence attached to the collected data, the analysis, and the procedures used to maintain the quality of a study (McMillan & Schumacher, 2014:197).

Credibility refers to the confidence that is attached to the truth of the research findings (Guba & Lincoln, 1989:12). It determines if the research findings correctly represent the participant`s original view and if the interpretation is correct (Lichtman, 2023:65). The strategies that can be applied to achieve this, are member-checking, prolonged fieldwork and triangulation (McMillan & Schumacher, 2014:197).

To ensure that this research was credible, the researcher used a member-checking method and triangulation. Non-participant observation was maintained throughout the research process, (see

Chapter 3). During the interview, participants were asked semi-structured questions and were recorded using a tape recorder. The interview aimed to collect data on the challenges of the use of provided ICT equipment and to establish if participants knew the purpose of the provided ICT equipment.

1.13 Research ethics

In research ethics are important because they guide how the research should be conducted; most qualitative research methods involve human beings. (Cohen, Manion & Morrison, 2018:16). To add further, they aim to protect the needs of research participants (Lichtman, 2023:71). Ethical issues include personal disclosure, safety, and dignity of participants (Creswell, 2021:144).

The study complied with the Unisa Research Ethics Committee`s guiding principles for research. The researcher applied for and was awarded ethical clearance from Unisa`s College of Education Research Review Committee before he started the process of gathering data from different respondents (Appendix A).

Before gathering data, the researcher applied for and obtained approval from the Circuit Manager (Appendix C), school governing bodies (SGBs) (Appendix F), principals, and teachers (Appendices D & E). The request letter specified the extent of time, the potential impact, and the outcomes of the research (Creswell, 2021:148). Before the commencement of the interviews and observation, the researcher met with the participants and explained the scope of the study, which was further detailed in a letter of consent that was also given to participants (Appendix I).

1.14 Limitations and delimitations of the study

1.14.1 Limitations of the study

The limitations of a study include all potential weaknesses and threats to the research and are usually out of the researcher`s control (Lichtman, 2023:53). Furthermore, they may arise because of the chosen methodology (Aspers & Corte, 2019:143), they may include amongst others, funding constraints (Creswell, 2021:144). Moreover, limitations affect the research results and the findings (McMillan & Schumacher, 2014:136).

This study was limited to four high schools located in the Eastern Cape, thus the geographical location of the research area presented challenges, since it was a rural setup and access to schools was a problem because of the long distance and poor roads that the researcher had to travel on. Since the participants of the study came from the same district within rural settings, the results may not be generalised to represent the South African education system or that of the world. It is therefore important that such research should be replicated across provinces in South Africa. Furthermore, the sampling method that was used could be a limitation. Thus, the findings cannot be used as a representative of all South African high schools.

1.14.2 Delimitations of the study

Delimitations are the limitations that are set by the researchers themselves (McMillan & Schumacher, 2014:139). The purpose of delimitations is to set the boundaries so that the study's aims and objectives will not become impossible to achieve (Creswell, 2021:144). Moreover, it describes the scope of the research (Lichtman, 2023:67)

This research had the following delimitations:

- Delimitation 1: The research was restricted to the Seplan Circuit of CHE District in the Eastern Cape province. The findings may or may not apply to other high schools.
- Delimitation 2: This study was delimited to principals and Grade 8 teachers as the target population of this study.
- Delimitation 3: This study was delimited to only public high schools.

1.15 Definition of key concepts

The following key concepts: ICT, DBE, and circuit are defined for study.

1.15.1 ICT

According to the DBE (2012:23.5), ICT is a broad term that encompasses all the electronic devices that are used to assist teachers in carrying out their duties successfully. Furthermore, ICT is versatile as it can be used to store data by electronic means such as e-mail and communicate, conducting meetings using Microsoft Teams. ICT is a range of computing devices that include desktops, laptops,

smartphones, data projectors, and data servers that can carry a wide range of communication and information functions (Perron, Victor, Hodge, Salas-Wright, Vaughn & Taylor, 2017:67). ICT improves the quality of teaching through modern and innovative teaching strategies.

1.15.2 Department of Education

The DBE is headed by the Ministry of Education and is responsible for managing Grades R to 12 (South African Schools Act no. 84 of 1996, hereafter referred to as the South African Schools Act (South Africa, 1996:12)). The grades are grouped into phases as follows: Grades 0 to 3 - foundation phase; Grades 4 to 7 - intermediate phase; Grades 8 to 9 - senior phase; and Grades 10 to 12 - further education and training (FET) phase (South Africa, 1996:14).

1.16 Programme of the Study

Chapter One presents an orientation of the study; the literature is reviewed in Chapter Two, and the research methodology and design are presented in Chapter Three. Data are analysed, interpreted, and discussed in Chapter Four. Findings are summarised, recommendations are made, and conclusions are drawn in Chapter Five.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The previous chapter presented an outline of the study. The literature was reviewed with an emphasis on exploring challenges in using the use of ICT equipment provided in Seplan Circuit high schools. This chapter's literature review aims to establish what other researchers have discovered about the challenges in high schools around the world, in other African nations, and in South Africa's provinces other than the Eastern Cape. Second, literature offers the corpus of knowledge that is currently available on comprehending the main goal of using the provided ICT equipment as a tool to improve teaching (Lichtman, 2023:21). Additionally, it offers information on ICT equipment provision in high schools.

This study was worth conducting because previous research has shown that the use of ICT equipment enhances teachers' motivation, professional development, technological knowledge, and skills (Zaheer, Malik & Munir, 2021:130). The use of ICT equipment has the potential to accelerate, enrich, and deepen skills during the teaching process (Amadi & Siminialayi, 2021:67). This study's context seeks to explore the use of ICT not only in South Africa but also in other nations.

Several variables, including the availability of skills and competencies and contextual elements like support and training, can impact the challenges encountered when using the provided ICT equipment (Chisango & Marongwe, 2021:68). Additionally, one's acceptance and use of ICT in the teaching process are influenced by motivation and attitudes toward its use. High schools in Botswana, Ghana, and Nigeria were taken into consideration to comprehend the African context, while high schools in the USA, Australia, and Germany were taken into consideration to establish the global challenge in the use of ICT. Additionally, Gauteng and KwaZulu-Natal (KZN) provinces were taken into consideration. An inherent challenge in the use of ICT is the failure to understand the primary purpose of its use in enhancing teaching (Chisango & Marongwe, 2021:48). Lastly, a conclusion is drawn on the understanding of past and current knowledge.

2.2.1 Theoretical framework: connectivism

Creswell (2021:108) describes the theoretical framework as a comprehensive explanation for behavioural patterns. It is primarily used to study people's cultures, shared behaviours, and attitudes. Siemens (2020:37) refers to the theoretical framework as a theoretical lens or perspective, which serves as the study's overall orienting lens. Furthermore, it plays a role in shaping the set of questions asked, informs the information to be collected, including the method that will be used to analyse, and serves for action or change. The theory of learning seeks to help researchers better understand how individuals learn (Creswell, 2021:156). Five learning theories in education include behaviourism, cognitivism, constructivism, humanism, and connectivism (Alam, 2023:38).

This case study applies and discusses the connectivism learning theory by George Siemens. (Siemens, 2020:38), the pioneer of connectivism theory defines connectivism learning as a theoretical model that perceives learning as a connection concept inspired by innovation and interpersonal interactions. It is the initial learning stage in the learning cycle, which happens when awareness is activated by individuals' connection to a learning community (Goldie, 2016:41). The connectivism model defines a learning community as a group of people that are interconnected with network connections and may include organisations, school community or individuals that are connected to the same source of information. Siemens (2020:42) characterises a network as a connection amongst institutions or access points that can be humans, gatherings, devices, fields, concepts, or community members and are guided by broad principles (Bell, 2011:529).

The main objective of connectivism is to analyse how individuals learn in the most beneficial ways in a variety of technological ecosystems (Corbett & Spinello, 2020:26). As the use of the Internet continues to increase in both developing and developed nations, transfer of information between individuals becomes easier and people who are thousands of kilometres away from each other can exchange messages instantaneously. Paré and Kitsiou (2017) argue that the theory's contribution stems from its "socio-technological nature," which involves teachers forming collaborative learning using social media.

Other learning theories gave rise to the Connectivism Theory, so connectivism ought not to be considered separately. Furthermore, these theories should be considered as the basic build

components of connectivism theory (Van Den Berg, 2017:75). These theories are behaviourism, cognitivism, and constructivism, and while they were developed at a time when the application of ICT in high schools had little influence on the educational system, the connectivism theory cannot be discussed without mentioning behaviourism, cognitivism, and constructivism.

Ivan Pavlov founded behaviourism during the 19th century. The Behaviourism Learning Theory focuses on what can be observed in individuals' responses to their surrounding environment and how to suggest a notable difference in their everyday life (Harasim, 2012:10). Behavioural learning theories agree that successful learning takes place when individuals are exposed to a phenomenon repeatedly. It is centred on classical and apparent conditioning with the assumption that the more that teachers are exposed to ICT, the more they will use it to achieve a positive outcome or comprehension (AlDahdouh, Osório, & Cares 2015:14). This theory falls short of this study because it assumes that knowledge is a physical phenomenon that teachers should acquire; furthermore, it considers learning as a process of just passing information to the teacher's head via reward and punishment mechanisms, also known as the "skill and drill" method. This does not apply to technology use because technology is constantly changing, but Connectivism Theory facilitates continuous learning and the development of more connections as teachers seek new and current knowledge on technology use (Siemens, 2020:37).

Piaget's (1983) progression of the Cognitivist Theory was linked to the growing discontentment with behaviourist theory during the 1950s, researchers argued that Pavlov's theory fell short of sufficiently explaining complex learning behaviours. The Cognitivist Theory explains that the assimilation of knowledge involves both internal and external factors. With the internal factors, the mind is active, allowing retention of knowledge. When individuals reflect on their learning the internal factors (mind) make connections with the external factors (ICT) forming meaning and understanding (Van den Berg, 2017:77). External factors that include the availability of ICT affect their use. Teachers who have been exposed to ICT at a young age have created their knowledge on ICT use and are better prepared to use ICT than teachers who have not experienced ITC use when they were young.

2.2 Challenges in the use of ICT

Many countries around the world face challenges in the use of ICT in high schools; however, the challenges vary from country to country (Reddy, 2020:35). The sub-sections hereunder are a discussion on the global, African, and South African context on challenges in the use of ICT. Lastly, a summary of this section is presented.

2.2.1 Challenges in the use of ICT globally

In the USA, educational policymakers and the Department of Education have the assumption that providing high schools with ICT will lead to improved teaching (Sethosa, 2021:36). Research in two high schools in Silicon Valley, Northern California, the epicentre of technological advancement, revealed that widespread teacher and learner use of equipment and software was rarely the result of access to these resources (Rajapakse, Ariyaratna & Selvakan, 2024:38). The lack of motivation of teachers in Northern California causes teachers to not use computers during lesson preparation (Sulistianingsih & Mukminan, 2019:122).

In Sweden, there are interrelated challenges in the use of ICT. Firstly, as the Department of Education integrates the use of ICT into all aspects of schools' curricula from planning to assessment, it falls short of understanding that teachers lack the basic skills for using the provided technologies (Amadi & Siminialayi, 2021:67). At Litorina Folk High School, out of 23 teachers who were provided with ICT to administer a district Mathematics competition, only eight managed to administer the quiz successfully; the rest failed to meet the deadline (Reddy, 2020:130). Poor technical support of teachers on the use of ICT presents a big challenge because technology is ever-evolving (Sulistianingsih & Mukminan, 2019:124). At Norra Real Secondary School, teachers' lack of effective training compounds to challenges in using the provided ICT. Sweden revealed that high school teachers needed more training (Amadi & Siminialayi, 2021:68).

According to Sulistianingsih and Mukminan (2019:122), schools in Australia have shown that principals lack the basic knowledge of computer application skills, which presents challenges in accessing administrative material from the Departmental website. The same problem applies to teachers, as they are not able to perform lesson preparation and downloading of revision material due to a lack of skills. At the same time, Science and Technology in education continue to develop at an

accelerated rate and a need for new skills and competencies will arise.

In Germany, at Heinz Brandt School in Berlin, almost one-third of all ICT provided has outdated software (Firomumwe, 2022:125). Furthermore, challenges in the use of ICT in high schools arise from technological factors that include poor infrastructure planning, hardware, and software (Reddy, 2020:133). This presents a huge challenge to teachers and learners. The same problem applies to two other schools: Platanus Combined School and Canisius High School (Firomumwe, 2022:125). Furthermore, the specific time allocation for lessons presents challenges: setting up the technology for lesson presentation and clearing it in preparation for the next lesson presentation has proven to be a rigorous burden for most teachers at Platanus Combined School and Canisius High School (Firomumwe, 2022:120).

The COVID-19 pandemic has brought about many changes in the education sector, including the transition to more technology-based learning and accelerated online teaching and learning (Moorhouse, Li & Walsh, 2021:118). Such a big transition had a diverse set of challenges in the use of the provided ICT in teaching and learning. The teachers had the challenge of determining which technology worked effectively and which did not (Reddy, 2020:132).

2.2.2 Challenges in the Use of ICT in Africa

The use of ICT in high schools in African countries is fraught with challenges. The challenges range from the total lack thereof, poor network infrastructure, and unsupportive curricula (Zaheer et al., 2021:66). Few African countries have adopted the use of ICT devices in their classrooms, while the majority still lag (Sethosa, 2021:44). The shortage of electricity causes unplanned power cuts known as load-shedding. All these contribute to challenges in the use of ICT (Chisango & Marongwe, 2021:122).

In Botswana, for example at Rainbow Secondary School, the lack of skills in ICT is a serious challenge that is hindering technology integration in the classroom (Gamede, 2021:87). Teachers lack the basic knowledge of computer applications; this conforms with the research study conducted at Naledi Secondary School that exhibited low teacher enthusiasm for the use of ICT devices (Zaheer et al., 2021:66). Furthermore, teachers have demonstrated a lack of basic knowledge of the

applications, which renders ICT ineffective to use for teaching purposes (Chisango & Marongwe, 2021:122).

In Ghana, high schools lack adequate connectivity and accessibility (Firomumwe, 2022:62). The use of ICT in most high schools in rural Ghana is new (Gamede, 2021:54). Thus, network connectivity and accessibility are still limited. There is a robust need to train teachers and develop policies and curricula that integrate the use of ICT into teaching (Firomumwe, 2022:62). Zaheer et al. (2021:87) mention that investigations in several research studies on whether these advanced ICT devices are effective in the classroom have been conducted and it has been concluded that they are effective (Sethosa, 2021:51). Zaheer et al. (2021:87) argue further that the challenge is whether the teachers believe they are using them effectively or not during the teaching process.

In Anambra State, Nigeria, teachers cannot perform digital lesson preparation due to a shortage of computers (Firomumwe, 2022:68). The schools cannot afford to provide each teacher with a laptop. Moreover, the Department encourages teachers to use ICT in assessment (Chisango & Marongwe, 2021:117). Thus, these shortages present challenges during lesson preparation as teachers must wait for a single laptop to prepare their lessons (Firomumwe, 2022:78). The problem extends further than lesson presentation; for example, in some schools only one classroom is fitted with necessary ICT and teachers must take turns to use it (Zaheer et al., 2021:61).

Firomumwe (2022:74) states that the period of COVID-19-induced lockdowns presented a lot of challenges in the use of ICT. Africa, just like the rest of the world, was not spared from the effects of the COVID-19 pandemic (Gamede, 2021:34). Some countries had hard lockdowns and countries were forced to completely close their schools with or without ICT to use online teaching and learning (Zaheer et al., 2021:58). Schools had to adhere to lockdown regulations, and during these periods teaching and learning were greatly affected, for example, Naledi Secondary School in Botswana was closed for more than eight months (Chisango & Marongwe, 2021:122).

2.2.3 Challenges in the Use of ICT in South Africa

Hereunder is a discussion on the challenges in the use of ICT in the South African context. These challenges include, amongst others: lack of skills, shortage of ICT, vandalism, and burglary (Dube, 2020:142). In recent years, the challenges have been exacerbated by continuous power cuts due to electricity shortages (Gamede, 2021:77). Moreover, the gap between the rich and the poor continues to increase, causing challenges in the provision of ICT (Abel, Tondeur & Sang, 2022:23).

In Gauteng, at Senwane Secondary School, teachers rarely use the provided laptops in the classroom (Chisango & Marongwe, 2021:128). The study has attributed the problem to a lack of skills: out of the 30 teachers only 6 use their laptops during lesson presentations. Most of the teachers pointed out that they do not know how to use them (Sanusi & Oyeiere, 2021:26). The same applies to Inkamana High School in KZN province, where most of the teachers highlighted that they do not have the relevant skills to prepare and present lessons using computers (Gamede, 2021:54). It is important to take note that the use of ICT provided in high schools is limited because of a lack of skills (Chisango & Marongwe, 2021:128).

The study that was conducted at the rural Centocow High School in the Harry Gwala District in KZN province, shows that there is an acute shortage of ICT (Gamede, 2021:87). Limpopo faces the same predicament: Makikele High School located in the deep rural area of Limpopo, for example, has no accessibility to ICT (Chisango & Marongwe, 2021:123). Furthermore, the provincial education department supplied 15 learner tablets at Magaliesburg SSS, whereas the school has a total enrolment of 450 learners (Gamede, 2021:74). This demonstrates the severity of the shortage of ICT in South African schools (Sethosa, 2021:63).

Theft, burglary, and vandalism are prevalent in South Africa and schools are not spared from these crimes (Chisango & Marongwe, 2021:130). Most of the ICT that was provided to high schools in the past five years has either been stolen or vandalised (Gamede, 2021:62). According to the research that was conducted on three high schools situated in Emfuleni in Sedibeng West District in Gauteng province, the computer laboratory for most of the schools has been vandalised; some other schools are reluctant to install equipment in their Science laboratories because high schools lack adequate security (Sethosa, 2021:50). At Secunda High School in Gauteng, thieves vandalised a computer

laboratory and stole all the computers, printers, and data projectors (Gamede, 2021:59). Vandalism is a serious challenge, at Matarapane SSS in Limpopo, a community protest resulted in the stealing of delicate central processing unit (CPU) hardware, backup batteries, and monitors, rendering the technology dysfunctional (Chisango & Marongwe, 2021:98).

The use of ICT relies on a continuous supply of electricity, which is lacking in most high schools (Gamede, 2021:56). Mashinga High School in the rural heart of KZN, has no electricity, which presents a serious challenge as the school cannot use any electrical devices (Sethosa, 2021:48). Despite the lack of electricity in most rural schools, the schools in towns are also faced with a current challenge of power cuts due to electrical shortage (Chisango & Marongwe, 2021:98). The use of ICT devices depends on a reliable electricity supply. For example, continuous power outages and rotational load-shedding have damaged the critical infrastructure at Zwelonke High School in KZN (Gamede, 2021:39). In KZN province, at Masibumbane High School, during presentations using the ICT that is provided, teachers faced challenges (Chisango & Marongwe, 2021:97), which was attributed to a lack of basic skills in using basic technology. The same challenge is true in the rural Limpopo province at Matarapane Secondary School, where a significant majority of teachers were not able to use ICT during lesson presentations (Gamede, 2021:55).

The COVID-19 pandemic has encouraged schools to teach their learners online to maintain physical distancing (Gamede, 2021:45). Most schools have successfully adopted the use of technology. Most schools face acute shortages in the supply of ICT devices and infrastructure (Chisango & Marongwe, 2021:93). This created many challenges where teachers needed to introduce online teaching and learning (Gamede, 2021:45). Teachers faced many challenges that ranged from the shortage of ICT devices, the shortage of soft copies of teaching material content, and poor network connections (Chisango & Marongwe, 2021:56).

The periods of extended power cuts cause catastrophic damage to ICT infrastructure (Sethosa, 2021:51). For example, at Senwane Secondary School, all the data servers were damaged by electricity spikes during load-shedding, rendering the whole ICT infrastructure useless (Gamede, 2021:39). The powering on and off electricity damages the most delicate components of the network systems, and most schools do not have any backup power sources (Chisango & Marongwe, 2021:87). Teachers will not be able to present their lessons using ICT during periods of power cuts, and data

can be lost or damaged due to uninformed power surges. For example, in Gauteng, Magaliesburg High School recorded that all its CPUs were damaged by an uninformed power cut-off (Chisango & Marongwe, 2021:54).

It emerged that a lack of skills, a shortage of ICT, and a high rate of vandalism and burglary, are the challenges to the use of ICT that is provided in high schools globally, in Africa and South Africa (Chisango & Marongwe, 2021:66). Although some of these challenges are like other countries, power shortages are a unique challenge that mainly only affects South African high schools (Sethosa, 2021:59).

2.3 Primary purpose of using ICT

The succeeding sections discuss the challenges faced in the use of ICT globally, in Africa, and in South Africa. The sections below will discuss the purpose of using the provided ICT globally, in Africa and South Africa.

2.3.1 Primary purpose of using ICT globally

In the USA, at Northside College Preparatory Secondary School, a study revealed that teaching personnel are developing motivational skills with ICT in the classroom (Guo et al., 2020:166). ICT use helps to increase teacher motivation,

In Pakistan, research at one of the rural high schools that have been provided with ICT, has shown a great improvement in technological knowledge, and skills (Zaheer et al., 2021:48). The use of advanced ICT such as the simulation of geography lessons in a virtual classroom and computer technology has made the classroom processes more efficient (Zaheer et al., 2021:51).

The government of Germany has implemented a cutting-edge school community model that focuses on the four key components of technology use in high schools: partnerships, professional development for teachers, leadership, and teaching environments (Lukas & Yunus, 2021:115). These components are essential to advancing educational innovation concerning the flexible application of digital technology. Because the model is generic, there is much room for interpretation when examining how the ICT currently used in schools should be assessed and enhanced. Teachers are

motivated, and their skills are accelerated, enhanced, and deepened when using ICT (Amadi & Siminialayi, 2021:134). Therefore, there are advantages to using ICT because it will increase teachers' motivation and create a positive attitude.

2.3.2 Primary purpose of using ICT in Africa

Teachers in Ghana can present lessons with engaging real-world examples and visually stimulating illustrations from a variety of sources thanks to the use of ICT (Dada & Olaniyan, 2021:50). Learners' comprehension and focus are enhanced by this. Furthermore, the implementation of ICT in two high schools located in the rural areas of Anambara state, Nigeria, has demonstrated a rise in learner engagement (Lukas & Yunus, 2021:117).

Studies conducted in Nigeria have indicated that the use of ICT fosters critical thinking (Dada & Olaniyan, 2021:56). Using a virtual classroom, virtual fieldwork was carried out that mimicked a three-dimensional physical classroom. This is an extremely uncommon pedagogical skill that encourages critical thinking in both teachers and learners. Additionally, the application of ICT to foster a lifelong learning community aims to teach skills necessary for their future involvement in the information society. By being exposed to a variety of technological channels used to obtain information, teachers who are exposed to ICT throughout their educational experiences develop high-order thinking skills (Lukas & Yunus, 2021:117).

The primary purpose of using ICT in high schools is for lesson preparation, presentation, and assessments. In Botswana, the Department of Education has made it compulsory for teachers to use their computers in developing lesson plans (Okafor, 2020:123). Moreover, teachers can download videos that stimulate learner involvement (Lukas & Yunus, 2021:111). The use of ICT results in increased classroom productivity and collaborative work. Hence, learners can be given tasks to research a topic using the Internet (Dada & Olaniyan, 2021:56).

2.3.3 Primary purpose of using ICT in South Africa

ICT is mostly used to enhance teaching methods, teachers in Gauteng have noted significant gains in learner performance when it is used (Sethosa, 2021:82). Teachers have reported that the incorporation of ICT in the classroom, including educational videos, helps keep learners' attention (Chisango &

Marongwe, 2021:84). When using videos, it appears that learners retain and focus more on what they see and hear than on the information that is simply given to them (Gamede, 2021:42).

In KZN, using ICT increases teacher motivation (Chisango & Marongwe, 2021:83). After receiving new laptops and tablets, teachers at Centocow High School have shown positive attitudes in class attendance, lesson preparation, and learner assessments (Gamede, 2021:52). It emerged that the source of motivation and inspiration was the new ICT that they had received (Sethosa, 2021:94). Furthermore, it enables situational and personalised teaching, thus, teaching can take place anywhere. This can be entertaining for both teachers and learners. When teachers are exposed to technology, which includes, teams, lesson plan software, websites and e-books, and interactive media, their interests and motivation increase (Chisango & Marongwe, 2021:92). The use of the Internet supports seamless learning experiences (Gamede, 2021:49).

ICT use improves teaching competency and independence (Sethosa, 2021:72). Teachers gain decision-making and significance skills as they experiment with digital environments. By performing this, they acquire abilities that will support their learning processes, like self-determination and digital literacy (Gamede, 2021:71). Teachers create both online and in-person social connections to support social learning in the social media age. By incorporating ICT into group projects or promoting learner involvement in virtual learning environments, teachers can create engaging, socially relevant lessons. Additionally, it offers a chance to teach learners about Internet safety and constructive digital socialisation (Chisango & Marongwe, 2021:88).

According to Zaheer et al. (2021:74), the use of ICT by high school teachers is thought to have contributed to their improvement in skill sets in recent years. In addition, it helps educators reach higher levels of professional and personal growth in a short space of time (Sethosa, 2021:41). Nevertheless, despite all these technological advancements, ICT use in the classroom is still sluggish (Gamede, 2021:45). They even go so far as to claim that teachers seem to be the main reason behind the notable decrease in the uptake of new technology (Chisango & Marongwe, 2021:67). From this vantage point, it is evident that teachers face difficulties when using the provided information technology because they are unaware of the main purpose of using it.

2.4 Provision of ICT

In recent years, many public high schools around the world have experienced a surge in the provision of ICT by their respective Departments of Education (Gamede, 2021:23). However, most researchers continue to mention the shortage of ICT as a major challenge hampering the effective use in the classroom.

The sub-sections hereunder discuss the provision of ICT globally, in Africa, and South Africa.

2.4.1 Provision of ICT globally

In Germany, at Litorika High School they were provided with a variety of ICT devices (Guo et al., 2020:171). Research that was conducted to evaluate how effective distance education was, found that there was a lot of duplication in providing ICT and most of the devices did not serve the purpose that they were intended to serve. Teachers were provided with individual laptops and tablets in 2019: in 2020 they were provided with the same set of ICT equipment.

In Sweden, the DoE ensures the availability of ICT for all the schools, each school must have a functional computer laboratory and a dedicated printing room for typing, printing, and photocopying (Guo et al., 2020:151). The high schools have schedules that describe the routine maintenance programme. Furthermore, the programme states which hardware and software components need to be replaced. The schools have established learning communities and platforms that allow for the exchange of information (Lukas & Yunus, 2021:114).

In Pakistan, educational institutions have been provided with powerful ICT equipment that have efficient speeds (Zaheer et al., 2021:76). This was achieved when the Education Department joined efforts with other stakeholders. The high-speed Internet connections allow the teachers to present virtual geography lessons. All these efforts show that globally other nations are prioritising the provision of ICT equipment in high schools (Guo et al., 2020:132).

2.4.2 Provision of ICT in Africa

In Anambra State, Nigeria, fibre network systems were distributed to teachers in 269 government-owned high schools across six learner centres (Dada & Olaniyan, 2021:53). This followed a research study that was conducted to establish if schools were fully equipped with ICT. The results from the study concluded that there was not enough ICT in high schools (Okafor, 2020:50).

In Taraba State, Nigeria, the same recommendations were echoed that school administrators should pay attention to the provision of modern educational technology to encourage teachers and learners to use it (Dada & Olaniyan, 2021:55). At Regina Pacis Model School there are only four functional desktops and eight laptops for a staff of more than thirty teachers; furthermore, the challenge is like Metu Memorial Secondary, where only 20 tablets were provided for 560 learners. The sections above show that the provision of ICT in Nigeria is not consistent.

Despite global advances in the scope and advancement of technology, the supply of ICT in the classroom remains a challenge in Ghana, specifically in Port Harcourt City (Lukas & Yunus, 2021:113). Schools rarely maintain the same momentum in their access to technological equipment. Dada and Olaniyan (2021:56) found in their study that high schools in Port Harcourt City are poorly equipped with ICT to use for their teaching. Dada and Olaniyan (2021) reported that a total of 25 teachers share four laptops.

2.4.3 Provision of ICT in South Africa

In KZN, at the rural Centocow High School in Harry Gwala District, there is an acute shortage of ICT (Gamede, 2021:87). This presents challenges as teachers must share the available resources for their lesson presentations and preparations. A lesson presentation normally takes 50 minutes and with the shortage of resources, a lesson presentation is rendered invalid (Chisango & Marongwe, 2021:75).

In Gauteng, most of the provided ICT is not functioning (Chisango & Marongwe, 2021:67). In all the schools where the study was conducted, no smart boards are working (Gamede, 2021:43). The same challenge applies to high schools in Limpopo and KZN provinces. However, in Gauteng, the DoE, in partnership with many stakeholders, has provided advanced ICT (Sethosa, 2021:41).

In Sedibeng West District, ICT equipment such as smart boards, interactive data projectors, and data servers have been installed in the newly built computer laboratory by the DoE (Chisango & Marongwe, 2021:67). Furthermore, Sethosa (2021:40) mentioned that the teachers were promised that training will be offered to all the teachers in the following weeks.

The research that was conducted in KZN, Gauteng, and other provinces clearly shows that the government and other stakeholders had put a lot of effort into providing ICT equipment to high schools (Sethosa, 2021:62). Challenges of lack of training or no training remain (Chisango & Marongwe, 2021:78). Researchers highlight that on several occasions the DoE will supply the ICT equipment without providing any technical training on how to use it, moreover no follow-up is performed to support the struggling teachers (Gamede, 2021:41).

Chisango and Marongwe (2021:56) mention the digital divide amongst the high schools between the rich and the poor as another cause for concern. In this context, Sethosa (2021:65) argues that some schools in South Africa have full access to ICT, while those in rural schools have a limited supply. Chisango and Marongwe (2021:88) agree with the researcher when they mention that to bridge the gap between the rich and the poor, the DoE developed the Thutong portal to link with other websites, giving free access to teachers and learners who cannot afford to pay for the Internet (Gamede, 2021:48).

The major characteristic of South African high schools is the wide disparity between schools in wealthy areas and those in rural areas that are poor (Sethosa, 2021:53). Although efforts have been put into providing all schools with ICT, there are a few disadvantaged high schools in South Africa that still struggle with a shortage of the provision of ICT devices (Chisango & Marongwe, 2021:130), for example, Makikele High School in Limpopo only has two laptops and one outdated, dysfunctional desktop that was donated from FNB. Furthermore, Zwelonke High School in Inanda, KZN has three computers, while Kwaggafontein Farm Primary School in Gauteng is equipped with state-of-the-art data projectors, advanced computers, and efficient Internet connectivity that is under camera surveillance (Gamede, 2021:47).

The provision of ICT equipment in high schools in South Africa still needs a concerted effort from

both the private sector and the government (Chisango & Marongwe, 2021:55). Although the government is showing commitment to providing ICT equipment in high schools, the major drawback is the failure of the DoE to provide support and training (Sethosa, 2021:43).

2.5. Conclusion

It has emerged that developed countries, including the USA and Sweden have adopted the use of ICT in the classrooms earlier as compared to most African countries that are in their infancy when it comes to technology use in the classroom. Those developed countries had the opportunity to study how effectively they can use ICT in the classroom (Reddy, 2020:35). This has resulted in the development of virtual classrooms and other ICT advancements. Although the USA has been providing a lot of ICT equipment in its high schools, the literature review reveals that providing a lot of ICT equipment does not translate into its use. Using one of the principles of the connectivism theory African countries including South Africa need to continue learning methods that apply to the African phenomenon that can be applied to improve technology use in the classroom (Siemens, 2020:45).

Major research studies in the previous years have focused on the benefits of integration of ICT in the classroom and this has caused the DoE to adopt the benefits and start rolling out ICT without taking into consideration the challenges that come with technology use. This agrees with Okafor (2020:24), when he mentions that there seems to be no significant research conducted on technology use by high schools. It is therefore imperative that teachers not only adopt ICT, because major researchers believe that it has the power to transform the world, but must consider their contextual factors including connectivity, electricity availability, and maintenance of ICT infrastructure (Willis, Weiser & Smith, 2016:145), Furthermore, they need to ensure that they receive professional training (Curtis, 2019:166).

The literature highlighted that the use of ICT in high schools in South Africa is marred by many challenges ranging from lack of skills to load-shedding. The passages above (Curtis, 2019:143) mention that most teachers in rural schools do not use ICT to prepare assessments or for personal and professional development. The literature confirms that most teachers use ICT equipment mainly for photocopying and printing, while it is important to highlight that the use of ICT equipment will reduce the cost of buying all the materials needed for printing and photocopying, and photocopied papers are

easily destroyed as compared to softcopies. Load-shedding is a new phenomenon that has devastating effects on the use of ICT; ICT infrastructure is considered very delicate and does not need unplanned power cuts that result in damage to the central processing devices.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The theoretical framework that grounded the study and the literature review was discussed in the previous chapter. This chapter provides an overview of how data were collected to explore the challenges in the use of the provided ICT in high schools of the Seplan Circuit. Firstly, it outlines the method that was used as well as the research paradigm. It elaborates further with a discussion on the population of the research, the methodology, design, and ethical issues.

The research was conducted using the qualitative method and employed a case study in its design. The researcher chose a case study because it gave a full description of the nature of the challenges faced by principals and teachers in the use of the provided ICT in high schools (McMillan & Schumacher, 2014:18).

3.2 Research Method

Creswell (2021:145) defines three types of research methods: qualitative, quantitative, and mixed methods research. In qualitative research, the researcher seeks to determine the meaning of a phenomenon based on the perspectives of participants, also known as a constructivist worldview, whereas quantitative research involves testing a theory by specifying narrow hypotheses and collecting data to support or refute the hypotheses, also known as post-positivism (Hennink et al., 2020:54). Mixed methods research combines qualitative and quantitative research techniques, resulting in a pragmatic worldview (Lichtman, 2023:67).

This study was conducted using the qualitative research method, which allowed for data collection in a natural setting (McMillan & Schumacher, 2014:37),

The design used in this study was a case study. A case study looks at a bound system over time (McMillan & Schumacher, 2014:32). The Seplan Circuit is a unique location. First, it is found in the Eastern Cape province, which is one of South Africa's underperforming provinces, with a pass rate of 68% in the 2020 matric results (DBE, 2020:16). It ranked second from the bottom amongst the nine provinces. Secondly, the province is primarily rural.

Semi-structured interviews as well as an observation checklist, were used to collect data. Two categories of participants were purposefully selected: principals and teachers. These participants were relevant to the research because principals are school administrators who must ensure that provided ICT equipment is used for its intended purpose, whereas teachers are facilitators of learning who must use available ICT equipment to improve teaching.

3.2.1 Research method

Although different scholars attach different meanings, in essence, the research method is the techniques, strategies and processes that are used during the data collection process (Abutabenjeh & Jaradat, 2018:240). The research method is the route that researchers need to take to complete their research; it describes the nature of the problem and goal and presenting their conclusions based on the data gathered during the study period (McMillan & Schumacher, 2014:18).

A qualitative research method was employed in this study. This research method was considered the most acceptable for this study because it gives a full narrative of the teacher participant concerning the challenges in the use of the provided ICT equipment in the high schools of the Seplan Circuit (Silverman, 2021:56). The participant's responses to the interview create a wider understanding of the nature of the challenge. Hence, the qualitative research. It aims to find from the participants their personal experiences about real life and is not limited to objectivity, and precision and is not parsimonious.

Data instruments that include semi-structured interviews and non-participant observations were used to collect data from participants in their natural settings (Hennink et al., 2020:18). It provided a detailed description of the challenges encountered by teachers and principals in their natural setting (Lichtman, 2023:89). Data that were generated from this study were real-time and specific because they were gathered on-site, which helped to answer how those challenges occurred.

3.2.2 Research paradigm

A paradigm can be defined as the adopted norms and beliefs of an individual or group of people or community (Williams, 2007:8). It is the worldview in which the researcher uses specific methods of inquiry in research Creswell (2021:44). Research methods are attributed by a specific ontology and epistemology (Lichtman, 2023:89). Research paradigms that can be used in research include amongst others post-positivism, constructivism, transformative, pragmatism, and the interpretive paradigm. This study uses the interpretive paradigm to explore the challenges in the use of the provided ICT equipment in the high schools of Seplan Circuit.

With the interpretivist paradigm, the researcher seeks meaning in the world they live and work. In this research, the researcher strives to establish the nature of the challenges faced by teachers in using the provided ICT (Hennink et al., 2020:31). The challenges experienced by teachers and principals were real (ontology); in establishing the lived experience from the participants the researcher conducted an interview (Lichtman, 2023:89). This is how reality can be depicted through discussions with participants with the motive of listening to their views (Silverman, 2021:12). In an interpretive worldview, the researcher needs to understand the background of the participants. To achieve this, I took the position of a non-participant observer, while collecting and analysing data (Creswell, 2021:24).

The post-positivist paradigm has a different perspective altogether. Post-positivist researchers believe that cause determines effects (Hughes & Sharrock, 2016:87). Post-positivists assume that there is knowledge and reality that exists in the world (Lichtman, 2023:59). This paradigm studies a reality through natural laws by which it is governed (Silverman, 2021:18). The research approach is objective and does not pay much attention to participants nor does it take into consideration their lived experience (Hennink et al., 2020:47). This paradigm is not suitable for this research. The challenges encountered by teachers in using the provided ICT cannot be separated from their own beliefs and values. So, as a researcher, this will determine how the researcher collects data, understands, and examines data (Ryan, 2018:56). Interpretivism is subjective means the researcher must negotiate with participants, showing them the benefits of participating in the research, discussing on their consent and protection of their personal information (McChesney & Aldridge, 2019:24).

Accordingly, interpretivism uses a variety of ontologies in which the challenges may have numerous contributing factors. Practically, this paradigm provides more understanding of the phenomenon to researchers (Hennink et al., 2020:16). It is centred on the fact that knowledge associated with social and human sciences cannot be the same as its usage is not the same (Lichtman, 2023:81). This study uses the interpretivism research paradigm as it believes in a variety of ontologies balanced on a social basis. The interpretivism research has varied and multiple meanings, these varied meanings will be categorised into themes and sub-themes (Ngcobo, 2020:65).

3.2.3 Research design

Grounded theory, ethnography, phenomenology, and case studies are amongst the designs that can be employed in qualitative research (Lichtman, 2023:89). It is a plan that guides the selection of participants, the site, and the procedures that are to be applied (McMillan & Schumacher, 2014:166). Furthermore, it aims to produce findings that will be credible (Hennink et al., 2020:16). The choice of research design is guided by many factors that include, amongst others, the title, the research question and the background information about the origin of the discipline, moreover it serves as a bridge between research questions and the implementation of the research strategy (Creswell, 2021:68).

3.3 Case study

A case study was implemented to explore the challenges in the use of the provided ICT in the high schools of the Seplan Circuit in the Eastern Cape province. A case study is defined as an in-depth analysis of a single or multiple entity to describe and explain the phenomenon Bromley (Hennink et al., 2020:34). The unit of measurement of a case study is the sample that includes the individuals, groups, artifacts or documents being studied (Lichtman, 2023:87). The researcher believed that an in-depth analysis of participants would bring out the objectives, hence a case study was used. It provided facts to study because a case study turns a researcher`s opinions into information that can be verified (Sethosa, 2021:36).

3.3.1 Differences between a single case study and multiple case studies

Research design can implement a single case study or multiple case study (Creswell, 2021:68). This research design uses a single case because all the four high schools selected are in the same geographical area, same district, and same circuit that is Seplan, generally they receive the same treatment from the Department of Education.

3.3.2 Types of Case Studies

Creswell (2021:146) distinguishes between three case studies, which are exploratory, descriptive, and explanatory case studies. The passages below describe in detail the three types of case studies followed by a justification for the choice of case study that was adopted for this research.

3.3.2.1 Descriptive

Numerous research techniques can be applied in a descriptive research design to examine one or more variables (Silverman, 2021:18). In contrast to experimental research, here the variables are merely observed and measured; no controls or manipulations are made. As the name suggests, descriptive research focuses on describing a case that may involve more than two phenomena causing an outcome of certain characteristics (Lichtman, 2023:85). In social sciences, it is used to describe the varying findings that can be generated after experimenting. Furthermore, it can be used to compare two phenomena of interest to the researcher (Creswell, 2021:148).

3.3.2.2 Explanatory

When there is little information available, explanatory research is a research method used to investigate why something occurs (Hennink et al., 2020:71). You can use it to learn more about a subject, work out how or why a certain phenomenon is happening, and make predictions about what will happen in the future (Lichtman, 2023:87). An alternative way to conceptualise explanatory research is as a “cause and effect” model that looks for previously undiscovered patterns and trends in the data (Silverman, 2021:36). This is why it is frequently regarded as a kind of causal research (Hennink et al., 2020:54). However, there seems to be a similarity between exploratory and explanatory research. It is important to know that explanatory research involves a case study that examines topics that have not been thoroughly studied yet (Lichtman, 2023:72).

3.3.2.3 Exploratory

The type of case study that was used is the exploratory case study. An exploratory case study was suitable for this study as it provides abundant information on the phenomenon under the study (Gamede, 2021:33). In the exploratory case study, the researcher starts by collecting data, then analyse data into themes looking for patterns, furthermore, the researcher needs to make interpretations based on the emerging themes and sub-themes (Lichtman, 2023:88). The researcher used an exploratory case study in exploring the challenges in the use of the provided ICT in high schools because it allowed the collection of a lot of richer and in-depth data from participants.

An exploratory case study was suitable for the study because the principals and teachers under study were living beings and the study needed to reflect on their personal backgrounds, level of education and experiences. This helped to reveal what caused the challenges because the direct observation of the participants involved gave verifiable data and showed the action taken by participants that led to specific results being generated

In this study, the researcher gathered information on whether teachers know the purpose for the use of the provided ICT equipment.

An exploratory case study is cost-effective and less expensive as compared to other research methods while at the same time, it uses several different methodologies. In this research, the researcher used interviews and non-participant observation (Lichtman, 2023:76). An exploratory case study was relevant to all parties participating. For example, if challenges arose from poor policy formulation there would be a need to reformulate the policy and workshop with the parties concerned. In this way, participants would further their knowledge and most importantly it would force people to make decisions about the questions being studied (challenges of using the provided ICT equipment), and once a decision was made then they would defend their position using facts.

The exploratory case study was a suitable method for exploring the challenges in the use of the provided ICT because it allowed data collection in a natural setting where the participants experienced the challenges. Furthermore, the researcher had a face-to-face interaction with participants, which helped to develop a complex picture of the challenges. The data that were generated from this study

were in real-time and specific because they were gathered on-site, which helped to answer how those challenges happened (Creswell, 2021:68).

The exploratory case study employed semi-structured interviews and non-participant observation that were used for data collection from the participants, the participants included principals and Grade 8 teachers. The semi-structured interviews (Appendix J) aimed to establish why there were challenges in using the provided ICT in the high schools of the Seplan Circuit, and their challenges are represented in Chapter 4 of this study.

3.3.3 Research population

In research, the population can be defined as a detailed group of individuals or objects with similar characteristics that are important to a researcher (Creswell, 2021:117). Moreover, the research population has common characteristics that distinguish it from other subjects and objects (McMillan & Schumacher, 2014:22). The population is well-defined with explicit inclusion and exclusion criteria (Creswell, 2021:148). Furthermore, it is a portion of totality of all the subjects and needs to align to set out specifications of the study (Silverman, 2021:21). The population need not consist only of people; thus, we can have a population of either professional academic levels of teachers or a population of learner performance achievement outcomes.

In selecting the population for the study their common characteristics on the provision and use of ICT in the schools' environment were considered. The high schools within the same geographical area were considered, furthermore, the schools must have been provided with ICT from the Department of Education. Seplan Circuit consists of 18 Schools: 11 primary schools and 7 high schools.

In selecting a population for this research study, the emphasis was on high schools from the Seplan Circuit. High schools were chosen within the circuit due to their high level of use of ICT as compared to primary schools; in this case, Grade 8 teachers were explicitly selected because this level of teacher still has a lot of time with learners at school, hence they had more time to conduct prolonged and persistent fieldwork. Moreover, their academic demand is not as high as Grade 12. The principals were a suitable population because they are the managers of schools and are responsible for ensuring that all ICT available is utilised for the benefit of the learners. Furthermore, teachers are the drivers

of the curriculum. Currently, the DoE has rolled out robotics in Grade 8 (DBE, 2012:4). This group of the research population is a homogenous group of black people who mostly reside in the rural areas and are isiXhosa-speaking.

3.3.4 Research sample

The research sample can be explained as the fraction, or a representation of a population chosen to conduct research (Silverman, 2021:45). Moreover, it needs to represent the attributes of the population being studied. According to Creswell (2021:118), this can be conducted through a sample survey. Several sampling strategies can be applied in research, the two common ones being probability sampling and non-probability sampling. McMillan and Schumacher (2014:18) argue that probability sampling involves randomly selecting participants in a population and each participant has an equal chance of being selected, while (Lichtman, 2023:79) state that, with non-probability sampling, the likelihood of choosing a participant is not known.

Non-probability sampling method was used in selecting the schools, and a further purposive sampling strategy was employed. Four high schools were purposively selected from the Seplan Circuit. According to McMillan and Schumacher (2014:18), this sampling strategy is best suited for this study because it involves all participants in the entire group and allows the use of criteria that ensure that there is no possible loss of variation. At each selected school one principal and four Grade 8 teachers were chosen. In totality, the research sample comprised twenty participants selected from four schools. The four high schools were studied one at a time through school visits. The research sample is further discussed in the subsequent sections.

The selected research sample best suited the research design for the following reasons:

1. Principals are managers of schools and are responsible for ensuring that all learning and teaching materials available in high schools are utilised for learning and teaching.
2. Principals are the custodians and guardians of school properties and must account for their misuse and abuse to their immediate managers.
3. Teachers are entrusted with the duty of ensuring that learning takes place effectively, using the available resources, so the researcher aims to establish if they possess the relevant competencies and skills to use the provided ICT devices in the execution of their daily duties.

4. Teachers are responsible for empowering learners using technology because technology is a subject in the GET phase.

3.3.5 Data collection techniques

Data collection involves purposefully identifying the selected sites and individuals for the proposed study. Creswell (2021:154) states that data collection techniques must show clearly where the research will take place, who will be observed or interviewed, and what the participants will be doing while being observed or interviewed (Lichtman, 2023:65). The selected participants would help the researcher understand the problem and the research question (Hennink et al., 2020:54). Data collection techniques discussed the strategies that were used to recruit individuals to the study and discussed ways to provide incentives for individuals to participate (Silverman, 2021:14). Qualitative data collection techniques include observations, interviews, documents, and audio-visual digital materials.

3.3.6.1 Semi-structured interviews

Semi-structured interviews (Appendix J), and non-participant observations are the data collection techniques that were applied in this case study. Sethosa (2021:66) states that interviews allow for the crystallisation of data. Crystallisation is when there is a deeper understanding of the phenomenon at hand (Sethosa, 2021:66); moreover, the participant would be interested to participate as they felt that the research would help to solve the challenges they face (Appendix C).

During the interview, I asked probing questions as a method to clarify the understanding of the participant on the question at hand. I would greet the participant and make introductory remarks reminding the participant about our scheduled interview on that day. Furthermore, I would explain to the participant issues concerning their consent (Appendices H and I) and make clarification on issues they did not understand, moreover, I explained that their participation is voluntary, and their personal information is confidential and will not be used in any other way besides the research. This was important in gaining trust of the participants.

Within the interviews (Appendix J), participants and the researcher were involved in a dialogue to answer the semi-structured questions. Following McIntosh and Morse (2015:10), the questions were

designed in a manner that addresses the research question and objectives of the study. The semi-structured questions were simple and easy to understand so that the participants do not struggle to find meaning; furthermore, questions were asked in simple English to maintain the validity and integrity of the research

The interviews had the following format:

- The principal and teachers were interviewed.
- The interviews were semi-structured.
- The interviews were face-to-face.
- The interviews were audio-recorded.

3.3.6.2 non-participant observation

Non-participant observation is a technique whereby the researcher will observe participants without being actively involved in the participant's activities (Lichtman, 2023:84). It aims to increase the validity of results through triangulation. The researcher will stay separate from the knowledge of participants and will not assist the participants (McMillan & Schumacher, 2014:34). Therefore, triangulation is important as it helps to reduce bias (Creswell, 2021:93).

With non-participant observation, the researcher aimed to explore and establish the readiness of ICT to be used for teaching purposes (Appendix K). Without assisting participants, the researcher will observe how the participant uses the ICT equipment, the non-participant observation assisted the researcher to establish the current state of the provided ICT and validate what the participants claimed to be.

3.4 Data analysis and interpretation

Data analysis and interpretation is the process of organising data (Silverman, 2021:19). It involves grouping data into similar categories followed by identifying patterns and relationships amongst the grouped data, also known as categories, to make deductions of the phenomenon that is being researched (Macmillan & Schumacher, 2014:395). Data analysis will involve four standard procedures that include contextualising data, decontextualising data, categorising, and compilation of data (Bengtsson, 2016:28).

Several styles can be used for qualitative data analysis that include quasi-statistical style, template analysis, editing analysis, and crystallisation style. According to McMillan and Schumacher (2014:396), the continuum of styles starts from quasi-style, which is prefigured, and the researcher decides categories in advance, and extends to the crystallisation style, which is emergent and is characterised by extensive long periods of immersion in the data (Lichtman, 2023:81). Qualitative data analysis can be conducted using computer software, or it can be coded manually (Hennink et al., 2020:49). Interpretation of data in qualitative research follows a set procedure that starts with summarising the results, compares the results to the literature, and concludes with a discussion of the results (Silverman, 2021:15).

Based on inductive reasoning; while using the content analysis technique the data was analysed; it is important to understand the two dimensions that can be applied in the content analysis including manifest analysis (Lichtman, 2023:53). The researcher must use the words of the participants as they are, while latent analysis, a deep analysis in which the researcher interprets what was intended to have been said. Furthermore, content analysis allows the data to be written in words, themes, and sub-themes (Hennink et al., 2020:16). The advantage of content analysis is that it can be used on any text, furthermore there are no specific rules to be followed (Lichtman, 2023:62). The recorded interviews were transcribed into written form, this is an interpretive approach (Silverman, 2021:11).

Firstly, the data was contextualised, which involved the researcher reading the transcribed text to obtain meaning. The researcher looked for similar paragraphs that answered the question set out in the aim and objectives of the study. For each identified meaning unit, a code was assigned about the context. The second step was recontextualisation, where the researcher after the meaning units had been identified, the original text was read alongside the final list of meaning units. Highlighters were used demarcate each meaning unit in the original transcript, the researcher attended to the unhighlighted text and repeated the process. During the categorisation process themes were identified, and themes were generated based on the questions that were used during the data collection process, moreover it was supported by theory from the literature review by Lichtman (2023:84). As the researcher progressed with interpretive latent analysis, sub-themes were generated, and the researcher needed to ensure that they aligned with their themes (Creswell, 2021:187). Lastly, the researcher analysed the findings and wrote them down. This process is known as compilation. In the write-up,

the researcher transformed experiences into consciousness, using the participant's words and referring to the original meanings and context. In terms of overall findings, the question "What are the challenges of using ICT devices that are provided in the high schools in the Eastern Cape?" should be answered at the end of the data analysis.

3.5 Measures of reliability, validity, credibility and trustworthiness

3.5.1 Reliability

Reliability is defined as the consistency of measurement (Guba & Lincoln, 1989:43). It is the extent to which the findings remain the same under different data collection periods, across different researchers, and amongst different projects (McMillan & Schumacher, 2014:195). Qualitative interviews cannot be measured, hence it is difficult to achieve consistency of measurement. Bengtsson (2016:12) argues that researchers always draw different conclusions from the same data, therefore researchers need to discuss and reach a consensus on the findings.

3.5.2 Validity

Validity is defined as the process of establishing whether the findings are accurate from the researcher's perspective, the participant, and the readers (Hennink et al., 2020:16). In ensuring validity the researcher used at least three of the eight primary strategies from those that are used to ensure validity as follows:

Validity was achieved using member checks. Bengtsson (2016:12) suggests that member check is when the researcher goes back to the participants and presents the results to achieve agreement. This method of increasing validity is not without disadvantages, for instance, there is a time delay between data collection and analysis which has a direct bearing on the memory of participants (Creswell, 2021:274).

Another method that is applied is respondent validation. Respondent validation involves the researcher ensuring that there is no drift in the definition of codes or a shift in the meaning of the codes during the process of coding Bengtsson (2016:13). This was achieved by continually comparing data with the codes (see Table 4.1) and by writing memorandums about the codes and their

definitions. Furthermore, the content analysis procedures that were used during data analysis were documented by Guba and Lincoln (1989:45). However, it is important to note that codes may change as the study progresses and they need to be noted and edited again. To achieve this, the researcher created a detailed case study protocol and database for procedures to be followed. The researcher checked and verified the transcripts for common mistakes and errors (Creswell, 2021:108).

Finally, the researcher used the services of another person who cross-checked the codes for what is called intercoder agreement or cross-checking (Creswell, 2021:103). Such an agreement was based on whether the coder agreed with the codes used for the same passages in the text.

3.5.3 Trustworthiness

Trustworthiness of the study is defined as the degree of confidence in the collected data, the analysis and interpretation techniques applied, and the methods used to ensure the quality of the study. In ensuring the trustworthiness of this study the data will be analysed through four criteria identified by Guba and Lincoln (1989), that is credibility, transferability, dependability, and confirmability. These criteria are further discussed in the passages below.

3.5.3.1 Credibility

According to Guba and Lincoln (1989:231), credibility is achieved by aligning each step of the research process, paying attention to the research question, data, and method, and ensuring that each step is accounted for in data analysis. Furthermore, Bengtsson (2016:12), believes that credibility determines whether the participants' original data were correct and represents the participants' original viewpoint. In this study, credibility is defined as a thorough description of the phenomenon under investigation, as well as stating what the study intends to achieve by stating the study's aims and objectives (Chapter 1, Sections 1.4 and 1.5). To ensure the credibility of the information gathered, I committed to selecting participants (Section 3.4.1), preparing interview instruments such as audio recorders and interview guides (Section 3.4.2.1), and triangulation. I used audio recording in all my interviews, which helped me avoid missing any information provided by the participants. This also prevented participants from making assumptions and misinterpreting information, resulting in more credible information. I carefully selected the participants based on their knowledge of the

phenomenon being investigated within the school setting (Silverman, 2021:19). I followed the suggestion to observe the participants for an extended period because as rapport grows, participants may volunteer differently and are more willing to share sensitive information than they were at the start of the research project (Lichtman, 2023:85).

3.5.3.2 Transferability

According to Bengtsson (2016:12), transferability refers to the degree to which research findings can be applied to other settings or groups. To improve transferability, I aimed to provide a thorough and compelling presentation of the research findings, complete with relevant quotations (Creswell, 2021:274). According to Guba and Lincoln (1989:234), to ensure the transferability of qualitative inquiry, the researcher must “collect thick descriptive data” that allows for comparison of the contexts to which transfer may be considered. Long semi-structured interviews and non-participant observations resulted in a detailed description of the data. The data for this study were collected through the purposeful selection of teachers who are knowledgeable about the issues under investigation. This means that when the researcher provides a detailed description of the inquiry and the purposeful selection of participants, the inquiry becomes more transferable (McMillan & Schumacher, 2014:165).

3.5.3.3 Dependability

Dependable research findings imply that even if the research were conducted by another researcher, the findings would produce similar results. Furthermore, the results would be based on accurate findings from participants, rather than being generalised or made up by the researcher. Guba and Lincoln (1989:320) define dependability as involving participants to evaluate the study’s findings, interpretation, and recommendations to ensure that they are all supported by data collected from study informants. The study used a purposeful selection of participants, and the collected data consisted of audio files with the content transcribed to ensure that inquiry audits could be established at any time (McMillan & Schumacher, 2014:326).

3.5.3.4 Confirmability

Confirmability assesses data and interpretations of findings to ensure that they are not based on the researcher's imagination but are derived from the data (Bengtsson, 2016:13). Based on the qualitative nature of the study, I used six stages to ensure confirmability. According to Guba and Lincoln (1989:321), the stages of data analysis include raw data, data reduction, process notes, personal notes, instrument development, and final report drafts. To achieve confirmability, the audit trail provides visible evidence from the process and product that the researcher did not simply discover what he or she sought (Bhandari, 2023:307). I used a reflective notebook to help me interpret and plan my data collection (Creswell, 2021:274).

3.6 Researcher ethics

Researcher ethics seeks to uphold the integrity of research, foster a relationship of trust with research participants, and safeguard their personal information. This is accomplished by taking precautions to prevent any misconduct or improper behaviour that may occur during the research process. According to Creswell (2021:144), personal disclosure, consent, and research credibility are additional ethical considerations.

The researcher applied to the College of Education Ethics Review Committee to make sure the study was ethical (Appendix A). By visiting the websites of the pertinent associations, the researcher was able to review ethical issues recommended by the Ethics Review Committee and Codes of Professional Conduct for Researchers (Creswell, 2021:143). Before the study, the researcher applied for permission from the schools' governing bodies (SGBs) to enter schools, approach principals, and the Circuit Manager (Appendices B, C, D, E, and F).

During data collection, the researcher minimised disruption as much as possible and the research was conducted through voluntary participation. According to McMillan and Schumacher (2014:146), this entails that participants were not forced or coerced to participate. The teachers and principals participated voluntarily. As a matter of principle, participants were provided with consent forms together with explanations of their right to participate or not. The participants' confidentiality was always respected. This means that the researcher shall not share participants' data with unauthorised personnel. Plagiarism, as an ethical principle, entails copying someone's work without

acknowledging the source of information (McMillan & Schumacher, 2014:136). The researcher shall ensure that all sources consulted are acknowledged and referenced according to the Harvard style of referencing.

3.7 Limitations and delimitations of the study

3.7.1 Limitations of the study

Limitations of any study include all potential weaknesses that are typically beyond the researcher's control and are closely related to the chosen research design, data collection constraints, and funding constraints. In this regard, a limitation is beyond the researcher's control. However, it may have an impact on the study design, results, and, ultimately, conclusions, so it should be acknowledged in the paper when submitted.

The geographical location of the research area also presented challenges since it is a rural setup and access to one of the schools was a problem because of the long distance and poor roads. Since the participants of the study come from the same district, with rural settings, the results may not be generalised to represent the South African education system or that of the world. It is therefore important that such research should be replicated across provinces in South Africa. Lastly, the results may be biased as participants may be biased. At the same time, the participants' scores may be influenced by various external factors. Since the schools are in a rural setting, the scores may also be biased because participants may fail to comprehend the purpose or clarity of the study.

3.7.2 Delimitations of the study

The boundaries that the researchers establish are known as delimitations. To ensure that the goals and objectives of the study can still be accomplished, they are concerned with the definitions that the researchers choose to establish as the bounds or limitations of their work. It provides justifications for selecting or rejecting specific sampling techniques.

3.8 Conclusion

An account of the case study's methodology was given in this chapter. First, the research's justification was assessed, and I made sure to highlight the reasons why I thought the case study suited

this study. The theoretical framework was thoroughly examined, beginning with Pavlov's behaviourism. This study's interpretive paradigm, qualitative research methodology, and research design which included an exploratory case study were all covered.

The chapter examined the purposive sampling technique used in the participant selection process. The chapter included both the non-participant observations and the data that had been gathered through semi-structured interviews. Furthermore, the chapter covers a discussion of validity, reliability, and trustworthiness and concludes on the limitations and delimitations of the study.

In the next chapter, there is a thorough discussion of the findings emerging from the data collection.

CHAPTER 4: DATA ANALYSIS, FINDINGS AND DISCUSSION OF DATA

4.1 Introduction

Chapter 3 details the research methods employed in the study. It provides an overview of how data were collected to address the study's primary question: what are the challenges in the use of the provided ICT equipment in the Seplan Circuit of the CHE District? Moving forward to Chapter 4, data analysis should address the aim, research questions, and objectives. It is divided into sections that cover the research findings, profiling of participants, discussion of themes and emerging sub-themes, and a discussion on non-participant observation. It concludes with a discussion on the summary of findings.

The chapter provides an in-depth examination of the data obtained from sixteen teachers and four principals of secondary schools in the Seplan Circuit. The non-participant observation determined the suitability of the learning environment and computer laboratories equipped with ICT; additionally, it assisted me in establishing the current state of the provided ICT and validating what the participants claimed the current state to be. The collected qualitative data will be analysed using the content analysis technique. Furthermore, the data will be analysed using a criterion identified by Guba and Lincoln (1989:234), which is credibility, transferability, dependability, and confirmability to enhance the rigor of the study.

4.2 Research findings

Research findings aim to produce a comprehensive report on the case study findings. It provides a means of answering the objectives of the study (Section 1.5). Sixteen teachers and four principals from the selected schools were interviewed, and non-participant observations were conducted in the same schools.

4.2.1 Profile of Participants

Participants were coded and profiled to help distinguish them and provide their information. Their coded and profiled information is captured below. In alignment with the Ethical requirements of research (Appendix A), the four schools were coded as schools A, B, C, and D, and the principals were coded P001, P002, P003, and P004 respectively. In the same endeavour, teachers were coded

from T001 to T016. This was important to protect their Identity and protection of personal information (Appendix H).

Table 4.1 Summary of participants

School	Participant	Position held	Professional training	Teaching experience	ICT DEVICES PROVIDED		
					Laptop	Printer/data	Other/specify
A	Principal 01 P001	Principal	None	12	√	√	Tablet
B	Principal 02 P002	Principal	Yes	27	√	√	Tablet
C	Principal 03 P003	Principal	None	5	√	√	–
D	Principal 04 P004	Principal	None	9	√	√	–
A	Teacher 01 T001	Teacher	Yes	5 years	√	√	Tablet
	Teacher 02 T002	Teacher	None	3 years	√	–	Tablet
	Teacher 03 T003	Teacher	None	3 years	√	√	Tablet
	Teacher 04 T004	Teacher	Yes	8 years	√	–	Tablet
B	Teacher 05 T005	Teacher	Yes	13 years	√	–	–
	Teacher 06 T006	Teacher	None	10 years	√	–	–
	Teacher 07 T007	Teacher	None	4 years	√	–	–
	Teacher 08 T008	Teacher	None	2 years	–	–	–
C	Teacher 09 T009	Teacher	Yes	22 years	√	√	Tablet
	Teacher 10 T010	Teacher	None	1 year	√	–	–
	Teacher 11 T011	Teacher	None	3 years	√	√	–
	Teacher 12 T012	Teacher	Yes	10 years	√	√	Tablet
D	Teacher 13 T013	Teacher	None	15 years	√	√	Tablet
	Teacher 14 T014	Teacher	None	12 years	√	√	–
	Teacher 15 T015	Teacher	None	6 years	√	–	–
	Teacher 16 T016	Teacher	None	3 years	–	–	–

Source: Self-compiled

4.2.2 Discussion of Themes

The discussion focuses on the findings from the semi-structured interviews. The primary goal was to understand the challenges associated with the use of provided ICT in Seplan Circuit high schools. The analysis of the interviews revealed certain themes and sub-themes, which were divided into four broad categories. To enhance the rigour of the study during the discussion of themes and sub-themes,

the researcher will refer to the literature to confirm the findings of the study. The themes and sub-themes emerged from the analysis of the transcriptions (Appendix G). These themes and sub-themes are listed in Table 4.2, followed by their detailed discussion below.

Table 4.2 Themes and sub-themes

Themes	Sub-themes
1. Primary purpose of using provided ICT.	a) Use of ICT as a tool to enhance teaching b) Use of ICT for teacher development and subject content development. c) Use of ICT for assessment.
2. Challenges in the use of the provided ICT.	a) Accessibility of ICT in high schools b) ICT training and skills c) Load-shedding
3. Strategies used to address the challenges in the use of the provided ICT.	a) Accessibility of ICT in high schools b) ICT training and skills c) Load-shedding
4. Recommendations for effective use of the provided ICT.	a) Recommendations and guidelines b) Training and support on the use of ICT.

Source: Self-compiled

The primary purpose of using the provided ICT

The primary purpose of using the provided ICT emerged as a theme, inspired by the first research question: What is the primary purpose of using provided ICT as a tool to improve teaching? The goal of this theme was to establish if teachers understood the primary purpose of using the provided technology. This theme's objective gave rise to three sub-themes: the use of ICT as a tool to enhance teaching, the use of ICT for teacher development and subject content development, and the use of ICT for assessment.

Challenges in the use of the provided ICT

Research question two: What are the causes of challenges in the use of the provided ICT in the high schools of Seplan circuit in the Chris Hani East district, Eastern Cape, as a tool to enhance teaching? The second theme that emerged from the second research question was the challenges that teachers face when using the provided ICT. The objective of this research question was to better understand the nature of the challenges that teachers and principals face when using the provided ICT. The theme will be thoroughly discussed in the following passages. The research question generated three sub-themes, which will be discussed shortly: accessibility of ICT in high schools, ICT training and skills, and load-shedding

Strategies used to address the challenges in the use of technology

Research question three: How effectively have the strategies been used to address the challenges in the use of the provided ICT in the high schools of Seplan Circuit in the CHE District, Eastern Cape, as a tool to enhance teaching?

The third theme emerged from the third research question: What strategies have been used in addressing the challenges related to the use of ICT in high schools in the Seplan Circuit, CHE District, Eastern Cape, as a tool for enhancing teaching? This theme aimed to determine how effective were the resolution of identified challenges in the use of the provided ICT. The objective of this theme leads to three sub-themes: accessibility of ICT in high schools, ICT training and skills, and load-shedding.

Fourthly, the recommendations for the effective use of the provided ICT

Fourth, the research question yielded a final theme: What recommendations can be made for the effective use of the provided ICT?

The following section discusses the themes and sub-themes.

4.2.2.1 Theme 1: Primary purpose of using provided ICT

Research question 1: What is the primary purpose of using ICT that is provided in high schools of the Seplan Circuit in the CHE District as a tool to enhance teaching?

This theme gave rise to three sub-themes, as shown in Table 4.2. These themes are the use of ICT as a tool for enhancing teaching; the use of ICT for teacher development and subject content development; and the use of ICT for assessment.

Sub-theme a: Use of ICT as a tool to enhance teaching

Section 2.2 in Chapter 2, (Reddy, 2020:45) argues that the use of ICT improves teaching. Teachers in the 21st century no longer rely primarily on tangible as well as hard-form media including printed textbooks, which may be out of date. Teaching today makes use of ICT, including Microsoft

PowerPoint presentations. A study conducted at Northside College Preparatory Secondary School in the United States found that teachers are gaining motivational abilities from the use of ICT in the classroom (Guo et al., 2020:166). In this context, teacher participants were interviewed to ensure that they fully grasped the aim of using ICT. Responses from teachers and principals varied, but the majority stated that the primary goal of using ICT was to improve instruction.

An analysis of responses from the participants shows that P001, T002, P003, T001, T005, and T011 validate the benefits associated with technology use. Besides returning learner attention in class, interactive and virtual classrooms are efficient in reinforcing information retention (Amadi & Siminialayi, 2021:134). Gorge Siemens (2020), using the Connectivism Theory, explains that classroom gaming tools connected to a network can be used. This is very effective as learners will be learning while playing, which increases information assimilation and synthesis.

P003 (School C) elaborates that:

“...believe me, when using ICT teaching is excellent because when learning content is presented as PowerPoint slides, student attentiveness and understanding improve, as does interest in my topic. Individuals who generally don't concentrate attentively throughout the lessons get interested or focus better.”

T002 from School A further mentioned that:

“... I use a variety of teaching strategies that include videos, PowerPoint slides, and WhatsApp groups. Learners are more engaged if you use a variety of strategies, but learners enjoy working with computers, my learners always get good grades.”

ICT provides the ability to promote, enhance, and develop teacher skills while also motivating them (Amadi & Siminialayi, 2021:35). Thus, there are positive benefits in the use of ICT, because the more the teachers utilise it, the more inspired and productive they will prove to be. In turn, teachers will tend to develop and maintain more connections and networks (Siemens, 2020:59). This is evident from the comments of T002 (School A). Furthermore, responses of T002 (School A) support the connectivism theory which aims to understand the effective way of learning in a technologically enhanced environment (Bell, 2011:529). Teachers have stated that the usage of ICT in the classroom, such as instructive videos, helps to keep students' attention. It appears that learners tend to recall and concentrate on what they can see and hear through the usage of videos rather than the information

just being delivered to them, refer to Section 2.3.3 Chapter 2 (Chisango & Marongwe, 2021:83).

P002 from School B noted that:

“...I rarely use ICT in the classroom since I have been making use of the conventional way for the past twenty years and it has been working well for me; I even get better outcomes than teachers who use computers in their class.”

An analysis of the responses from P002 and T002, according to Guba and Lincoln (1989) on trustworthiness, shows that qualitative research has no single definite result (Guba & Lincoln, 1989:236). This is evident when P002 argues that the use of traditional methods of teaching produces better results, while T002 is of the view that the use of ICT produces good grades.

T001 (School A) felt that:

“...I choose to work with downloadable videos and electronic questions for learners as a complementing teaching strategy, especially for concepts that learners consider challenging to understand.”

P001 (School A) and T005 (School B) stated that they were accustomed to the conventional technique of teaching and used it most of the time during their classes. They did, however, believe that ICT was very important in teaching and teachers need to use it daily to understand how engaging the use of ICT in teaching can be (Lukas & Yunus, 2021:117). On the contrary, T010 (School C) and T003 (School A) suggested that ICT should be implemented in conjunction with traditional teaching methods.

P003 (School B) highlighted that:

“...using technology is time-consuming, from setting up the ICT tools which may not work properly, and you will need to remove your equipment earlier to accommodate the next lesson, instead of enhancing a class in this situation the class will become unmanageable.”

In summary, the responses above show varying understanding and beliefs from the interviewed participants. Qualitative research assists comprehension of the human condition in many contexts (Bengtsson, 2016:8). T001 believes that the use of ICT enhances teaching, while P002 is of the view that it does little to enhance teaching. The use of ICT enhances teacher autonomy and proficiency. As teachers navigate virtual worlds, they gain the ability to make judgements and create meaning (Siemens, 2020: 35). As a result, they obtain skills such as digital literacy and autonomy, which will enable them to prolong their educational process. Teachers build social relationships both online and

in-person to promote social learning in the age of social media (Chisango & Marongwe, 2021:92). Teachers can plan to engage in socially relevant classes by incorporating ICT into group activities and encouraging students to collaborate in digital learning environments. This also provides an opportunity to teach pupils about Internet safety and healthy digital socialisation (Gamede, 2021:23).

Sub-theme b: Use of ICT for professional development and subject content development

Teaching in this modern technological era enables easier accessibility of information and transmission from any part of the world regarding how to give lessons on content. The Internet contains an infinite quantity of material that may be used to create subject content for all subjects taught in Grade 8. This lowers the need for prescribed school texts, which may be out of date. The interview aimed to determine whether teachers used ICT to further their subject expertise.

T002 (School A) shared that:

“...During my lesson preparation, I always go to YouTube and other educational websites and download current videos. Through these educational videos, videos are colourful and appealing to learners will have a better understanding of the concept you are presenting during your lesson, I also send the videos to their Whats app group so that they can revisit the video anytime at the leisure of their time.”

T012 (School B) indicated the following:

“...Our subject advisor has created a Ms. Teams platform, with this platform we meet every fortnight to discuss our ATP coverage, if a teacher is having any challenges, there is a drop box where one drops it. The teacher will get a variety of solutions and suggestions from peer teachers. The platform is moderated by the subject advisor.”

Siemens (2020:12) defines this as a learning network in which peers make use of ICT to communicate with colleagues in their school, adjoining schools, or nations beyond their own to spread and exchange information regarding their area of expertise.

P002 (School B) said:

“I seldom connect to the school router; the last time I recall accessing the router was to check for past exam question papers on the DoE’s webpage for memo discussion.”

The responses from the interviews show that learning in digital environments, which include web pages, electronic books, as well as multimedia content, enhances teaching (Chisango & Marongwe, 2021:92). In Section 2.2.3, Sethosa (2021:34) warns that teachers who neglect the use of ICT to make traditional classroom instruction significantly simpler and more accessible will miss valuable opportunities to bring more appealing, distinct, and more sophisticated methods of teaching. The foregoing responses revealed that the teacher participants had different experiences with ICT. Social networking has been shown to allow teachers to learn from one another. Unfortunately, Participant P002 misses out on some of the ways they can apply to enhance their teaching strategies. Connectivism Theory facilitates collaboration of teachers in their everyday lives using technology. Unfortunately Participant P002 and their peers who do not use ICT are missing a lot of valuable information from sources like YouTube, Thutong, and MS Teams.

Sub-theme c: use of ICT for assessment

This sub-theme relates to the research results that developed from the responses of teacher participants in the context of the use of ICT for carrying out school assessments. According to Sethosa (2021:64), teachers should use ICT during assessments. Moreover, learners ought to be provided with the possibility to carry out their evaluation tasks, including projects and assignments using computers and start fostering an attitude of personal information management, and autonomous learning.

T001 and T005 admitted that they occasionally use ICT to prepare learners' activities. They also give learners tasks that require them to use the Internet, although they prefer doing so as group reviews. T005 stated,

"...When I was requested to set the district exam paper for March exams, I visited the ec.exam.gov.za. website and downloaded the previous exam papers, which saved a lot of time in searching for hard copies in my disorderly cupboard, I want to encourage other teachers to use the Internet to source for their subject content if they want to set assessment tasks. Past exam papers from all the provinces are there online"

P002 (School B) acknowledged the following:

"...It is challenging to use ICT for assessment because data is very expensive these days and I cannot spend more than an hour on the Internet, the data we used to receive from the

Department is no longer provided.”

However, T004 (School A) revealed as follows:

“...my classes have a big number of learners; the smallest class size is approximately 65 learners. The school has few computers and tablets, making it very difficult and stressful for me to make room for all the learners to be assessed in the computer laboratory that has little and dysfunctional equipment”.

On the other hand, T006 (School C) reported that:

“...I do not use any ICT for assessment, because being that I teach IsiXhosa which is a mother language. This subject revolves around the Eastern Cape, there is no need to search on the Internet for information that surrounds us, secondly, most of our formal assessments are set either at the district or from the province.”

T013 (School D) stated that they rarely use ICT for assessment because they believe that technology is not reliable and should not be used for assessment. They went on further to say that:

“...It may compromise the reliability and integrity of formal assessment if learners can do copy and paste from the Internet. There are applications and software that can be entered into a question, and it will generate answers. I prefer to give learners assessments that require them to work in groups rather than use the Internet.”

T011 (School C) reveals that:

“...I use ICT for all my assessment and lesson preparation at the beginning of each quarter I compile a bank of activities on my laptop and create a backup. As the term progresses, I extract the assessment as per the Annual Teaching Plan requirements. All my learner marks are electronically recorded. Assessment is better managed using ICT because even if you need 2020 assessment you can retrieve them in a matter of seconds.”

The responses from the interviews revealed that most teachers appeared unfamiliar with the main purpose of using ICT. In Botswana, the Department of Education has made it compulsory for teachers to use their computers in developing lesson plans (Okafor, 2020:123). Using ICT, teachers can formulate adaptive assessments (Lukas & Yunus, 2021:117). This kind of evaluation modifies the degree of difficulty based on the learner; questions become easier if the learner struggles and provides incorrect answers, and more difficult if the student provides correct answers. The use of ICT allows for e-assessments that can be assigned to a large group of learners and they will receive immediate feedback because the feedback is computer-generated. The connectivism concept benefits teachers

by encouraging them to explore and become active makers of their knowledge through networking (Feldman & McPhee, 2017:72).

4.2.2.2 Theme 2: Challenges in the use of the provided ICT

Table 4.2 displays the sub-themes that developed from this theme (Section 4.2). The sub-themes include accessibility of ICT in high schools, ICT training and skills, and load-shedding. Each of these sub-themes is covered in depth hereunder.

Sub-theme a: accessibility of ICT in high schools.

This sub-theme attempted to evaluate if teachers have access to the available ICT in schools. As noted in Chapter 1, Section 1.1, the Department of Education has embarked on an extensive programme of rolling out ICT equipment in schools across the country (DOE, 2004:17). The ICT equipment has been provided to schools, but the question remains; are they accessible to all teachers? Chisango and Marongwe (2021:56) mention that there is a digital divide in South African schools. In this context, they are of the view that some schools in South Africa have full access to ICT, while those in rural schools have limited access. Addressing the challenges in the accessibility of ICT equipment in high schools will help to resolve the associated challenges.

P001 (School A) shared that

“... teachers have access to the school Wi-Fi and ten laptops, with five allocated to each department. The school has a computer lab equipped with a smart interactive whiteboard, a telematics centre, a mounted projector, and a variety of other innovative accessories. MTN, Vodacom, and DoE have also donated tablets. The Department of Education provided each teacher with a laptop. Grade 12 Math and Science students primarily use the computer lab to complete school-related assignments. The administration office has three laptops, two desktop computers, and three printers, including four photocopiers.”

Even though P001 (School A) & P002 (School B) appear to have similar resources at their schools, their responses were not similar. P002 (School B) acknowledged that:

“...I always try to keep our computers safe, and all of our information communication technology is locked in the strong room.” I am not sure of the accessories we have because it is seldom used. Each teacher was given a laptop, but most relied on two teachers to complete

all their printing tasks. four laptops are assigned to department heads; if a teacher requires one, they must receive approval from the HOD. In addition, the school has two functional photocopying machines and several that are not working.”

P003 (School C) is new at their school. The participant mentions that when they were appointed the computer laboratory was dysfunctional; other teachers were using the computer laboratory as a classroom, while participant P004 (School D) mentioned that:

“...We no longer have access to ICT the computer lab was vandalised last year and most of the computers and projectors were stolen. There is a big challenge of vandalism at our school, all valuable computer accessories that remain are kept in the locked strong room.”

Participant P004 could not give exact quantities of the provided ICT because the school faced continuous burglary and vandalism. In Chapter 2 (Section 2.2.3), Chisango and Marongwe (2021:128) mention that in the Gauteng province, the computer laboratory for most schools has been vandalised and ICT equipment has been stolen. In another scenario teacher participants' responses are as follows: T001 (School A), who claimed that he was in the ICT committee at his school, mentioned that:

“...the laboratory is fitted with a telematics centre and there are whiteboards in each classroom, and two classes equipped with overhead projectors and interactive whiteboards. The computer lab is equipped with twenty desktop computers, each with its desk and chair. Each teacher is provided with a tablet, teachers have access to the Internet that is provided by the school, the challenge we have is on the Wi-Fi. It has intermittent connections, and teachers abuse it such that we run out of Data before month- end.”

It is important to note that there were variations in the information that was provided by P001 & T001, despite the fact they are from the same school (School A)

T005 (School B) could not give the exact quantities of ICT they had, they alluded that most of the laptops, data projectors, and laptops are locked up in the strong room. T005 added:

“...yes, it's true that all teachers were provided with an electronic device from the Department, unfortunately not all teachers still use them teachers fear moving with their laptops, other teachers have given the laptops to their kids who are studying in colleges, secondly our institution features a safe wireless network that is exclusively used by teachers. Our SMT [school management team] feared the abuse of the Wi-Fi if the password was given to pupils. The school printing room contains two laptops a desktop computer and two printers. Another room is used for storing other equipment, with three photocopiers, three of which are

broken, and one printer, the tablets and laptops that were donated from Vodacom and MTN are locked in the strong room”.

T009 (School C) mentions that:

“...The challenge we have in accessing of ICT is that our computer lab was converted into a classroom, and all the computers (dysfunctional) were taken to a crowded storeroom, so currently we do not have a computer lab. Secondly, the projector and the smart boards that we received from the Department were installed in the staff room due to security reasons, this data projector and smart boards serve no purpose because they are not accessible to use for teaching in the classroom. We have Wi-Fi, but it is no longer working, since it was struck by lightning no repairs have been done. A new computer lab is currently being built and we hope our situation will improve.”

T015 (School D) concurred with T016’s response that the school is facing a vandalism challenge. Accessibility to ICT remains a challenge in high schools.

The interview with four school principals revealed that schools were provided with ICT either from the DoE or from other stakeholders. Accessibility was a challenge that affected most of the teacher participants. Some of the teacher participants concurred that school management preferred to keep the provided ICT in the strong rooms and safes for fear of accountability and responsibility. Most of the teacher participants were aware of the provided ICT, but acknowledged that they rarely used it (Gamede, 2021:87), hence, they do not know the exact quantity available in their schools. Furthermore, despite being given their ICT equipment, the teacher participants agreed that they mostly used their peers’ ICT equipment. Slower and poor network connections were some of the challenges that made ICT inaccessible.

Sub-theme b: ICT training and skills

ICT has the potential to accelerate, enrich, and deepen skill development (Amadi & Siminialayi, 2021:92). Sethosa (2021:46) continues, “Technological tools solely do not improve education; subject specialists must be professionally trained and have a support system. A sizeable proportion of teacher respondents agree that ICT improves teaching; nevertheless, without adequate training, teachers are not able to use it.”

P001 and T005 stated that they participate in the Professional Learning Communities (PLCs) training

programme, which is funded by the DBE. P001 stated that:

“...During the PLCs scholarship programme, we received training on the use of basic computer skills including spreadsheets like Excel.” PLC lasted three months and culminated in the distribution of laptop computers. Despite having fundamental ICT skills, I believe participating in the programme increased my knowledge of information and communication technology to apply it in education.”

In Chapter 2, during the literature discussion (Section 2.3.1), Guo et al. (2020:166) mention that the positive impact of using ICT is to improve the participation of learners, which can be witnessed in how it increases their motivation and performance. Teachers who attend training must understand the implications of training and the goal of learning ICT skills.

T005 (School B) further commented that:

“...During the training, teachers were more concerned with receiving laptops than the skills they will learn.”

ICT training is productive when it is conducted frequently to accommodate new teachers who join the Department. According to Sulistianingsih and Mukminan (2019:122), principals lack the basic knowledge of computer application skills, which presents challenges in accessing administrative material from the Departmental website. T008 reported as follows:

“...I was recently appointed and have not received any training since joining this school. I can only boost my computer skills from my tertiary education, and it involved computer programs that helped me use Excel during the recording of learner assessments, and MS Word that we used to prepare our assignments. However, training would help me understand computers.”

T010 (School C) and T016 (School D) agreed with T008 (School B) that the Department ought to concentrate on educating aspiring young teachers about ICT use.

P002 (School B) noted that:

“...I was born before computers. Even cell phones were not there we relied on technology written in the textbook, and we were getting good results as compared to your computer generation.”

The responses to the interviews indicated that other than the PLCs scholarship programme, teachers were not knowledgeable. An inherent challenge in the use of the provided ICT equipment is the failure

of the Department of Education to understand that teachers lack the basic skills to use the provided technologies (Amadi & Siminialayi, 2021:67). This is highlighted by participant T014:

“...the professional training programmes are very scarce in our department, at times the Departmental officials who are also in acting positions will come to our school trying to workshop us on the use of ICT, but I do not think it is effective. The Department must take teachers for real professional training.”

In conclusion, the challenges in the use of the provided ICT are influenced by several factors such as the availability of skills and competencies, and contextual factors that include training and support (Chisango & Marongwe, 2021:68). Out of twenty participants, only six had obtained specialist instructional training on the application of the provided ICT. The DoE and other stakeholders need to find ways of making their programmes include all schools. More stakeholders need to be recruited into these training programmes. A study that was conducted in Sweden at Litorika High School (Section 2.2.1) shows that ICT is ever-evolving and teachers need to be continuously supported for them to develop proper skills and competencies.

Sub-theme c: load-shedding

Gamede (2021:56) highlighted that ICT equipment requires an uninterrupted supply of electricity. With the current problem of shortage of electricity, Eskom had to introduce load-shedding, which has negatively reversed all the achievements and milestones that have been gained in the implementation of the use of ICT in high schools; some of the data servers that have been installed by the DoE have been damaged beyond repair. Load-shedding is a sub-theme that emerged in the responses of almost all participants who were interviewed.

P001 (School A) felt that:

“...the school has a challenge of continuous load-shedding this presents a serious challenge as the school cannot use any electrical device during load-shedding, this has become a stabling block because load-shedding can take four hours, while our lessons are 30 minutes, in recent times the use of projectors has become a nightmare.”

Despite a general lack of stable electricity distribution in rural schools, the schools in rural areas now face a new challenge of power cuts and load-shedding, Chisango and Marongwe (2021:43) argue that

extended periods of load-shedding can cause catastrophic damage to delicate ICT infrastructure. The problem is exacerbated by the lack of power backup resources in high schools

T007 (School B) reported that:

“...using technological devices at our institution has become a nightmare due to continuous load-shedding, our server has been damaged due to intermittent power cuts.”

T011 (School C) felt that rural schools have more power outages than urban institutions. T015 (School D) agrees with T011 (School C) when he proffered that:

“...Eskom should make sure that rotational load-shedding is fair, schools in rural areas experience more load-shedding than schools in town. We are losing important school infrastructure from load-shedding.”

The use of ICT devices depends on a reliable electricity supply. Continuous power outages and rotational load-shedding damage critical infrastructure. Load-shedding and power cuts emerged as a new challenge that threatens all the strides and achievements made in the use of the provided ICT in the high schools of the Seplan Circuit. Gamede (2021:56) acknowledges that most of the high schools in the rural heart of KZN have severe power cuts and load-shedding, which presents a serious challenge as the schools cannot use any electrical devices.

4.2.2.3 Theme 3: Strategies used to address the challenges in the use of the provided ICT

Research objective 3: Strategies used in addressing the challenges related to the use of ICT in high schools in the Seplan Circuit, CHE District, Eastern Cape, as a tool to enhance teaching?

Three sub-themes that arose under this theme are listed in the table of themes (Section 4.2.2). We conducted interviews with the participants to find out how successful the strategies were. The teacher participants' responses revealed the following sub-themes: load-shedding, ICT training and skills, and accessibility of ICT in high schools. Each of these sub-themes is covered in detail below.

Sub theme a: accessibility of ICT in high schools

When asked about the resolution of challenges in the accessibility of ICT in high schools, T002 (School A) mentioned that:

“...I am new at this school, and I do not have access to any ICT at this school. What I have observed is that only the senior teachers have access to school ICT, I have not been allocated a laptop and when I ask my Departmental head, he says I need to be patient with the Department, they will allocate me in their next rollout programme. Not all teachers have access to personal laptops; there are instances when teachers wish to use the Departmental laptop simultaneously, which poses issues in determining who should use the laptop first.”

In contrast, T004 (School A) claimed that:

“...Some computers and laptops provided by the department are no longer accessible due to outdated software and programs. You will not believe me if I tell you that some of the desktops in our lab have Windows Explorer; such computers are no longer portable with current programs such as Windows 11. To add to that, not all the computers in the computer lab are completely broken; others only require repairs. Suggestions have been made to management regarding repairing the computers, but I believe the school does not financially prioritize the provision and maintenance of ICT.”

Contrary to this, T006 (School B) claimed that:

“... We have raised the matter with the Circuit Manager, and she instructed the SMT to engage a staff meeting and nominate an ICT committee to handle all ICT-related matters, until now nothing no progress has been made. All the ICT that was provided by the Department and other stakeholders is still locked in the strong room.”

T0011 (School C) observed that:

“... Since the conversion of our computer lab into the classroom, we do not have Internet access all the ICT was removed. The Department is constructing a new computer lab but will need time to complete it. Another challenge we have is that the Department of Education issued computers once, and never made a follow-up to issuing to new teachers and lack of commitment from SMT in making follow-up on Departmental promises makes the situation worse.”

T013 (School D) states that:

“...The matter of burglary was raised with the police, but until now, not a single arrest has been made, the Science lab was destroyed, and to make matters worse the Department is reluctant to provide us with other new computers, Even the telematics that was installed in one of the classes the Department took it to another school.”

According to Sethosa (2021:26), management is critical in effectively resolving the ICT constraint in

schools.

T014 (School D) stated that:

“...As for me I do not need to rely on the Department to have a laptop, I have bought my own, I also buy my data from Vodacom, and most teachers rely on my laptop.”

Siemens (2020:38), the pioneer of the connectivism theory, defines the connectivism theory of learning as a framework that sees learning as a network phenomenon shaped by technology and socialisation. From Siemens's perspective management of high schools should be collaborating and forming networks to resolve their challenges, unfortunately, that is not happening in this case study. The resolution of challenges on the accessibility of ICT equipment in high schools is a challenge on its own because of several reasons that include amongst others, failure to form networks and tiresome procedures and processes that must be followed to resolve the challenges. This results in some teachers not bothering themselves when it comes to using ICT equipment that are provided by the DoE. The responses of the interviews from T004 and T006 show that there is no resolution of challenges in the use of the provided information communication technology.

Sub-theme b: ICT training and skills

ICT cannot simply be installed in schools and assumed to function in every school day; it requires continuous upkeep and care, as this is a specialised responsibility that should not be given only to teachers. According to the teacher participants' replies during the interviews, the DoE was not providing adequate ICT training and skills to instructors. Teacher respondents were questioned regarding the difficulties they had when using the offered ICT.

P002 (School B) noted that it is challenging for senior teachers who did not receive training on how to use ICT, to unexpectedly begin incorporating it into their lessons. It is important to emphasise that training is essential, especially for senior teachers who have not adapted to the digital age. P002 (School B) voiced worry about:

“...The difficulty PLCs have, and the DoE's training programmes is that they are paid for through a scholarship. All teachers should be trained to build the abilities needed to use ICT. For example, for you to get the scholarship you need to be teaching a subject that is related to technology, one of my colleagues applied for the scholarship but was not successful because

he is a language teacher.”

When questioned if the certified teachers who participated in the PLC programme implemented the skills they were taught, T002 (School A) objected that:

“...The trained teachers failed to share what they learned during the programme with their peers. Few of the teachers use the ICT skills they have acquired for teaching reasons.”

Connectivism is the starting point for learning, which happens when knowledge is activated by individuals' connection to and participation in a learning community (Goldie, 2016:41). As pointed out by teacher T002 (School A), it shows that the resolution of challenges on training and skills is not yielding the intended results.

T009 (School C) states that:

“...The ICT was couriered to their school, and were given an invoice to sign, and each teacher was handed a laptop no training or orientation was done on how to use them.”

As a result of the interview, it became clear that a lack of training and ongoing support influenced teachers' behaviour in the use of the provided ICT. Sulistianingsih and Mukminan (2019:122) state in Chapter 2, Section 2.2.1 that a scarcity of skills leads to teachers not using ICT, resulting in reduced confidence, anxiety, and fear of being ashamed in dealing with learners who are better acquainted with technology. Siemens (2020:89) defines a network as links connecting entities or nodes, which might be people, groups, systems, and organisations, and a set of broad guiding concepts. The interviews above show that principals and teachers in the Seplan Circuit need to adopt and implement the Connectivism Theory in sharing their skills. T002 (School A) explicitly mentions that the trained teachers did not share the skills that they had acquired from their training. Furthermore, few teachers are using the skills they have gained in the classroom. If teachers do not share their ICT skills, they will not acquire the relevant skills to use the provided ICT. This is one of the reasons why teachers are hesitant to use the provided ICT equipment. Based on the replies of the teacher participants, they emphasise the importance of training for all teachers, as it will enable teachers to make effective use of the given ICT equipment without fear. The connectivism theory's main aim is to understand how to learn effectively in a digitally enhanced environment (Siemens, 2020:54) while sharing information.

4.2.2.4 Theme 4: Recommendations for effective use of the provided ICT

Research question 4: What recommendations can be deduced regarding the use of the provided ICT in the high schools of the Seplan Circuit as a tool to enhance teaching?

Theme 4 addresses guidance for making optimal use of the provided ICT equipment. Table 4.2 shows that the following sub-themes evolved from theme 4: recommendations and guidelines, intervention, and support. In this theme, teacher participants gave suggestions and recommendations for the Department of Education to consider addressing the challenges that schools face in the use of ICT.

Sub-theme a: Recommendations and guidelines

The concluding section of the interview included a discussion of suggestions, recommendations, and guidelines. In this theme, the participants were questioned if there was any advice or guidelines for using ICT to enhance education.

P001 (School A) and T005 (School B) believed that the DoE ought to provide adequate ICT equipment in schools. P001 (School A) recommended the following:

“...Department of Education should have correct information on the total number of educators and enrolment of learners so that the DoE’s supply of information communication technology corresponds to the school enrolment.”

P003 (School C) mentions that:

“The department must establish a section dedicated to ICT alone, to ensure that ICT resources are managed effectively. Many schools have outdated computers, if you send your laptop to the Department for repairs it never comes back.”

T010 (School C) suggested that the administrators of schools should undertake a substantial programme in ensuring that all teachers have access to ICT and that it is used efficiently.

T008 (School B) suggests that:

“...The DoE needs to formulate a policy framework that governs ICT use in schools. The policy will additionally act as a guideline on how the school will handle and safeguard its resources.”

T014 (School D) believed that the SMT had little understanding of how to handle and regulate ICT-

related challenges, however, if the school had a procedure with which all teachers were trained, it could help the school. They stated that some teachers had given laptops to their children.

The preceding interview involving the teacher respondents demonstrated their reservations about inappropriate handling of the provided resources. Furthermore, they stated that schools ought to establish and enforce a policy that guides management in the allocation and use of ICT.

Sub-theme b: ICT intervention and support

In this theme, teachers and principal participants presented proposals for ICT interventions and support that they believe the DoE should provide to their schools.

P001 (School A) mentions that:

“...Training in the use of the provided ICT is crucial for all teachers, and more emphasis should be given to those who have never gotten any type of training previously.”

P003 (School C) suggests that:

“...Teachers will develop confidence and capacity to use ICT following training. The introduction of ICT training through a scholarship, such as the one offered by PLC, has raised many concerns amongst teachers. Teachers complain that the selection process is not fair and discriminates the teachers that need the training.”

However, P004 (School D) concurred with the following:

“...It could be beneficial to provide ICT through a workshop on an ongoing schedule, such as every quarter.”

T007 (School B) proposes that:

“...at my school, there are old PCs with non-functional keyboards sitting idle. Without regular software updates and technical help, computers slow down, get overloaded with malware, and ultimately cease operating. I believe that the DoE ought to take these kinds of problems into account given the use of ICT increases with time, and so will the application itself.”

A consolidation of the extracts from the interview transcripts above clearly shows that despite concerted efforts from the Department of Education and other stakeholders in providing high schools with ICT equipment (DBE, 2016:82), a huge challenge remains. Most participants lack the basic skills

that are needed to operate computers. This is evident in Chapter 2, Section 2.2.1, technology is evolving at a much faster rate than the teachers are learning.

Furthermore, I collected data from non-participant observations to ensure triangulation. The data acquired during the non-participant observation are elaborated in the next section.

4.3 Non-participant Observer

This data collection strategy involved observing the surroundings as well as actions taken by participants at the schools that were chosen. Non-participant observation assisted me in determining the level to which ICT was used, allowing me to acquire a piece of more in-depth knowledge. This was made possible by considering the number along with the quality of accessible ICT. Throughout the process of observation, I took notes to analyse and compare data from interviews and content analysis. I used the observation checklist (Appendix H) to help me decide what to observe at the schools.

I chose four schools from the Seplan Circuit that I observed and labelled them as School A, School B, School C, and School D. All the schools that were observed were government-run facilities. Table 4.3 provides the school code as well as the participating teachers and principals.

Table 4.3: Summary of school details

SCHOOL	PARTICIPANTS	PROFESSION
School A	P001	Principal
	T001	Teacher
	T002	Teacher
	T003	Teacher
	T004	Teacher
School B	P002	Principal
	T005	Teacher
	T006	Teacher
	T007	Teacher
	T008	Teacher
School C	P003	Principal
	T009	Teacher
	T010	Teacher
	T011	Teacher
	T012	Teacher
School D	P004	Principal
	T013	Teacher
	T014	Teacher
	T015	Teacher
	T016	Teacher

Source: Self-compiled

School A was the first school I observed. It was a large school, with 24 teachers and a learner population of over 1,000. T001 was the ICT chairperson, which means that the school had a functional ICT committee. Two routers provided a secure connection that I noted was quite slow. There were eight laptops. The school has a computer laboratory equipped with a smart interactive whiteboard, a telematics centre, a mounted projector, and a variety of other cutting-edge tools. In addition, MTN, Vodacom, and the DoE had donated tablets that were in their moveable trolleys.

The computer room is primarily used by pupils in Grade 12 in the Mathematics and Science streams for school-related tasks. In the principal’s office, there was a laptop on his desk connected to a small

Kyocera printer that was Wi-Fi-enabled and had a wireless connection; a desktop computer on a small separate table in the corner that had accumulated dust, showing that it was no longer used. Three printers and four photocopiers were in the printing area adjacent to the principal's office. All the ICT in the computer laboratory worked properly.

School B was the second school I observed. I noticed that the Science laboratory was not accessible; it had strong doors that were reinforced with burglar bars. There was a camera and an alarm system. The Science laboratory housed 12 desktop computers, each with its own desk and chair. The principal led me to the strong room, where the remaining ICT equipment was locked away. It featured tablets from the Department of Education. The tablets remained packed in their original cartons, indicating that they had never been used. Furthermore, I noticed a cart with another set of brand-new tablets; when I tried to turn them on, the batteries were long dead.

School C was the third school I observed. I was greeted by the principal, who led me to his office. The principal's office was very spacious with a table in the centre. Teachers had converted a computer laboratory into a staff room. This was evident from the tables. The tables were arranged in a manner that showed that it was once a computer laboratory. There were adapters and power connections around the room. There was a projector mounted in the ceiling and a data server was mounted at the back, which confirmed T009's remark. Everything seemed to be working perfectly. When I tried to connect to the available secure Internet connection, I noticed that it was very slow, which corroborated P003's response that their network connection was very slow

In concluding my observation, I visited School D. School D featured its unique problems. The Science laboratory was empty. There were signs of vandalism everywhere. The cables were lying on the floor, and some of the burglar bars showed that there was forced entry. The principal took me to the strong room. All the remaining ICT equipment had been transferred there. There was not enough space to accommodate all the equipment, and as a result, it was difficult to count or check the functionality of those accessories. This agreed with participant T014, when they mentioned that our school has serious challenges of vandalism. The evidence around the Science laboratory showed that it had been vandalised more than once.

Despite these schools being geographically located in the same location of Seplan Circuit. Some of

their challenges were different from each other. For example, School A had a challenge of high enrolment of learners, while School D had a serious challenge of vandalism. School C was characterised by a shortage of infrastructure, while School B had a challenge of poor management of resources. In School B, teachers did not have access to the provided ICT equipment because the principal kept them locked in the strong room. Poor Internet connectivity and load-shedding seem to be prevalent in all four schools.

4.4 Summary of Findings

Through content analysis of the semi-structured interviews, a distinct perspective of each participant in terms of ICT application and use in high schools, was revealed. A significant application of ICT by teachers in rural areas will help to educate society and communities (Chisango & Marongwe, 2021:83), making instruction more relevant, inventive, and convenient. The passages below discuss a summary of the findings.

According to information gathered during the interviews, several teachers felt inferior because they lacked ICT skills. This causes teachers to avoid using ICT out of fear of being humiliated. Training of teachers must remain a priority because technology changes with time. As shown from the same-structured interviews, one of the biggest challenges that is hampering the effective use of the provided ICT is the lack of learning communities. The DoE's ongoing support and maintenance of ICT is highly valued by teacher participants, but the DoE should contribute more by taking an initiative in the formation of learning communities and should engage the Department of Communication to come up with methods that promote research and development in the use of ICT.

Finally, teacher participants suggested that the school administration team collaborate with the DoE on policy formulation. The findings revealed that ICT use is a challenge at all four selected schools; PCs, laptops, and tablets are always locked, leaving some teachers irritated with the bureaucracy of seeking permission to use them. Although all four schools had Wi-Fi connections, two of them were experiencing connectivity issues.

4.5 Conclusion

The preceding sections above provided a comprehensive description of the findings obtained from semi-structured interviews and non-participant observation. Section 4.1 began by presenting the study findings and consolidating the information gathered following the procedure that is applied in content analysis, which is decontextualisation, recontextualisation, and categorisation of themes into sub-themes that aided in responding to the aims and objectives of the study. This chapter addressed major themes and sub-themes that arose from the study's questions. Themes were discussed successively starting from the first theme until the last one, the first theme: what are the challenges in the use of the provided ICT in the Seplan Circuit of CHE District, in which teacher participants discussed the challenges that they experienced in their local schools in accessing the provided ICT, the training and support they have received from the DoE, and perceived challenges with load-shedding. Themes about the challenges that teachers faced when required to use ICT were highlighted, including a lack of adequate skills, ineffective training, and teachers' reluctance to abandon traditional teaching methods. The chapter closed with a discussion of recommendations made.

CHAPTER 5: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

The previous chapter meticulously discussed data analysis and interpretation of the findings.

This chapter concludes by providing a summary of the findings, recommendations, conclusion, and suggestions for future research. A summary of key findings is presented through the cross-referencing of Chapters 2, 3, and 4. Furthermore, the chapter provides recommendations for the empirical study to the DoE, the SMT, and teachers. Finally, it concludes with the study's limitations, conclusions, and suggestions for further study.

5.2 Summary of Findings

The summary of the findings involves key participants identified through comprehensive content analysis of the semi-structured interviews and non-participant observation of qualitative data in Chapter 4, Sections 4.2.2.1 to 4.2.2.4. The summary of findings will discuss the similarities, differences, agreements, and disagreements of the responses from the participants against the literature and the application of the Connectivism Theory by Siemens for each of the themes and sub-themes that were generated during the interview process. The findings influenced the recommendations to assist overcome the obstacles in using the provided ICT in high schools. According to the data obtained, the principal and teacher participants had distinct challenges when it came to the use of the provided ICT in Seplan Circuit high schools.

5.2.1 Primary purpose of using provided ICT equipment.

Interviews with teacher participants revealed that most teachers were not aware of the primary purpose of using the provided ICT equipment. As teachers explore the digital world, they learn to generate social meaning enhancing their understanding while planning and creating lessons that are funny and interesting (Siemens, 2020:86). The majority argued that ICT poses a challenge to the continued existence of conventional teaching methods (Section 4.2.2.1). compared to the traditional method of teaching that is dependent heavily on the chalkboard and textbook, ICT makes teaching and learning much more engaging and practical to already highly technological learners (Reddy,

2020:34). However, some teacher participants indicated that many of the teachers still employed the traditional approach of teaching.

On the sub-theme of ICT as a tool to enhance teaching, some teacher participants agreed that most learners lose focus or concentration during lessons; however, when ICT is used, learners' concentration and involvement levels improve. Teacher participants saw ICT as a beneficial instrument for developing academic and technological skills in rural schools, as they become active participants in the information society with the rest of the world. However, some participants argued that the use of ICT in classes with many learners is difficult; not all learners will have access to digital tools.

On professional development, most teacher participants highlighted that they do not use ICT (Section 4.2.2.3). The Department of Education rolled out the ICT programme to improve teacher professional development (DOE, 2004:17). Use of ICT has the potential to transform human society by increasing digital literacy while creating opportunities for individuals (Gamede, 2021:23). The literature concurs that ICT is a powerful tool that can be used for professional development (Section 2.2.3).

On the sub-theme of ICT for assessment. Participants think that ICT should be used to develop formal learner activities and recording of assessment is performed using ICT. Sethosa (2021:63) argues that teachers should give learners projects and assignments that require them to search online and other scholarly websites. Other teacher participants contradicted the idea sighting the reasons for copying when learners cut and paste information from the Internet.

5.2.2 Challenges in the use of the provided ICT.

Access to the provided ICT emerged as one of the sub-themes presenting challenges in the use of provided ICT equipment. Responses from the teacher participants showed that principals were reluctant to give full access to ICT to both teachers and learners (Section 4.2.2.1). This highlights the contradiction between the Departmental objectives and the school principals' actions. The DoE has embarked on rolling out a variety of ICT programmes to increase accessibility and use of ICT equipment in high schools (DOE, 2004:17), while principals are locking up the provided ICT resources in strong rooms for safekeeping. This is in contradiction with Connectivism Theory that

promotes the networking of teachers and sharing of information is made possible if teachers have access to ICT (Siemens, 2020:36).

Another distinct difference between the literature and the research findings is the provision of ICT equipment. The literature highlights that high schools face an acute shortage of ICT infrastructure (Section 2.4.3). Chisango and Marongwe (2021), Gamede, (2021), Okafor (2020), and Lukas and Yunus (2021) all agree that high schools are poorly resourced with outdated desktop computers, which contradicts teacher participants' responses when they acknowledge that every teacher was provided with a new ICT device that include amongst others a laptop, a tablet or a data projector. Teacher participants concur that their schools were equipped with Wi-Fi connections, smart boards, and telematics (Section 4.2.2.1). It is from this perspective that using the Connectivism Theory, the teachers and principals need to start developing learning communities using the provided ICT equipment.

The other challenge in accessing the provided ICT equipment is the high enrolment of learners in public high schools (Firomumwe, 2022:76). Teacher participants highlighted that their classes have a high number of learners. Responses from one participant confirm that this has caused the SMT to convert the computer laboratory into a classroom (Section 4.2.2.1). The literature acknowledges the same, high enrolment numbers in public high schools in Africa is a big challenge that creates an acute shortage of resources when computer laboratories are converted into classrooms and staffrooms (Gamede, 2021:87). The ICT equipment is left without proper housing and is dumped into storerooms rendering it inaccessible to teachers. The scenario above contradicts with the Connectivism Theory which states that learning is influenced by the accessibility of ICT.

Some principals confirmed that they had access to wireless Internet but struggled to connect because of slow network speeds (Section 4.2.2.1). A principal respondent claimed that it was impossible to use wireless Internet to download instructive movies for the learners (Section 4.2.2.1). All the teacher participants acknowledged dissatisfaction because of slow speeds and network disruptions. Connectivism is the backbone of teaching where teachers need to connect to their world to disseminate and receive information through networking (Siemens, 2020: 81).

The sub-theme on ICT training and skills shows varying responses from the participants. Some

teacher participants acknowledge that the DoE was involved in teacher training through PLCs while other participants argue that they had never received orientation or training on computer use. Teachers in high schools lack the basic skills needed to use computers in the classroom daily (Chisango & Marongwe, 2021:128). According to Connectivism Theory skills are transferred amongst teachers when they form communities. Findings from this study show that there are no learning communities, as supported by one of the respondents, when they mention that teachers who attended the PLC programme did not share their information with others (Section 4.2.2.1). Teachers are reluctant to share their information with others.

The literature concurs with the research findings on load-shedding. All the participants revealed that they faced a challenge of loading shedding and uniformed power cuts that adversely affected their ICT infrastructure (Section 4.2.2.1). The use of ICT requires a continuous supply of electricity because data servers operate 24 hours a day (Reddy, 2020:32). The literature confirms that South Africa is currently experiencing a critical power shortage which is affecting the use of ICT (Gamede, 2021:10).

5.2.3 Strategies used to address the challenges in the use of the provided ICT.

On the resolution of challenges in the use of the provided ICT equipment, most of the teacher participants' responses showed that the DoE put little effort into addressing the reported challenges (Section 4.2.2.1). Responses from one of the participants acknowledged that they had engaged with the circuit manager on the issue of the principal locking the ICT equipment in the strong room. The participant confirmed that until now nothing has been done. Curtis (2019:146) argues that the biggest challenge in using the provided ICT equipment in schools is the failure of the managers to resolve ICT-related disputes that arise in schools. High level of vandalism and stealing of ICT causes principals to lock the ICT equipment in strong rooms (Chisango & Marongwe, 2021:146).

Teacher participants remarked that access to ICT equipment was constrained because of budgetary limitations, and the schools determined that maintaining software on absolute desktops would be too costly (Section 4.2.2.2). Observations from non-participant observation from one of the schools showed that several computers were not repaired and were stored in the storeroom, indicating that the school did not have technicians to repair and maintain ICT infrastructure (Section 4.2.2.3). Guo et al.

(2020:166) argue that financial constraints cause the DoE to reduce spending on ICT equipment. While literature shows that for ICT to be effective it needs regular updates and upgrades of both software and hardware.

The responses of the principals from four schools all concurred that some of the challenges were beyond their control challenges (Section 4.2.2.1). A principal participant indicated that issues of burglary have been raised with the police unsuccessfully; the same with the challenge of poor network connectivity: the DoE has made it clear that there is nothing that they can do. Rural schools in South Africa are characterised by poor network connections (Chisango & Marongwe, 2021:186). The literature validated the challenges. Learning as a learning phenomenon is shaped by the interaction of individuals using technology and socialisation. Without an effective and functional network, it becomes difficult for teachers to share information.

On the sub-theme of training and skills, participants' responses varied greatly. The DoE has been involved in various training programmes to empower teachers in using ICT equipment (DOE, 2004:17). Responses from one of the teacher participants argue that training of teachers should be an ongoing process because the Department employs new teachers regularly (Section 4.2.2.1). Other participants complained that the training from the Department is ineffective (Section 4.2.2.1), while other responses showed that the absence of ICT technical help in schools was identified as a difficulty for teacher participants when attempting to use ICT (Section 4.2.2.1).

5.2.4 Recommendations for effective use of the provided ICT.

Teacher participants suggested that the Department of Education should invest in ICT tools for all public schools. The Department of Education should ensure that schools have adequate ICT tools to accommodate every teacher, as well as unlimited use for all teachers. Furthermore, they advocated frequent software upgrades and ICT tool maintenance to improve ICT implementation in teaching.

Some teacher participants suggested that the Department of Education should assign technicians to visit the schools individually to learn about the issues that they face. Teacher participants additionally stressed the importance of regular software maintenance and upgrades for ICT-enhanced teaching and learning.

5.3 Recommendations

Based on the findings of this study, recommendations are made to the DBE, the SMT, and teachers. The DBE introduced ICT to improve teaching and learning (Gamede, 2021:67). In aligning with the findings from the interviews and observations conducted in this study, which led to conclusions, the study makes recommendations regarding the use of provided ICT to the DBE, SMT, and teachers.

5.3.1 Recommendations for the Department of Education

The empirical study found that a lack of adequate ICT use in high schools is accompanied by a lack of ICT training and skills amongst teachers (Section 4.2.21), which impacts their perspectives regarding the use of ICT for teaching. The achievement of Departmental goals in the use of ICT in teaching is contingent on teachers' ICT expertise.

The DoE should focus on ICT training, which should be delivered in the format of regularly scheduled sessions rather than a bursary plan. Observations and monitoring of schools should be carried out to ensure that the teachers implement the ICT skills learned from the supplied training in an efficient manner. The Department can also introduce some incentives to motivate teachers to use computers in their classrooms. According to Gamede (2021:10), poor ICT expertise and a lack of assistance with technical issues are factors that impede teacher readiness to incorporate ICT into their classes. The empirical study recommends that all teachers receive appropriate ICT training and ongoing technical support.

It is recommended that the DBE design a strategy that guarantees that all school principals must ensure that the provided ICT resources are accessible to all teachers. The Department should take a leading role in formulating a policy framework that encourages equal access to ICT. Furthermore, the DBE can establish a strategic plan to regularise the ICT policy. The policy has an important role in regulating processes and directing principals (Section 2.2.3). Corrective measures should be applied to principals who lock ICT equipment in strong rooms and the DoE needs to find ways of raising funds to upgrade the security of computer laboratories

All non-functional computers and other devices need to be assessed and those that can be repaired need to be fixed, and those that are not broken should be distributed to other schools in need. For the Department of Education to achieve its long-term goal, it needs to routinely maintain and upgrade its infrastructure, the Department can invest in a fibre network that is fast and reliable.

5.3.2 Recommendations for the SMT

School management teams need to take into consideration the available resources and allocate them according to school needs. When sending teachers for training they need to choose teachers who are key players in the dissemination of knowledge related to technology use in the classroom. The SMT should take a leading role in forming learning communities and forming social networks and platforms to share ideas and discuss challenges and solutions in the use of technology.

The managers of the school must demonstrate a clear understanding of their responsibility by facilitating the creation of an acceptable ICT policy, as well as an accessible implementation plan that specifies the school's objectives for adopting ICT. It is vital to emphasise that the policy should not be one-size-fits-all. The policy should be contextualised to school needs and the SMT must design guidelines that allow for evaluation of the use of ICT equipment during the teaching process. On the issue of load-shedding, it is the responsibility of the SMT to find alternative power options that include generators, and installation of solar panels.

5.3.3 Recommendations for teachers

Although a young generation of teachers are familiar with technology, the majority do not use it to its full potential. Young teachers should take a leading role in setting up ICT infrastructure and keeping software up to date while helping senior teachers. Most learners nowadays are familiar with technology, and teachers must prepare lessons that incorporate videos and colourful presentations to make learning more interesting. The empirical study suggests the use of massive open online courses (MOOC) to boost their professional growth and knowledge of curriculum-related topics, rather than relying primarily on textbooks and chalkboards for instruction.

Teacher participants encountered numerous problems when using the provided ICT (Section 4.2.2.2),

including a scenario in which a laptop was couriered to a teaching participant without receiving any training or support on how to use it. Most of the participants in Section 4.2.2.2 demonstrated a lack of competence. To solve this, teachers must take the initiative to empower themselves by frequently registering for new ICT courses.

To increase accessibility to ICT teachers, they should form and maintain learning communities (Section 4.2.2.3). Learning communities are the backbone of any society and allow for the transfer of information between members of that learning community (Siemens, 2020:87). As the study has revealed that some teachers have no access to ICT, it is advised that they engage with the school management team and facilitate the establishment of an ICT committee, it is from this perspective that the ICT committee will formulate an ICT policy and guidelines that allow equal access to ICT of teachers. Lastly, teachers must start using ICT in the creation of formal and informal assessments. When used correctly, assessments can be stored safely in backup devices and can be retrieved by a click of a button making assessments more orderly and manageable.

5.4 Conclusions about the research questions.

This study aimed to understand the challenges in the use of the provided ICT in the high schools of the Seplan Circuit, CHE District.

These sub-questions are discussed below:

1: What is the primary purpose of using ICT that is provided in the high schools of the Seplan Circuit in the CHE District as a tool to enhance teaching?

Section 2.3.1 quotes Guo et al. (2020:166), as saying schools that have implemented ICT use into their curriculum acknowledge that it can establish an educated and lifelong society targeted at showcasing strategies for future engagement in the information age. Teachers who are exposed to ICT acquire high-order cognitive skills throughout their time in school, since they are connected to a variety of digital channels to acquire knowledge (Fieldman & McPhee, 2007:72).

Sethosa (2021:56), in Section 2.2.3, concurs that ICT has the potential to extend beyond the boundaries of space and time in ways that allow education to be reached at any time of the day with

no restrictions. Goldie (2016:41) agrees that teachers can share and communicate knowledge with learners beyond the classroom, which makes learning more accessible because it is not specifically restricted within the school setting.

The research findings show that most teachers are not familiar with the purpose of the provided ICT (Section 2.3.3). The DBE has provided ICT to enhance teaching; if used effectively, ICT has the potential to retain learner attention and understanding. In Section 4.2.2.3, some teacher participants have acknowledged that they only use ICT equipment for printing and photocopying, while some agree that they use it to prepare lessons that are interactive and interesting. Furthermore, teacher participants use educational films, particularly on topics that are challenging to comprehend. They reported that employing such skills in the classroom is helpful (Section 4.2.2.3). It appears that learners recall and focus on what they see and hear when using ICT resources rather than the information that is simply conveyed.

In terms of teacher development, there is little progress as evidenced in (Section 4.2.2.3). Teacher participants seem to rely heavily on the training that they receive from the Department of Education for professional development. Siemens (2020:46) explains that technology is important for personal development when individuals explore the world using the Internet of Things. It is worrying that most participants do not value their personal development; not a single participant mentioned any endeavour that they take to upgrade their profession using the ICT provided by the Department.

2: What are the causes of challenges in the use of the provided ICT in the high schools of the Seplan circuit in the CHE District, Eastern Cape, as a tool to enhance teaching?

In endeavouring to respond to this study's question, I drew on the literature review, the empirical study findings, the semi-structured interviews, and the non-participant observation.

The primary challenge mentioned was limited access to ICT tools in classrooms, Chisango and Marongwe (2021:56) mention that access to ICT is the initial stage in the implementation of ICT use in the classroom. Responses from teacher participants indicate that most teachers did not have access due to various reasons. Some principals intentionally locked the ICT equipment in strong rooms without justifiable reasons, while other principals locked them to protect them from vandalism and theft which were rampant in their communities. In Chapter 4, Section 4.3, the researcher observed

that School D was vandalised more than once.

Load-shedding was singled out as a major threat to the use of the provided ICT equipment in high schools. Power surges due to overloaded power supply and abrupt switching off electricity due to load-shedding can damage delicate ICT components (Gamede, 2021:35). South Africa has been experiencing a persistent problem of load-shedding and power cuts and schools have not been spared from the problem. Furthermore, in Section 2.2.3, Chisango and Marongwe (2021:96) confirm that investing in alternative power sources that include solar energy, wind energy, and generators seems fruitless for the Department of Education due to financial constraints.

Section 2.2.2. quotes Moorhouse et al. (2021:118), confirming that lack of professional training and support of teachers results in poor use of ICT in the classroom. The absence of technicians' assistance in schools was identified as a challenge. Many schools possessed obsolete computers that were not functional, and some of the operational systems had software issues that needed serious attention. When computers as well as other ICT equipment malfunction, technical assistance and support must be provided immediately.

Van Den Berg (2017:56) explains that in the digital world, network connectivity plays an important role in the dissemination of information amongst members of the learning community. In Section 2.2.1, Reddy (2020:42) agrees that ICT can bring teachers from different parts of the world together. Network connectivity of high schools in the Seplan Circuit showed that it was not suitable for downloading longer videos that required a considerable amount of data. The location of the high schools is characterised by mountainous terrain that presents challenges in network transmission. Furthermore, the stealing of batteries on network boosters exacerbated the problem (Chisango & Marongwe, 2021:68).

3: How effective have the strategies used to address the challenges in the use of the provided ICT in the high schools of Seplan circuit in the CHE District, Eastern Cape been, as a tool to enhance teaching?

Bell (2011:432) states that learning is a lifelong process and is a continuous process. Effective use of ICT in the classroom depends on how effectively the challenges are addressed when they arise (Kop

& Hill, 2008:14). The SMT and the Department of Education must be proactive and not reactive when it comes to the resolution of challenges encountered by teachers when using the provided ICT equipment.

The bureaucracy of the Department of Education has rendered the resolution of challenges in the use of the provided ICT equipment ineffective. The literature, (Amadi & Siminialayi, 2021:67) mentions that decision-making in government institutions is ineffective due to the number of procedures and processes that must be followed before a resolution can be approved and adopted. Teacher participants confirm that several proposals have been forwarded to the District Manager to resolve the challenges of load-shedding and vandalism, but until now they have not received any feedback. To add further, by the time the suggested solutions are adopted the problem will have worsened causing the concerned parties to seek further solutions, thereby repeating an unending cycle of unresolved challenges.

Gamede (2021:56) states that the DoE has started a pilot project to test the effectiveness of its training programme to close the gaps. Teachers who receive training need to share the knowledge that they have acquired with their peers; learning takes place through networking between nodes and connections (Siemens, 2020:74). Soon after the workshop, teachers need to put into practice what they have learned by taking it to learners and apply in the classroom setting. Principal participants have confirmed that all this is not happening in high schools of the Seplan Circuit (Section 4.2.2.2).

4: What recommendations can be made regarding the use of the provided ICT in the high schools of the Seplan Circuit as a tool to enhance teaching?

The participants presented several recommendations to the Department of Education, the most important being free access to ICT for teachers (Section, 4.2.2.3). Without access to ICT, their use is not possible (Sethosa, 2021:91). The DoE must ensure that principals do not lock ICT resources in strong rooms. New and young teachers must be provided with ICT as soon as they enter the system.

Furthermore, the participants advocated for frequent software upgrades and ICT maintenance to improve ICT implementation (Section 4.2.2.4). Technology, by its nature, is always changing (Kop & Hill, 2008:21). The DoE must understand that superior technology today will be obsolete in the next five years. Having this in mind will help the DoE to make plans to replace old technology and

develop systems that will allow for effective monitoring and implementation of the process of replacing outdated ICT with new ICT.

Moreover, the DoE should focus on improving its ICT training, Participants have described the training as ineffective (Section 4.2.2.4). It has also been revealed that most participants are not familiar with training programmes that are available on the Internet and some of them are for free. Inspections and oversight need to be performed to enforce the successful use of the ICT skills acquired through the supplied training (Chisango & Marongwe, 20221:34). This strategy would help to notify the DoE of any issues that impede the efficient use of ICT in schools.

Main research question: What are the challenges in the use of the provided ICT in the Seplan Circuit of the CHE District?

Teacher participants struggled with using the provided ICT as a teaching tool. Most public schools in the Seplan Circuit have large class sizes. Using ICT in classrooms with many learners is not feasible. It is challenging to make room for all pupils during sessions, and valuable time is lost.

In the present research, teacher participants encountered infrastructure-related issues such as load-shedding and an inconsistent power supply, which hampered network supply. ICT is a vital tool for capturing learners' attention. Most learners lose attention or attentiveness throughout lessons, however, when ICT is used, learners' attentiveness and involvement levels improve. Teacher participants saw ICT as a beneficial instrument for developing learners intellectually and technologically in remote schools, allowing them to become actively involved in a knowledge-based society alongside other learners across the world.

5.5 Limitations of the study

In qualitative research, limitations are bound to be present because the findings, conclusions, and recommendations all depend on the opinions, views, and beliefs of the researcher. Moreover, interviews cannot be numerically measured, this limitation shows that all qualitative research studies have limitations.

The research was confined to the Seplan Circuit, which is a limitation as the findings cannot be generalised to represent the whole province or country. Only 20 participants took part in this research; this small sample cannot be used to make deductions for all the teachers in high schools of South Africa. Even the teachers themselves, being human, are subject to bias and misinterpretation of questions during the interview process. All these are forms of limitations that can prove difficult to eliminate during the interview process.

5.6 Suggestion for further study

This study leads to other possible suggestions for further study. Firstly, the study can be replicated in all the provinces of South Africa. This will help to increase the validity and reliability of the study; moreover, other theories like Constructivism can be integrated into the study, thereby increasing rigour, support, and acceptance of the research. The number of participants can be increased during the sampling process to increase validity.

The study suggests that further research be conducted on the experiences of teachers and principals in the use of ICT equipment for teaching and learning. This could provide more benefits and can lead to the formulation of teaching models that incorporate technology in totality. Furthermore, further research into pedagogical frameworks that can be used to train and support teachers needs to be conducted.

5.7 Conclusion of the study

The empirical study aimed to explore the challenges in the use of the provided ICT equipment in high schools. The empirical study implemented the Connectivism Learning Theory for the digital era by George Siemens. The theory has helped to understand how the Department of Education, school management teams, and teachers can collaborate to eliminate the challenges in using the provided ICT equipment. Being guided by theory, the research findings from the interviews have shown that there are no learning communities in the high schools of the Seplan Circuit. Although there are some efforts from some teachers to adopt technology use in the classroom, there is still room for improvement. Learning is a continuous process that needs to be nurtured and maintained (Siemens, 2020:82).

High schools of the Seplan Circuit face diverse challenges that include, amongst others, lack of basic ICT skills to enhance teaching, professional development, and assessment. Furthermore, the challenges have been exacerbated by continuous load-shedding. Load-shedding and uninformed power cuts damage the delicate ICT infrastructure, resulting in poor network connections. Efforts of the Department to provide ICT training and support have been criticised by most teachers, citing inconsistencies in the training processes and programmes. A major drawback is the failure of trained teachers to disseminate the learned skills to their peers.

Finally, the researcher consolidated the interviews and presented the findings and recommendations. The findings from the study show that a variety of ICT equipment has been provided to teachers, but teachers have received little or no training. Moving forward, the DoE needs to design and implement training and support systems. This initiative will help the teachers move away from the traditional teaching methods to the digital methods. Even though this research study included only sixteen teachers, it provided a snapshot of similar issues or triumphs seen by other South African rural high schools, particularly in the Eastern Cape province.

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Appendix A: Ethical clearance



UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2023/09/06

Ref: 2023/09/06/47323582/10/AM

Name: Mr H MUNZWA

Student No.:47323582

Dear Mr H MUNZWA

Decision: Ethics Approval from
2023/09/06 to 2026/09/06

Researcher(s): Name: Mr H MUNZWA
E-mail address: 47323582@mylife.unisa.ac.za
Telephone: 071 107 8944

Supervisor(s): Name: Prof LDM Lebeloane
E-mail address: lebelldm@unisa.ac.za
Telephone: 083 453 8148

Title of research:

**EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION
TECHNOLOGY THAT IS PROVIDED IN SCHOOLS: CASE STUDY**

Qualification: MEd Environmental Education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2023/09/06 to 2026/09/06.

The medium risk application was reviewed by the Ethics Review Committee on 2023/09/06 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



University of South Africa
Pretorius Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date **2026/09/06**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 2023/09/06/47323582/10/AM should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,



Prof AT Motlhabane
CHAIRPERSON: CEDU RERC
motlhat@unisa.ac.za



Prof Mpine Makoe
EXECUTIVE DEAN
qakisme@unisa.ac.za



University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

Appendix B: Application to conduct research: Circuit Manager

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APPENDIX D: REQUEST PERMISSION FROM CIRCUIT MANAGER

HOUSE NO. 805
MANKAZANA STREET
CALA
5455

12 SEPTEMBER 2023

EASTERN CAPE DEPARTMENT OF EDUCATION (CMC)

REF: Request for permission to conduct research in Schools in Chris Hani East

Dear: MRS MPOTULO

I write this letter seeking permission to conduct research in schools in your in Seplan Circuit. My name is HONEST MUNZWA, I am a MED ENVIRONMENTAL EDUCATION student at the University of South Africa (UNISA) with student No. 47323582. I am doing a research under the supervision of PROFESSOR LEBELOANE, and my study is entitled: **EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS**

The aim of the study is to explore what are the challenges in the use of information communication technology that is provided in high schools of Cala, Eastern Cape. Previous research has shown that use of information communication technology in high schools enhance learners' computing, literacy and numeracy skills

Schools in your District has been selected because they were provided with information communication technology from different stakeholders. The study will entail semi structured interviews that will be administered to selected teachers and principals from the sampled schools.

The participation of your schools in this study will have positive benefits that will help to address:

- ❖ The cause of challenges in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape.
- ❖ Identifying the purpose of information communication technology gadgets that are provided in Cala high schools, Eastern Cape) happen.
- ❖ Identifying if there is need for training and workshops in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape)?

There are no potential risks involved in the participation of this study and there will be no reimbursement or any incentives for participation in the research. Your consideration for the study will be highly appreciated as it will help to address the challenges faced in the use of information communication technology in schools.

For further information you may contact me on the contact details below, waiting to hear from you at your earliest convenience.

Yours Faithfully

Honest Munzwa

Appendix C: Approval to conduct research: Circuit Manager



Province of the
EASTERN CAPE
EDUCATION

CHRIS HANI EAST DISTRICT – HUMAN RESOURCE ADMINISTRATION & PROVISIONING
Prefab Complex, Market Street, Ngcobo, 5050, Private Bag X214, Ngcobo, 5050
REPUBLIC OF SOUTH AFRICA Website: www.ecdoe.gov.za
Enquiries: Ms L. Mpotullo Email: lucympotulo@gmail.com Tel: 047 877 0992

20 September 2023

Dear sir/Madam

Re: GRANTING PERMISSION FOR A RESEARCH PROJECT

I am writing to formally grant permission on behalf of the Department of Education, Chris Hani East District to Honest Munzwa, a Master's degree student from UNISA to conduct a research in our district.

Honest Munzwa is pursuing a Master's Degree in Environmental Education, and has expressed a keen interest in conducting a research that will contribute to the enhancement of educational practices in our district. The proposed research project is titled: **EXPLORING CHALLENGES IN THE USE OF INFORMATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS**. The research aims at exploring the challenges the use of information technology that is provided by secondary schools of sakhisizwe CMC.

We recognize the importance of supporting academic research that has a potential to benefit our educational community. Therefore, we are pleased to grant Honest Munzwa permission to conduct interviews. This permission is granted for a period of a month.

Thank you for your cooperation in facilitating this research endeavour, which aligns with our commitment to continuous improvement and excellence in education.

Sincerely

Mpotulo NL (Circuit manager Seplan circuit Chris Hani East district)

Department of Education
RANK: EDUCATION DEVELOPMENT OFFICER
Signature:

20-09-2023

Province of the Eastern Cape
Private bag X214, ENGCOCO 5050



Customer care line: 086 063 8636
Website: www.ecdoe.gov.za



Appendix D: Application to conduct research: Principal

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HOUSE NO. 805
MANKAZANA STREET
CALA
5455

26 SEPTEMBER 2023

THE PRINCIPAL A.M.ZANTSI SENIOR SCHOOL

REF: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL for permission to conduct research in School

EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS: CASE STUDY

Dear: SIR/MADAM

I write this letter seeking permission to conduct research in school. My name is HONEST MUNZWA, I am a MED ENVIRONMENTAL EDUCATION student at the University of South Africa (UNISA) with student No. 47323582. I am doing a research under the supervision of PROFESSOR LEBELOANE, and my study is entitled: **EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS**

The aim of the study is to explore what are the challenges in the use of information communication technology that is provided in high schools of Cala, Eastern Cape. Previous research has shown that use of information communication technology in high schools enhance learners' computing, literacy and numeracy skills

Your School has been selected because it was provided with information communication technology from different stakeholders. The study will entail semi structured interviews that will be administered to Four Grade 8 teachers and the principals of your school.

The participation of your school in this study will have positive benefits that will help to address:

- ❖ The cause of challenges in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape.
- ❖ Identifying the purpose of information communication technology gadgets that are provided in Cala high schools, Eastern Cape) happen.
- ❖ Identifying if there is need for training and workshops in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape)?

There are no potential risks involved in the participation of this study and there will be no reimbursement or any incentives for participation in the research. Your consideration for the study will be highly appreciated as it will help to address the challenges faced in the use of information communication technology in schools.

For further information you may contact me on the contact details below, waiting to hear from you at your earliest convenience.

Yours Faithfully

Honest Munzwa

Appendix E: Approval to conduct research: Principal

A.M. ZANTSI S.S.S



P.O. Box 1027
Cala, 5455
Cell No: 083 769 8351/
071 428 80516

06/10/2023

Dear Mr. Honest Munzwa

REF: Approval letter for to Conduct Research at A.M.Zantsi SSS

This letter serves to give approval to your application to conduct research at our Institution. The school is pleased to give you permission to conduct your research with the hope that your research will help to improve in the Department of education.

We hope you adhere to research ethics as stipulated in your research ethics certificate. The school will be pleased if you could share with the school your findings

Best regards

**Mr S Melane
Principal**



Appendix F: Application to conduct research: SGB

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HOUSE NO. 805
MANKAZANA STREET
CALA
5455

26 SEPTEMBER 2023

THE SGB CHAIRPERSON A.M.ZANTSI SENIOR SCHOOL

REF: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL for permission to conduct research in School

EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS: CASE STUDY

Dear: SIR/MADAM

I write this letter seeking permission to conduct research in school. My name is HONEST MUNZWA, I am a MED ENVIRONMENTAL EDUCATION student at the University of South Africa (UNISA) with student No. 47323582. I am doing a research under the supervision of PROFESSOR LEBELOANE, and my study is entitled: **EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS**

The aim of the study is to explore what are the challenges in the use of information communication technology that is provided in high schools of Cala, Eastern Cape. Previous research has shown that use of information communication technology in high schools enhance learners' computing, literacy and numeracy skills

Your School has been selected because it was provided with information communication technology from different stakeholders. The study will entail semi structured interviews that will be administered to Four Grade 8 teachers and the principals of your school.

The participation of your school in this study will have positive benefits that will help to address:

- ❖ The cause of challenges in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape.
- ❖ Identifying the purpose of information communication technology gadgets that are provided in Cala high schools, Eastern Cape) happen.
- ❖ Identifying if there is need for training and workshops in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape)?

There are no potential risks involved in the participation of this study and there will be no reimbursement or any incentives for participation in the research. Your consideration for the study will be highly appreciated as it will help to address the challenges faced in the use of information communication technology in schools.

For further information you may contact me on the contact details below, waiting to hear from you at your earliest convenience.

Yours Faithfully

Honest Munzwa

Appendix G: Teacher participant transcript



APPENDIX G: Teacher participant transcript

1. INTRODUCTION

Q: Good morning, I am Honest Munzwa. I am currently undertaking a research study on exploring what are the challenges in the use of provided ICT in the Seplan Circuit of Chris Hani East (CHE) District. This interview is conducted to seek and gather if you were provided with any ICT device from the Department of Education and also to know if you are using them. In this interview I would like you to air your views and opinions if you have any challenges that is preventing you from using them. I have chosen you to participate in this interview, reason being that at your school you were recently supplied with trolley of tablets from MTN and Vodacom. I will not use your name to ensure anonymity and all the information you provide will be kept in confidence. I will not use your name in any case of your particulars or personal information. I encourage you to answer all questions as this will help me to gain a better understanding of what I am researching. Remember that you are not under any obligation to take part in this research study and in order to continue with this interview, I need your consent to proceed. If you do not wish to continue, you can stop the interview as you wish. I am going to refer to you as Teacher (T011) and thank you for agreeing to participate in this interview.

R: Okay

Q: So do you accept?

R: I do accept it.

Q: Okay, thank you, before we start with few biographical questions, you gender?

R: Female

Q: Your age?

R: 43

Q: What position do you hold at your school?

R: Educator PL1

Q: Do you have any Professional training in ICT?

R: No

Q: how many number of years do you have as grade teacher?

R: 11

Q: how many number of years do you have as subject teacher?

R: 8

Q: how long is your experience as a teacher?

R: 15

Q: ok that's great now let get into the business of the day

R: ok

- 1. Q:** interview questions. We have FOUR interview questions and then each question have sub-questions. So, you answer the sub-questions. So, the first one is about. What are the

challenges teachers in the use of the provided ICT? Why are there challenges in the use of the provided information communication technology? How are these challenges resolved? how effective are the solutions?

R: The biggest challenge I have is that I am not very good in computers

Q: besides that, are there any other challenges you face at school when you want to use computers?

R: The other issue is about time management our lesson periods are 1 hour, so I feel it will waste my lesson trying connect projectors and all those things, and I must disconnect them maybe 15 minutes before the end of the lesson to accommodate the next lesson.

Q: I see your point, what about other teachers do they not present challenges to you?

R: That one is a big issue, they always tell us that Science lab is for Grade 12 teachers no other teachers are allowed there.

Q: So at individual level how do you deal with such problems?

R: I prefer giving my learners assignment or projects that require them to work in groups in the classroom and it works well for me than going to the lab.

Q: So you do not always use ICT on a daily basis?

R: Yes

Q: on the issue of time consuming of setting up projectors, why not ask the young ones and those who know how to use them so that they can help you?

R: Most often I ask them especially if there is something important to present, the challenge is that I cannot ask them every day because they also have their work to do?

2. **Q: Okay, now we move to the next question? Do you have any information communication technological devices that was provided to you, if any, what is it? Have you received any training on the use of the provided information communication technology in your teaching activities? If yes, how long was the training? In your opinion was the training successful, regarding use of the provided information communication technology in the classroom as a tool to enhance teaching? To what extent can you rate the success of the training on a scale of 1- to 10, with 1 being successful and 10 being was not successful at all?**

Q: What Information communication technology tools are available at your school?

R: Our school has a lot ICT devices, we have a trolley of tablets from MTN and Vodacom, computer lab, a couple of projectors and Wi-Fi.

Q: Do you have any information communication technological devices that was provided to you, if any, what is it?

R: There are many, but I don't remember well, but around 2013 we were provided with tablets, then around 2015 every teacher was provided with Lenovo laptops that had 3GB sim card.

Q: Is that all, I heard that there was a program during the Covid that was giving teachers tablets during the lock down?

R: Oh, sorry I had forget about that yes I also got a tablet.

Q: Have you received any training on the use of the provided information communication technology in your teaching activities? If yes, how long was the training?

R: no, the laptops came with a courier all they needed was proof of identity, to make sure that they issued the device to the rightful teacher.

Q: In your opinion was the training successful, regarding use of the provided information communication technology in the classroom as a tool to enhance teaching?

R: no training was done

Q: To what extent can you rate the success of the training on a scale of 1- to 10, with 1 being successful and 10 being was not successful at all?

R: no training was done.

- 3. Q: Okay, We are finished with the second question. Now we will move on to the third one. What is the primary purpose of using information communication technology that is provide in high schools of Seplan circuit in the Chris Hani East (CHE) District as a tool to enhance teaching? Does the use of information communication technology prove to be a better method of teaching learners as compared to the traditional methods of teaching?**

Q: Does the use of information and communication technology prove to be a better method of teaching learners as compared to the traditional methods of teaching?

R: Oh okay, I think for me no other one is better than the other because teachers who have been working for the Department of Education for many years do not want to shift from using it and this traditional method of teaching seems to work for them. So I think no teaching method should over shadow the other, they should instead be used concurrently in order to help improve the performance and concentration of the learners.

Q: Do you make use of the internet to develop your professional or subject knowledge?

R: sometimes

Q: why don't you use it more often?

R: because of the previous challenges I have mentioned before.

Q: Ok, Do you give learners tasks which prompt the use of the internet?

R: Not always, I have noticed that they mostly do cut and paste and all their answers will be the same

Q: Do you regard using information communication technology as having any benefits to teaching and learning in the classroom?

R: Yes, I cannot deny that.

- 4. Q: Okay, I hear you. We are done with question3, now we move on to the last question, which is question 4, What recommendations can be made regarding the effective use of provided information communication technology that is in teaching?**

Q: Please share with me any recommendations or guidelines for the use of provided information communication technology in the classroom.

- For teachers who face challenges as well
- As well as the schools

R: First, the Department should take an initiative to offer technical support to School principals and teachers so as to improve their knowledge and skills in the use of ICT, secondly the Department should offer training before issuing us with laptops. Lastly it is important that the Department must

formulate a framework that guides schools on how to use ICT and schools must formulate their own ICT policies that are tailor-made to meet the needs of a particular school.

Q: Is there anything you would want to add with regard to the use of provided information communication technology

R: no

Q: I understand. We have come to the end of our interview, however, Is there anything you would want to add with regards to ICT integration?

R: No, I think everything was covered on my side.

Q: Thank you so much for your time.

R: Pleasure.

Q: Thank you so much

4. OBSERVATION CHECKLIST

<p>1. NAME OF SCHOOL: MAZIBUKO S.S.S</p> <p>2. DATE OF OBSERVATION: 17 OCTOBER 2023</p> <p>3. Position held (Educator or Principal): TEACHER</p> <p>4. Professional training in ICT (specify level): NONE</p> <p>5. Number of years as grade educator/teacher: 11</p> <p>6. Number of years as subject educator/teacher: 8</p> <p>7. Number of years as educator/teacher/ principal: 15</p>	
DESCRIPTION	COMMENT
1. Does the school have a computer centre or laboratory?	YES
2. Are there any desks and tables in the computer laboratory/centre?	YES
3. Does the computer laboratory/centre have proper security?	IT HAS BURGLARS AND HAS ALARM SYSTEM
4. Is there available electricity?	YES
5. Does the school have IT committee?	NO

ICT EQUIPEMENT	
1.How many computers or tablets in the computer laboratory/centre	2 TROLLIES OF TABLETS , WE COULDN'T FIND THE KEYS TO OPEN THEN, A COMPUTER LAB WITH SOME DYFUNCTIONAL DESKTOPS
2.Is there internet connection	YES
3.Digital teaching tool (Interactive whiteboard) and overhead projector	EVERY CLASS IS FIITED WITH WHITE BOARD AND A PROJECTOR
4. Proper functioning of computers or tablets.	NOT FUNCTIONAL
5.Updated computer software	NOT UPTO DATE
TEACHER / PRINCIPAL OBSERVATION	
ATTRIBUTE	COMMENT
1. Confidence in use of computer	NOT CONFIDENT
2. Attitude towards the use of computers	POSITIVE
3. Overall comment	The teacher shows interest in the use of ICT but lacks confidence due to lack of skills

Appendix H: Letter of consent to Participants (teachers and principals)

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HOUSE NO. 805
MANKAZANA STREET
CALA
5455

26 SEPTEMBER 2023

TO THE PROSPECTIVE PARTICIPANT

REF: REQUESTING YOUR PERMISSION TO PARTICIPATE IN MY STUDY

Dear: PROSPECTIVE PARTICIPANT

I write this letter seeking permission to conduct research in school. My name is HONEST MUNZWA, I am a MED ENVIRONMENTAL EDUCATION student at the University of South Africa (UNISA) with student No. 47323582. I am doing a research under the supervision of PROFESSOR LEBELOANE, and my study is entitled: **EXPLORING CHALLENGES IN THE USE OF INFORMATION COMMUNICATION TECHNOLOGY THAT IS PROVIDED IN SCHOOLS**

The aim of the study is to explore what are the challenges in the use of information communication technology that is provided in high schools of Cala, Eastern Cape. Previous research has shown that use of information communication technology in high schools enhance learners' computing, literacy and numeracy skills

Your School has been selected because it was provided with information communication technology from different stakeholders. The study will entail semi structured interviews that will be administered to Four Grade 8 teachers and the principals of your school.

The participation of your school in this study will have positive benefits that will help to address:

- ❖ The cause of challenges in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape.
- ❖ Identifying the purpose of information communication technology gadgets that are provided in Cala high schools, Eastern Cape) happen.
- ❖ Identifying if there is need for training and workshops in the use of information communication technology gadgets that are provided in Cala high schools, Eastern Cape)?

There are no potential risks involved in the participation of this study and there will be no reimbursement or any incentives for participation in the research. Your consideration for the study will be highly appreciated as it will help to address the challenges faced in the use of information communication technology in schools.

For further information you may contact me on the contact details below, waiting to hear from you at your earliest convenience.

Yours Faithfully

Honest Munzwa

0711078944

Appendix I: Consent for participation



CONSENT/ASSENT TO PARTICIPATE IN THIS STUDY (Return slip)

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the _____ (insert specific data collection method).

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print) _____

Participant Signature

Date

Researcher's Name & Surname (please print) HONEST MUNZWA

A rectangular box containing a handwritten signature in black ink, which appears to read "Honest Munzwa".

Researcher's signature

24 JULY 2023

Date

Appendix J: Teacher`s interview Guide

INTRODUCTION

- Introduction of myself as an interviewer
- The purpose of conducting the interview

BIOGRAPHICAL INFORMATION OF THE PARTICIPANTS

Teachers' responses to name of the school, list of provided ICT gadgets, ICT workshops attended subject/s taught by the teacher as well as years of experience teaching.

1.	NAME OF SCHOOL:				
2.	GRADE TAUGHT:				
3.	SUBJECT:				
4.	TEACHING EXPERIENCE:				
Mark with X the items that were provided to you by the Department					
ITEM	Laptop	Printer	Data	Other	Specify
RESPONSE					

INTERVIEW QUESTIONS

1. **What is the primary purpose of using provided information communication technology in the classroom.**

Interviewer: Does the use of information communication technology prove to be a better method of teaching learners as compared to the traditional methods of teaching?

Interviewee:

Interviewer: Do you make use of the internet to develop your professional or subject knowledge?

Interviewee:

Interviewer: Do you give learners tasks which prompt the use of the internet?

Interviewee:

Interviewer: Do you regard using information communication technology as having any benefits to teaching and learning in the classroom?

Interviewee:

2. **What are the challenges faced by school teachers in the use of the provided information communication technology?**

Interviewer: What Information communication technology tools are available at your school?

Interviewee:

Interviewer: Do you have any information communication technological devices that was provided to you, if any, what is it?

Interviewee:

Interviewer: Have you received any training on the use of the provided information communication technology in your teaching activities? If yes, how long was the training?

Interviewee:

Interviewer: In your opinion was the training successful, regarding use of the provided information communication technology in the classroom as a tool to enhance teaching?

Interviewee:

Interviewer: To what extent can you rate the success of the training on a scale of 1- to 10, with 1 being successful and 10 being was not successful at all?

Interviewee:

3. **What recommendations can be made regarding the effective use of provided information communication technology that is in teaching?**

Interviewer: Please share with me any recommendations or guidelines for the use of provided information communication technology in the classroom.

- For teachers who face challenges as well
- As well as the schools

Interviewee:

Interviewer: Is there anything you would want to add with regard to the use of provided information communication technology?

Interviewee:

Interviewer:

Many thanks for your time and allowing me to conduct this research.

Interviewee:

Appendix K: Observation checklist

OBSERVATION CHECKLIST	
NAME OF SCHOOL:	
DATE OF OBSERVATION :	
DESCRIPTION	COMMENT
1. Does the school have a computer laboratory/centre	
2. Are there any desks and tables in the computer laboratory/centre?	
3. Does the computer laboratory/centre have proper security	
4. Is there available electricity?	
5. Does the school have IT committee	
ICT EQUIPEMENT	
1. How many computers or tablets in the computer laboratory/centre	
2. Is there internet connection	
3. Interactive whiteboard and overhead projector	
4. Proper functioning of computers or tablets.	
5. Updated computer software	

Appendix L: Turnitin report

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EXPLORING CHALLENGES IN THE USE OF THE PROVIDED INFORMATION COMMUNICATION TECHNOLOGY IN SCHOOLS OF SEPLAN: A CASE STUDY

BY
HONEST MUNZWA

Submitted in accordance with the requirements for the degree of

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In the school of

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Under the Department of

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Mike Leisegang

Freelance Copy-Editor and Proofreader

Phone: +37 83 837 8733

Email: mike@wellspotted.ink

Web: www.wellspotted.ink



Certificate of Editing

This serves to confirm that copy-editing and proofreading services were rendered to Honest Munzwa for "Exploring Challenges in the Use of The Provided Information Communication Technology in Schools of Seplan: A Case Study" with a final editable page count of 107 from 24th October 2024 to 27th October 2024

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