School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study

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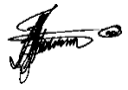

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SIGNATURE DATE

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DEDICATION

I dedicate this study to my mother and my entire family, who stood by me and believed in me throughout this challenging journey. To my wife and children, thank you for being my number one supporter. Your belief never wavered. A special, heartfelt note of gratitude goes to my daughter, Zibusiso, whose exceptional technical skills were vital to my success. I owe you my life for your indispensable role in my research journey.

ABSTRACT

The study aimed to explore and describe the experiences and challenges faced by School Management Teams (SMTs), including principals, deputy principals, and department heads, in integrating and implementing Information and Communication Technology (ICT) into teaching and learning in South African primary schools. It was conducted in Gauteng Province, South Africa. The study was grounded in the interpretive paradigm and employed a qualitative research approach. It focused on five purposively selected primary schools in the third quantile. Three data collection tools were used: semi-structured interviews, non-participant observation, and document analysis. Data were analysed using a qualitative approach. The study found that SMTs encountered several challenges in integrating and implementing ICT in their schools. Despite their efforts to provide ICT infrastructure, such as computer labs and network connectivity, facilitated through collaborations with the Gauteng Department of Education (GDE), Ekurhuleni North District, and NGOs, challenges persisted. This case study found that SMTs encountered significant challenges in integrating ICT in primary schools, primarily due to a lack of computer skills and knowledge. Resistance to adopting ICT, insufficient funding, and inadequate training further complicated implementation. Additionally, the unavailability and dysfunction of ICT infrastructure, along with issues such as theft, vandalism, and poor Internet connectivity, hindered progress. The SMTs' unfamiliarity with National ICT policy guidelines and the absence of school-based ICT policies also contributed to ineffective implementation. Moreover, schools lacking ICT enablement did not provide adequate support for SMTs.The study concluded that SMTs successfully engaged in instructional and technological leadership, exhibiting optimism towards ICT integration despite challenges. Recommendations included broadening SMTs' understanding of ICT, exploring alternative funding to address its high costs, and revising school ICT policies. The findings aim to aid national and provincial authorities in understanding SMTs' experiences with ICT integration and inform effective interventions.

Keywords: Information and Communication Technology; ICT in Education; School Management Teams; ICT Integration and Implementation; Teaching and Learning; Experience and Challenges; South African Primary Schools; Gauteng Department of Education; National ICT Policy; Instructional and Technological SMT roles

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LIST OF ACRONYMS

ACRONYM	FULL EXPLANATION
ADDIE	Analysis, Design, Development, Implementation, and Evaluation
ATP	Annual Teacher Planning
CDs	Compact Disc
CK	Content Knowledge
CT	Communication Technology
DBE	Department of Basic Education
DCDT	Department of Communications and Digital Technologies
DH	Departmental Heads
DoC	Department of Communications
DP	Deputy Principal
DSAs	District Support Advisors
FAL	First Additional Language
GDE	Gauteng Department of Education
ICT	Information and Communication Technology
IT	Information Technology
KCDM	King Cetshwayo District Municipality
LMS	Learning Management System
MECSS	Ministry of Education, Culture, Science, and Sports
MGSLG	Matthew Goniwe School of Leadership and Governance
NDP	National Development Programme
NGO	Non-Governmental Organisation
PAM	Personnel Administrative Measures
PCK	Pedagogical Content Knowledge
PDRDL	Professional Development Framework for Digital Learning
PK	Pedagogical Knowledge
RST	Realist Social Theory
SACE	South African Council for Educators
SAHEIs	South African Higher Education Institutions
SAMR	Substitution, Augmentation, Modification and Redefinition

SAPS	South African Police Service
SASA	South African Schools Act, 1996
SA-SAMS	South African School and Administration Management System
SETI	Socio-Ecological Technology Integration
SGB	School Governing Body
SLPs	Short Learning Programmes
SMT	School Management Team
TCK	Technological Content Knowledge
TIM	Technology Integration Matrix
TK	Technological Knowledge
TPACK	Technological Pedagogical Content Knowledge
TPK	Technological Pedagogical Knowledge
TV	Television
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNISA	University of South Africa
USA	United States of America
USB	Universal Serial Bus
USD	United States Dollar

CHAPTER 1

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

School Management Teams (SMT) play a central role in supporting the integration and implementation of Information and Communication Technology (ICT) in schools. In the era of digitalisation, the use of ICT has become a key factor for the successful management of schools (Orhani, Saramati, Drini, Kolukaj & Morina, 2024). As a result, ICT in schools has become increasingly significant. SMTs act as change agents in overseeing ICT policy implementation by ensuring teachers and learners are equipped with the skills and resources for effective technology use in classrooms while facing several challenges in integration (Mwendwa, 2017).

The literature reveals the widespread influence of ICT and how it has fundamentally transformed educational landscapes worldwide, making the effective integration of ICT an essential priority for modern schools (UNESCO, 2023). Furthermore, empirical literature shows that the use of ICT in schools strongly impacts teaching and learning approaches, processes, quality and accessibility of education, learning motivation, learning environment, and academic performance (ViralSangat, 2013; Bariu, 2020). Also, academic research shows that a curriculum integrating ICT tools to improve teaching and learning offers many benefits, including motivation and enhanced learner achievement (Nsolly & Charlotte, 2016).

There is significant evidence in the literature that reveals how ICT enhances the productivity of basic instructional tasks, such as preparing learner-centred lesson plans and class outlines, developing quizzes, games, and examinations, and writing comments on learner papers and reports (Uluyol & Şahin, 2016; Razak, Jalil & Ismail, 2019; Agyei, 2021). Moreover, empirical evidence suggests that ICT usage in schools enhances flexibility, allowing learners to access education regardless of time and geographical constraints (ViralSangat, 2013; Brueck & Lenhart, 2015; Drummond & Sweeney, 2017). Likewise, empirical evidence shows that ICT offers a rich environment and motivation for the teaching process, which appears to significantly

influence learning by providing new approaches and opportunities for learners and teachers (Uluyol & Şahin, 2016).

Thus, teachers increasingly use ICT tools to conduct and present learning activities effectively and efficiently worldwide (Bariu, 2020; Agyei, 2021). As a result, using ICT tools in education offers several benefits, including sharing resources and learning environments, promoting collaborative learning, and a general shift towards increasing learner autonomy (Drummond & Sweeney, 2017; Padayachee, 2017).

Despite its assumed benefits and successes, ICT usage in schools faces challenges that affect its integration and implementation in schools (Razak, Jalil & Ismail, 2019; Bariu, 2020). Although the benefits of ICT are many, challenges remain (Orhani *et al*., 2024). Research by Mwendwa (2017) indicates that although teachers in schools show great interest and motivation to learn about the potential of ICT, in practice, the use of ICT is relatively low, and it focuses on a narrow range of applications, with word processing being the predominant use and video or network conferencing, e-mailing and the internet being rarely used (Mwendwa, 2017). Furthermore, educational policymakers have encouraged the implementation of ICT in classrooms; however, learners have not yet realised the full benefits, as many teachers fail to integrate ICT effectively, despite significant investments in infrastructure (Mirzajani, Mahmud, Fauzi Mohd Ayub & Wong, 2016).

Even though governments developed various action plans to support ICT integration in educational programmes effectively, many barriers exist in practice and integration (Uluyol & Şahin, 2016; Msiza, Malatji & Mphahlele, 2020; Agyei, 2021). In South Africa alone, the introduction of ICT in schools remains a topic of debate across many academic platforms. The Gauteng Department of Education (GDE) embarked on a transformative journey to incorporate ICT into curriculum delivery, carried out under the auspices of the Operation Phakisa ICT programme, which was also connected to the National Development Programme (NDP) (Ntsobi, Ntsobi & Nyamkure, 2025). Still, the integration of ICT in South African schools remains low (Mwendwa, 2017; Padayachee, 2017).

SMTs play a vital role in successfully integrating ICT into education (Ghavifekr & Wong, 2022). Moreover, SMTs significantly influence the success of ICT

implementation at the school level, making decisions on strategic plans, budgeting, organisational structures, curriculum, programme evaluation, external relations, and ethical issues (Sun & Gao, 2019). Their duties extend beyond merely providing equipment to strategic leaders who established the vision, policies, and environment needed for effective technology use (Sun & Gao, 2019) in schools. However, SMTs encounter challenges such as limited resources, inadequate infrastructure, and resistance to change. Moreover, the perceptions, attitudes, and behaviours of SMT members can also influence the success of ICT integration (Wallet & Beatriz, 2015).

The study aimed to explore and describe the experiences and challenges faced by SMTs (principals, deputy principals (DPs), and departmental heads (DH) in integrating and implementing ICT into teaching and learning in South African primary schools.

The following section presents the background of the study.

1.2 BACKGROUND OF THE STUDY

There is no doubt that the world has become increasingly digitally driven, driven by advancements in ICT across both business and academic spaces. As a result, ICT is among the key production elements in every organisation (Sylvestre, Haiyan & Yiyi, 2018; Bariu, 2020; Agyei, 2021) that enhances its success. It is also a powerful agent for change in many academic spaces and developments. As a result, ICT use extends beyond providing computers and internet access in schools. It demands sound and conversant technological pedagogical knowledge (TPK) and skills of relevant tools (Hart & Laher, 2015; Msiza, Malatji & Mphahlele, 2020).

The literature evidence indicates that ICT integration and implementation in schools depend on several factors and human involvement to sustain their prolonged usage and achieve their benefits (Drummond & Sweeney, 2017). Therefore, the South African government has made it its priority to integrate and implement ICT into education as a means of enhancing learner learning and performance (Ntsobi *et al*., 2025). Also, the belief in ICT efficacy in education has led many governments to develop programmes to speedily integrate and implement ICT into their education systems globally (Nsolly & Charlotte, 2016). It is for the same reason that South

Africa's education system has also attempted to integrate ICT into its curriculum since its inception.

However, the inception, integration and implementation programmes are slow compared to other regional and international countries (Padayachee, 2017). This greater plan and enthusiasm are yet to be successful due to common impediments that usually affect even developed nations like the United States of America (USA) and other developed countries that are believed to be experts in the use of technology in education (Nsolly & Charlotte, 2016). One such barrier, which is a critical aspect of ICT integration and implementation into teaching and is widespread in most countries, like South Africa, is the absence of a clear vision and planned strategy for technology integration in education (Wallet & Beatriz, 2015). Others include the lack of technological resources, the lack of knowledge and skills, and the attitudes and beliefs of teachers and parents towards using technology in schools (Wallet & Beatriz, 2015; Orhani, Saramati, Drini, Kolukaj & Morina, 2024).

(Msiza, Malatji & Mphahlele (2020) found that the Department of Basic Education's (DBE) e-learning implementation faces challenges such as poor planning, theft of devices, non-academic access, and unreliable internet connections. They also noted that the failure to install firewalls allowed misuse (Msiza *et al*., 2020). Countries, like Singapore, Malaysia, America, Sub-Saharan African countries and South Africa, still face numerous challenges in integrating ICT into their education systems to promote teaching and learning. However, there are some countries worldwide that have successfully integrated technology into schools for teaching and learning. Success stories of the integration and implementation of ICT globally have shown the effectiveness of ICT in promoting and supporting teaching and learning in schools.

Singapore, for example, has continued to develop and improve its educational system, making it one of the most modern education systems globally. It established educational technology as one of the academic and organisational structures in Singapore, which had the mission to be the catalyst in harnessing ICT to enrich learning and teaching (Machmud, Widiyan & Ramadhani, 2021). Also, the Singapore government supported this by spending about 12.8 billion Singapore dollars (9.2 billion USD) on education in 2018 alone (Machmud *et al*., 2021). The study by Machmud *et*

al. (2021) shows that in 2017, the ICT Development Index data showed outstanding progress for Singapore's rank because of the educational leadership's involvement.

Singapore ranked highest in ASEAN and 18th in the world in successfully integrating and implementing ICT in its schools (Machmud *et al*., 2021). The empirical literature evidence shows how the Technology Master Plan baked this achievement. The Singapore government has adopted a systematic approach to promote ICT for learning in schools and to continue supporting its effective adoption and deployment in the teaching and learning process (Machmud *et al*., 2021).

A document published by the Authority of the House of Lords, London, confirmed that the countries ranked higher than the United Kingdom in ICT implementation include Singapore, Switzerland, the USA, Germany, Japan, Finland, Hong Kong, and the Netherlands (LORDS, 2015). According to the report, Singapore is among the countries that have invested heavily in digital 'foundations', including up-skilling the population in technical expertise and digital capability, and driving universal access and usage (LORDS, 2015). However, this does not suggest that Singapore's education system does not have ICT integration problems and challenges.

The success story of ICT integration in schools to enhance teaching and learning extends beyond the Singapore educational system. Ghavifekr and Rosdy (2015) considered ICT one of the most critical elements in transforming Malaysia's future education system. A recent Education Blueprint (2013-2025) published by the Ministry of Education Malaysia identifies the importance of technology-based teaching and learning in national curricula (Ghavifekr & Rosdy, 2015). The results show that ICT integration and implementation have a significant impact on both teachers and learners. As a result, the inclusion of ICT in the classroom is becoming increasingly important. It enhances learners' collaborative learning skills and develops transversal skills that promote social skills, problem-solving capabilities, self-reliance, responsibility and the capacity for reflection (Ghavifekr & Rosdy, 2015; Hart & Laher, 2015; Ghavifekr, Kunjappan & Ramasamy, 2016).

The evidence in literature discovered that professional development programmes for teachers played an important role in fostering a high level of learning in Malaysia (Ghavifekr & Rosdy, 2015). Still, the study acknowledged several factors negatively

impacting ICT integration in Malaysian schools. Including limited access and network connections, lack of technical support, insufficient training, limited time, and incompetent teachers (Ghavifekr *et al*., 2016). Addressing these challenges through comprehensive and ongoing professional development opportunities for teachers can lead to successful ICT integration in Malaysian schools. By providing the necessary support and resources, teachers can enhance their skills and knowledge to effectively utilise ICT in the classroom.

In America, Hanny, Arnesen, Guo, Hansen and Graham (2023) found that a lack of both technical support and funding for technology and professional development hindered schools' technology integration. Furthermore, they found that teacher-perceived barriers included, among others, costs perceived as outweighing benefits, lack of administrative support, and learner characteristics (Hanny, Arnesen, Guo, Hansen & Graham, 2023). On the same vein, Durff and Carter (2019) previously revealed that teachers faced attitudinal, sociocultural, and pedagogical barriers to technology integration in spite of its positive impact on academic achievement. Elementary teachers acknowledge the role of technology as an essential tool, with benefits and challenges in teaching, but face time constraints and inconsistent support (Buschmann & Fiore, 2025). However, there is no doubt that ICT integration in schools engages learners and increases academic achievement (Durff & Carter, 2019).

These barriers highlight the need for comprehensive strategies that address not only financial constraints but also organisational and individual factors that influence technology adoption in educational settings. Therefore, it is crucial for school leaders to prioritise resources and support systems that enable teachers to overcome these obstacles and integrate technology effectively into their teaching practices. School leaders are expected to spearhead all school improvement initiatives, including technological initiatives, and fulfil these in their capacities as technological leaders (Mwawasi, 2014). This requires them not only to have a strong understanding of technology but also to communicate and collaborate effectively with stakeholders to ensure successful implementation. Effective school leaders must continuously stay informed about emerging technologies and education trends to make decisions that benefit both learners and teachers. The challenges principals and SMT members face in America are prevalent in most Sub-Saharan African countries.

In Sub-Saharan African countries, Agyei (2021) evaluated the impact of an ICT instructional professional development programme by examining how well teachers translated ideas from capacity building into classroom instruction. Nigeria, Kenya, Tanzania, Ethiopia, Ghana, and Uganda participated in the evaluation programme. The study findings indicated that the teachers expressed general satisfaction with the content and processes of the training programmes; nevertheless, the necessary conditions to support the transfer of the training's ideas to the school level were not met during the implementation period (Agyei, 2021).

In Nigeria, in particular, ICT education is highly in demand due to its large population and industrialised economy (Strang & Vajjhala, 2021). Since 2015, there has been significant progress in integrating ICT into the education system (Strang & Vajjhala, 2021). Despite ICT's considerable impact on traditional school systems, most governments have achieved relatively little of this potential, especially in poor communities (Padayachee, 2017).

Nigeria, like other African countries, faces challenges in integrating ICT into schools. As a result, many studies were conducted to test Nigeria's educational system's readiness to implement and integrate ICT in its schools. To provide equal and adequate educational opportunities, the Nigerian government has made several attempts to expand access to education. In this regard, the 2004 education policy was implemented, emphasising every Nigerian child's right to receive an education of the highest quality (Fahm, Azeez, Imam-Fulani, Mejabi, Faruk, Abdulrahaman, *et al.*, 2022).

This policy aimed to ensure that education is accessible to everyone who qualifies (Fahm *et al.*, 2022). Several states in Nigeria have made primary education accessible and compulsory following this policy, and secondary education has also been made accessible in several other states (Fahm *et al.*, 2022).

In Kenya, for example, Mingaine's (2013) study examined the challenges school leaders face in implementing ICT in public secondary schools. The study discovered that ICT programmes had been implemented successfully due to school leaders' interest, commitment, and championing (Mingaine, 2013). Moreover, the study results articulated that even though school leadership is a critical component of implementing

ICT in schools, few studies have been conducted in Kenya on school leaders' capacities and technological skills (Mingaine, 2013).

Consequently, the percentage of ICT integration remains considerably small in Kenya compared to other countries, with an average of 41% ICT implementation in their schools (Mingaine, 2013). Similar sentiments were echoed in Amuko, Miheso and Ndeuthi's (2015) study. They conducted a study in Nairobi County to explore the various opportunities and challenges influencing the integration of ICT in teaching and learning mathematics in secondary schools (Amuko *et al*., 2015). The study found that teachers face several challenges, such as developing their technical skills and knowledge and self-training using ICT in the classroom (Amuko *et al*., 2015).

Hence, it was concluded that teachers should receive regular training on how to use ICT infrastructure and that such training activities should be conducted at zone levels every six months at the very least (Amuko *et al*., 2015). In 2017, a study by Mwendwa aimed to explore teachers' and principals' perceptions of ICT integration in the public primary school curriculum in Kitui County, Kenya. The results indicated that ICT was essential for improving performance, collaboration, learning experiences, and learning outcomes (Mwendwa, 2017). Meanwhile, principals oversee and implement innovations and changes within the school (Mwendwa, 2017). It is beyond doubt at this stage that using technology in schools has more benefits than challenges.

The global demand for innovative education has prompted the South African education system to draft policies that promote the integration of ICT into teaching and learning. Vision 2030, which is the backbone of the South African National Development Plan (NDP), proposes that "By 2030, ICT will underpin the development of a dynamic and connected information society and a knowledge economy that is inclusive and prosperous to everyone." (National Integrated ICT Policy White Paper, 2016). The adoption and use of ICT in education positively impact teaching, learning, and research processes in any country desiring to implement twenty-first-century teaching approaches and techniques. It affects the delivery of education and enables access to educational opportunities by shaping how learners are taught and how they learn in classrooms.

Nevertheless, Vision 2030 has not progressed rapidly in South African educational institutions, especially e-education in schools (Padayachee, 2017; Mlambo, Chukwuere & Ndebele, 2018). As a result, most South African schools have not yet started implementing ICT in classrooms, especially in poor and disadvantaged communities (Mlambo & Chukwuere, 2018). Many teachers remain rooted in traditional pedagogical approaches, underscoring the failure of many schools to integrate ICT into classrooms. The few who have started using ICT in their classrooms and those who have not yet used it cite numerous challenges in integrating technology (Padayachee, 2017; Bariu, 2020; Agyei, 2021). Thus, a considerable number of learners are excluded from e-learning, preventing them from participating and competing with their peers in the digital age worldwide.

Maruping and Velempini (2022) conducted a study in the Northwest province in South Africa, aiming to analyse the state of ICT integration at rural schools in the Rekopantswe Area office in the Ngaka Modiri Molema district. Data were collected using quantitative research approaches and questionnaires. The authors accurately concluded that using appropriate ICT tools can improve teaching and learning, enabling teachers to become more innovative (Maruping & Velempini, 2022).

The results suggested that ICT integration requires modernising ICT tools and significant shifts in stakeholders' mindsets, including their attitudes, roles, and belief systems, to construct new knowledge. (Maruping & Velempini, 2022). In the study, the authors wisely suggested that learners and teachers should be aware that the South African government is integrating ICT into learning and teaching in schools (Maruping & Velempini, 2022). It can be assumed that the successful integration of ICT projects into schools depends on the awareness and readiness of SMTs, teachers, and all relevant stakeholders.

Meanwhile, the Gauteng Department of Education Annual Report, 2021/2022, articulates that ICT and e-learning strategies should be repositioned to accommodate developing teacher and learner needs (Gauteng Department of Education, 2022). The changes stem from the impact of the COVID-19 pandemic, which exposed challenges children from poor communities faced during this period. The challenges posed by the digital divide led the GDE to seek methods to mitigate the pandemic and respond to

future disruptions to teaching and learning time. Also, in the annual report, the Gauteng Department of Education (GDE) acknowledged the need and a shift towards a blended learning approach with virtual classroom models (Gauteng Department of Education, 2022). The report further acknowledges that in Gauteng, ICT integration is slow to be adopted in most public schools (Gauteng Department of Education, 2022).

The failure to integrate ICT in Gauteng province is widespread in most public schools, and the Ekurhuleni North District is no exception. Some primary schools in the Ekurhuleni North District, especially in Tembisa township, have fully operational computer labs. These schools are popularly known as computer schools. However, there are some primary schools in the same district which are not ICT schools. These schools are not implementing ICT in teaching and learning. Despite schools having computer labs, they are not integrating ICT into the classrooms.

Most of the equipment and ICT gadgets are no longer functional. In some schools, the gadgets are gathering dust and becoming outdated. Less convincing is the broad-sweeping generalisation conclusion that the challenges faced by principals and SMT members are similar. Yes! It may be true that most principals face challenges when integrating ICT in their schools, but one could argue that different schooling environments face other challenges. For this reason, the current case study investigated why school SMTs are not integrating and implementing ICT successfully in public primary schools to enhance teaching and learning in the Ekurhuleni North District.

The researcher was enthusiastic about this research journey. The researcher showed great creativity and determination and wanted to dig deeper into the reasons why SMTs are not taking advantage of ICT benefits to support teachers in using modern teaching and learning pedagogies. The researcher's experiences and zeal led him to believe that a hidden mystery can be unveiled from the study's results and recommendations to support ICT integration in these primary schools.

1.3 STATEMENT OF THE PROBLEM

SMTs are not implementing ICT in some primary schools in the Ekurhuleni North District. This finding prompted the researcher to embark on a study to determine why

SMTs are not implementing ICT in their primary schools. The researcher was keen to explore their experiences and challenges. Many studies show that ICT integration in schools enhances teachers' ability to improve assessments and feedback, personalise instruction for diverse learners, and create learner-centred lesson plans, quizzes, and examinations. Furthermore, its integration is vital for structuring learning experiences and ensuring equal access to education in contemporary educational settings (Uluyol & Şahin, 2016; Razak *et al*., 2019; Ifenthaler & Yau, 2020; Agyei, 2021; Chima, Onyebuchi & Idowu, 2024).

It raises many questions when SMTs do not take advantage of ICT to enhance teaching and learning in schools. It is also concerning, as the literature shows that most primary schools in South Africa still do not use ICT tools to support teachers and learners in the classroom (Mwendwa, 2017; Padayachee, 2017). As a result, the researcher strongly wanted to find out why some SMTs were not implementing ICT in teaching and learning. Therefore, the researcher critically reviewed a list of journal articles published from 2010 to 2024 to determine the extent of the literature on the experiences and challenges of ICT integration by SMTs in South African schools. The researcher found that many studies on ICT integration in South African schools primarily focused on teachers, resulting in less evidence regarding SMTs. There is insufficient evidence in the current literature on SMTs (Msiza *et al*., 2020). For example, Gudmundsdottir (2010) focused on the various obstacles teachers encountered when integrating ICT into classrooms in South Africa. The primary emphasis of the study was on the concept of a digital divide, precisely how cultural diversity, with a particular focus on language, can impact the divide in schools that already have access to ICT (Gudmundsdottir, 2010). This study was carried out in Cape Town, specifically.

During the same year, Chigona and Chigona (2010) conducted a study focusing on the capability approach to teachers' pedagogical use of ICT in schools. Their study examined the Khanya project in the Western Cape Province of South Africa as a specific example (Chigona & Chigona, 2010). Again, Chigona and Chigona (2013) researched the underpreparedness of in-service teachers to teach with ICT. The research was also done in Cape Town, focusing mainly on the experiences of newly qualified teachers (Chigona & Chigona, 2013).

In the following year, Chigona, Chigona and Davids (2014) also carried out a study to examine the determinants that drive teachers to use ICT in schools in underprivileged communities. The study was conducted in disadvantaged communities in the Western Cape. A follow-up study aimed to "Understand why, given the deployment of ICTs for teaching and learning in teacher education, the new teachers remain underprepared to teach with ICTs" (Chigona, 2015). Again, their study focused on teachers' experiences; little was known about SMT members.

Furthermore, researchers conducted extensive studies on ICT integration in South African schools from 2015 to 2023. For instance, a study by Hart and Laher (2015) aimed to investigate teachers' attitudes towards educational technology and the factors that influence teachers' perspectives. This study was conducted in Johannesburg, where a convenience sample of 117 teachers from both public and private schools, across foundation, intermediate and senior phases, completed the Attitudes Towards Computer Scale (Hart & Laher, 2015).

Padayachee also did a survey of ICT integration in schools. The research aimed to determine the extent of ICT usage in South African schools to understand the practical enforcement of ICTs at the school level (Padayachee, 2017). The study sample involved teachers in secondary schools in Tshwane South. Yet again, the study focused on teachers' experiences. In the subsequent year, Ojo and Adu (2018) examined the level of availability and use of ICT facilities by teachers and learners in high schools in Eastern Cape Province, South Africa, as well as the factors influencing and challenging their effectiveness.

Moreover, Naidoo *et al*. (2019) studied the conceptual framework for ICT integration in rural secondary schools in South Africa. The paper focused on rural secondary schools in the King Cetshwayo District Municipality (KCDM), which comprises the following municipalities: Mbonambi, uMhlathuze, Ntambanana, uMlalazi, Mthonjaneni, and Nkandla (Naidoo *et al*., 2019).

In the same year, Mwapwele, Maris, Dlamini and Van Biljon (2019) conducted a study on "Teachers' ICT Adoption in South African Rural Schools: A Study of Technology Readiness and Implications for the South Africa Connect Broadband Policy." The study investigated one dimension of the South Africa Connect policy objectives by

considering rural teachers' adoption of ICTs for teaching and learning at 24 schools (Mwapwele *et al*., 2019). The participants in both studies were teachers, respectively.

Similarly, the study conducted by Kolobe and Mihai (2021) focused on "The integration of technology in supporting progressed learners' comprehension of English as a first additional language (FAL)." The study aimed to "find the impact of ICT as an intervention tool for progressed learners in the teaching and learning of English FAL comprehension in the intermediate phase." (Kolobe & Mihai, 2021). Once more, the main objective of their qualitative descriptive study was to examine the degree to which teachers of the FAL use ICT as an intervention tool to support learners who are making progress (Kolobe & Mihai, 2021). Again, the study focused on teachers, not the SMTs.

Correspondingly, the study conducted by Filita and Jita (2022) sought to unpack teachers' perspectives on teaching one South African language, Sesotho, as a home language using ICT in secondary schools in South Africa. Once again, the study focused on teachers.

According to the information above, many studies on ICT integration in schools in South Africa focused on teachers rather than SMT members. A few studies, as discussed below, focus exclusively on SMTs integrating ICT in schools.

In 2016, Naicker and Mestry investigated principals' views of the use of computers in 35 secondary schools in Cape Town, South Africa (Naicker & Mestry, 2016), while Msiza *et al*., (2020) conducted a study to investigate the challenges faced by Tshwane South Secondary Schools associated with the implementation of the e-learning project. The qualitative case study purposively sampled SMT members, teachers, and learners in secondary schools in Tshwane South District in South Africa (Msiza *et al*., 2020).

Similarly, a study conducted by Graham in 2020 on "Barriers to the Implementation of Electronic Textbooks in Rural and Township Schools in South Africa" investigated the technology acceptance model using a mixed-methods approach, with an online questionnaire and a semi-structured interview protocol as the data collection instruments. The study did not focus on experiences and challenges SMTs faced in integrating ICT in primary schools in the Ekurhuleni North District.

Tigere and Netshitangani (2022) conducted a study whose primary purpose was to investigate the perceptions of SMTs (principals and DHs) regarding ICT integration in township and rural secondary schools in the KwaZulu-Natal province, South Africa. Similarly, the study by Maruping and Velempini (2022) aimed to analyse the state of ICT integration at rural schools in the Rekopantswe Area office. The study selected five schools in the Ngaka Modiri Molema district in North West province. The schools were selected using a random sampling method (Maruping & Velempini, 2022). Although the focus was on SMTs, the studies were not conducted in the Ekurhuleni North District in Gauteng province.

After thoroughly scrutinising and critically analysing the literature on ICT integration in the South African context above, the researcher acknowledges significant improvement in research on ICT integration in South Africa. The researcher also recognised the efforts of many researchers who have conducted extensive research on ICT integration in South African schools. Once more, the researcher acknowledges regional and international researchers whose literature has contributed to finding the gaps in the current studies.

However, based on the critically analysed literature mentioned above, the empirical evidence indicates that most researchers have focused on teachers' experiences rather than those of SMTs. While researchers focused on SMTs, little research was conducted on their experiences and challenges in integrating ICT in schools, particularly in the Ekurhuleni North District of Gauteng province. Still, the analysed literature reveals that most studies were conducted in the Western Cape, Eastern Cape, and KwaZulu-Natal provinces, with only a few conducted in Gauteng and Limpopo.

In my experience as a mentor in schools in the Ekurhuleni North District, I observed that most schools have adequate infrastructure for introducing ICT. Still, most of the buildings are empty; when used, they serve as storerooms at some schools. Some schools have a few tablets used by selected grades for coding activities. In some schools, the SMTs are not transparent about their use.

Based on the literature presented above, the researcher justifies the need for further research on SMTs' experiences in integrating ICT in South African schools, especially

in Gauteng province. As a result, this study explored the experiences and challenges of SMTs in South Africa regarding integrating ICT into teaching and learning. It aimed to offer explanations for the challenges and successes encountered by SMTs in implementing ICT in South African educational settings.

1.4 RESEARCH QUESTION

The study used qualitative methods, including semi-structured interviews and document analysis, to explore SMTs' experiences and challenges in integrating and implementing ICT in their schools. The following research questions assisted the researcher in exploring SMTs' experiences and challenges in integrating ICT in South African primary schools.

1.4.1 Main research question

What are the experiences and challenges faced by school management teams in integrating and implementing Information Communication Technology into teaching and learning in South African primary schools?

1.4.2 Sub-research questions

- What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?
- What challenges do SMTs face when integrating ICT in primary schools?
- What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?
- How do the National ICT policy and the school-based policy support SMTs in effectively integrating ICT in primary schools?
- What model can be recommended for integrating ICT in schools?

1.5 AIM AND OBJECTIVES OF THE STUDY

The study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

1.5.1 Objectives of the study

The objectives of the study were to:

- Assess the SMTs' understanding of ICT integration in teaching and learning.
- Explore the challenges SMTs face in integrating ICT in schools.
- Determine the existing support structures and systems that enable SMTs to integrate ICT in schools.
- Review and analyse the National ICT Policy and the School-Based Policy to evaluate their effectiveness in guiding SMTs to integrate ICT in schools.
- Investigate and develop a Model that SMTs can use to accelerate the successful integration of ICT in schools.

1.6 RATIONALE AND SIGNIFICANCE OF THE STUDY

The results of this qualitative case study have practical implications for various stakeholders involved in educational aspirations. The study offers the South African government and other nations valuable information and strategies to enhance the integration of ICT in schools. This information guides future ICT policies and investments in educational technology. The findings also serve as a vital element in showing the progress made by government programs in promoting ICT in the school system.

The research serves as a valuable instrument for clarifying the challenges encountered by SMT members in South African primary schools during the integration and implementation of ICT in their educational systems. Moreover, the research serves as a valuable resource for the Ministry of Education in South Africa and the GDE, offering them insights into the current state of ICT integration and implementation in schools. Furthermore, the case study's findings provide the Ministry of Education in South Africa, DBE and the GDE with valuable insights into their strengths and limitations, enabling informed decision-making for future ICT educational initiatives.

Educational planners can use the findings to identify and understand the prevalence of ICT in South African schools. This information contributes to enhancing ICT

redesign initiatives and fosters efficiency in school settings. Likewise, the findings provide significant value to non-governmental organisations (NGOs) and other stakeholders involved in educational initiatives by offering up-to-date information about the current state of IT integration in South African schools.

The findings of this study also benefit other researchers interested in exploring the experiences and challenges of SMT members in integrating ICT in schools. It offers suggestions for researchers in South Africa and those in different countries seeking to enhance the quality of education through ICT integration at all levels. It also offers SMTs the opportunity to identify the gaps and challenges they face when implementing ICT in their schools.

1.7 ETHICAL CONSIDERATIONS

Ethical issues are paramount in primary research, particularly in using primary data sets, because ethical problems relate to the fair and unbiased selection of sources and analysis (Farrimond, 2013; Rahman, 2017). Credible research does not necessarily involve selecting participants and research strategies but requires a researcher to adhere to research ethics (Juta & Van Wyk, 2020). To adhere to research ethics, the researcher applied for ethical clearance from the College of Education at the University of South Africa (UNISA) and the UNISA Ethics Committee before conducting the case study in Ekurhuleni North District public primary schools. Furthermore, the researcher sought authorisation from the DBE within the GDE to access schools and conduct semi-structured individual interviews for the case study.

1.7.1 Informed consent as a dialogue

Every academic researcher must obtain permission from the relevant authorities before proceeding with the research. As a result, the researcher sought consent from the GDE to conduct the study in Gauteng province schools and completed a case study of face-to-face interviews in their schools. To meet this academic requirement, the researcher employed the five steps mentioned in Hammersley and Traianou (2012): minimising harm, respecting autonomy, protecting privacy, offering reciprocity, and treating people equitably (cited in Rahman, 2017). As a result, the researcher sent written consent letters to five principals, School Governing Body (SGB) members, and

all relevant stakeholders representing the five schools selected for the study. Academic research was conducted only after consent or clearance from all appropriate parties was obtained.

1.7.2 Confidentiality and anonymity

Authorisation for the design of this study was approved by validating the methodologies and minimising known risks to ensure the protection of human participants' rights in accordance with the University of South Africa (UNISA) School of Education research confidentiality guidelines. All potentially selected participants were provided with an informed consent form approved by UNISA outlining the boundaries of the study, potential risks to participants, and how their confidentiality would be protected throughout the study.

The confidentiality clause was explicitly outlined and explained to the participants before obtaining consent. A detailed description of the study and an open invitation to participate were communicated at the school level at the beginning of the school year, with the district officials indicating their support. As the school year progressed, all participants were constantly reminded of the opportunity to participate in the interview process. To protect participants' identities, they were approached individually in their empty classrooms to agree or disagree with the interview process. If a participant decided to complete the interview forms for the study, they were given a copy of the consent form and a time and place for the interview completion.

The researcher ensured the anonymity and confidentiality of all participants. The final version of the thesis will not identify the locations or names where the study was conducted. The researcher assured them that the collected data would be kept safe and not shared with anyone. The raw data will not be used in any write-up or presentation. Only transcribed data with pseudonyms will be used. The researcher reassured participants that the data would be documented in a research report. It is predicted that the research findings will be used solely for academic purposes, including books, journals, and conference proceedings. All data will be entirely destroyed within 2-5 years after the completion of the research project.

1.7.3 Caring and fairness

As an academic researcher, I pledge to take action to prevent any harm to my participants. Furthermore, I refrain from asking questions that may cause embarrassment or make participants uncomfortable during the research process. I will use simple, understandable academic language to ensure all interview participants understand the case study.

1.8 LIMITATIONS AND DELIMITATIONS OF THE STUDY

Several limitations affected the results of this case study. Identifying and acknowledging the study's shortcomings is imperative to provide an objective perspective and authentic results.

1.8.1 Limitations by design

It is important to note that the findings of this qualitative case study may not be generalisable to all educational institutions in South Africa, as it focuses on selected public primary schools. Therefore, it is essential to carefully analyse and validate the collected data to ensure its accuracy and reliability. Additionally, incorporating multiple data sources can help mitigate potential errors or biases in the research findings. However, the insights from this research can still provide valuable guidance for schools looking to integrate ICT effectively into their teaching practices.

Consequently, the findings cannot be generalised to participants outside the programme and are limited to the group participating. The absence of some principals, DPs, and DHs during the individual semi-structured interviews and observation days negatively affected data collection. As a result, the study attempted to mitigate these problems by providing a flexible research programme schedule that allows all participants to participate.

1.9 CHAPTERS OUTLINE

Chapter 1 presented the study's introduction, background of the study, statement of the problem, research questions, aim and objectives of the study, rationale and significance of the study, ethical considerations, limitations and delimitations of the study, chapter outline, definition of the key terms, and summary of Chapter 1.

Chapter 2 presented the introduction, the theoretical framework that underpins the study, a review of literature related to the case study, models for integrating ICT in education, and a summary of Chapter 2.

Chapter 3 presented the research methodology, introduction, research approach (qualitative), research design, research paradigm/philosophy, population and sampling procedures, data collection instruments, data analysis, trustworthiness, ethical considerations, limitations and delimitations of the study, and a summary of Chapter 3.

Chapter 4 presented and interpreted the findings. It also presented the schools' and participants' biographic data, as well as a description of the schools involved in the case study. The chapter concluded by summarising Chapter 4.

Chapter 5 discussed and analysed the study's findings.

Chapter 6 discussed the conclusions and recommendations. It also provided a chapter-by-chapter summary of key ideas and presented a summary of key findings pertaining to the research questions, implications for further study, and a recommended model.

1.10 DEFINITION OF KEY CONCEPTS

This case study outlines six fundamental keywords that serve as the foundation for the investigation:

- Information Communication Technology (ICT) is a new term for information technology or educational technology. It refers to all technologies used in education and training and strategies for using them (Roblyer & Doering, 2014). ICT also refers to the technological use of machinery, devices, equipment, and school systems for information dissemination and communication (Gauteng Department of Education, 2011). ICT also refers to hardware, software and connectivity (Meyer & Gent, 2016; UNESCO, 2022: 13).
- ICT in Education refers to the intersection of ICT and education that pertains to multiple perspectives, including the use of ICT as a provision medium by providers of educational programmes to enable or expand access to learning

opportunities; the use of ICT as pedagogical tools by teachers and learners to improve the relevance and quality of teaching and learning processes; and the development of ICT competencies or digital skills needed for living, learning, and working in our increasingly technology-rich world (UNESCO, 2022: 13). Further, ICT in education refers to "…the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Roblyer & Doering, 2014).

- It includes tools such as computers, tablets, interactive whiteboards, and educational software programs that enhance the educational experience for learners (Gauteng Department of Education, 2011; Msiza *et al*., 2020; UNESCO, 2022: 13). Educational technology also encompasses online learning platforms and virtual reality simulations that provide new ways for learners to engage with content (Roblyer & Doering, 2014).
- School Management Teams (SMTs) refer to the school managers (leaders of the school) who involve the principal, DPs, and DHs. The SMT members, particularly the principal, oversee school policy implementation, manage staff, and ensure a safe and productive learning environment for students (Tigere & Netshitangani, 2022). Additionally, the principal plays a key role in fostering positive relationships with parents, the community, and other stakeholders.
- Structure refers to all building materials and resources. Resources may include textbooks, charts, maps, audiovisual and electronic instructional materials, such as computers, radios, voice recorders, and television and video recorders (Malatji, Soundy, Kafidze & Chiloane, 2022). Archer (1995), in her Social Realist Theory, regards structure issues as one of the critical elements for any successful project (Archer, 1995). In the context of this study, 'structure' refers to all computer laboratories, computers, internet access, e-learning platforms such as smartboards and other technological resources (Malatji *et al*., 2022).
- Culture Archer (1995) regards school culture as the day-to-day practices of its community members. School culture is critical in integrating ICT into teaching and learning (Archer, 1995; Malatji *et al.*, 2022).
- Agency – Agents represent the 'people' in the sociocultural system (in this article, the school) into which they enter and who operate within a particular structural or cultural system (Malatji *et al*., 2022). Archer (1995) argues that the

agential role of academics in the use of ICT is likely to be affected by the structure as well as the culture of the institution (Archer, 1995).

1.11 SUMMARY OF CHAPTER 1

Chapter 1 introduced the study by presenting the background of the study, the statement of the problem, the research questions, the aim and objectives of the study, and the rationale of the study. It further addressed ethical considerations, the limitations and delimitations of the study, the chapter outline, and the definition of key concepts. The chapter ends with a summary. The following chapter presents a literature review and a theoretical framework that underpins the study.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

Chapter 2 provided the theoretical framework for the study and critically reviewed the existing literature on ICT integration to understand the body of knowledge and justify the research problem. The study was to enquire about and describe the experiences and challenges faced by SMTs (principals, DPs, and DHs) in integrating and implementing ICT into teaching and learning in South African primary schools.

The following section presents and explains the theoretical framework that supports the study.

2.2 THEORETICAL FRAMEWORK

The study used the Realist Social Theory (RST) and the Socio-Ecological Technology Integration (SETI) Framework. The proposed research topic was based on the two theoretical frameworks, which ensured the study's foundation in existing theories or empirical evidence. As a result, this qualitative case study was guided by RST and the SETI framework to explore the experiences and challenges SMTs faced in integrating ICT in South African primary schools. The RS theory and SETI framework provided a detailed understanding of how these theories enhanced the study's aims and objectives.

Below, the researcher detailed how the RS theory and SETI framework supported the study's aims and objectives.

2.2.1 The Realist Social Theory (RST)

The RST was founded by Margaret Archer in 1995. The RS theory is suitable for study because it emphasises the importance of understanding how individuals navigate social structures and cultural influences to achieve organisational change (Archer, 1995). Moreover, individuals can understand and interpret the reality through their experiences and perspectives, which can shape their perceptions and beliefs (Archer, 1995; Archer, 1996). This view was fundamental to the study because it was supposed

to investigate SMTs' experiences, challenges, and perspectives on ICT integration and implementation in schools. Archer's RS theory emphasises the importance of considering social structures, agency, culture, and power dynamics when shaping individuals' understanding of reality (Archer, 1996). This view was also essential to the study because the researcher examined how social structures, agents, culture, and power dynamics influenced ICT integration in schools.

The RS theory further emphasises the importance of understanding how societal structures, cultural norms, and individual agencies influence human behaviour (Archer, 1995; Archer, 1996; Archer, 2003). The researcher also examined how societal structures, cultural norms, and individual human behaviour affected ICT implementation in schools. Schools are communities of people with diverse societal structures, cultural norms, values, and beliefs. Therefore, the researcher needed to read more about the school's values and beliefs to understand their influence on ICT integration.

Archer's (1995) structure, culture, and agency framework offers insight into how SMTs can implement change in their institutions (Archer, 1995; Archer, 1996; Archer, 2003). In this case study, implementing change implied integrating ICT in schools to enhance teaching and learning. In essence, Archer's three Realist Social Agency level lenses – structure, agency, and culture —assist the researcher in exploring the experiences and challenges faced by SMTs when integrating ICT into primary schools in South Africa. The three lenses are illustrated in Figure 0.1 below.

Figure 0.1: A general picture of the interplay of structure, culture and agency towards integrating ICT in schools

The RST comprises three lenses: structure, culture, and agency. Each lens provides a concise understanding of the theory, as explained below. The explanation showed how structure, culture, and agency influence the change and integration of ICT in teaching and learning in schools. By examining the impact of these three lenses, the researcher better understands the complexities of implementing ICT in educational settings to enhance teaching and learning. This analysis helped identify barriers and opportunities for successful integration, ultimately leading to more effective teaching and learning practices. The structural lens focuses on how power dynamics and

institutions shape individuals' actions and opportunities within the education system. Below, the study explored the application of Margaret Archer's RST in the case study.

2.2.2 Application of Margaret Archer's RST in the case study

The study aimed to explore and describe the experiences and challenges faced by SMTs (principals, DPs, and DHs) in integrating and implementing ICT into teaching and learning in South African primary schools. The experiences and challenges SMTs face in integrating ICT into primary schools were analysed using RST, explicitly drawing on the theoretical viewpoints of structure, culture, and agency. Below is the application of all three theoretical lenses in school settings.

2.2.2.1 ICT structure readiness and availability in schools

According to Archer's Theory, the concept of structure includes interactions with others, delegation, rules and procedures, freedom of expression, the shaping of the reward structure, the sharing of good practices, and collegial commitment to finding solutions (Archer, 1995; Archer, 1996; Archer, 2003). Based on the above viewpoint, SMTs, as school leaders, should play a role in delegating to the entire school staff how ICT should be implemented in schools. Rules and procedures of implementation should be followed carefully as guided by the National ICT Policy, GDE ICT Policy, and the school-based policies. In the process of achieving this, SMTs should foster freedom of expression by providing a safe space for staff members to air their views without fear of judgement.

In addition to the theory's views, SMTs are expected to sharpen the reward structure to motivate teachers to embrace and implement ICT in classrooms. At the same time, SMTs have a duty to encourage teachers to share good implementation practices through collegial commitment to share solutions. The theory also focuses on roles, organisations, institutional structures, systems, policies, committees, substructures, and positional levels within the organisation (Archer, 1995). This idea is fundamental to this case study because SMTs are supposed to interact with one another and other stakeholders before introducing ICT in their schools. Besides, SMTs, as school leaders, should be able to delegate duties to their subordinates regarding curriculum coverage and other school administrative responsibilities.

School principals make the conditions, learning spaces, and structures that help teachers and learners learn and teach effectively (Shava & Heystek, 2019). Moreover, SMTs ensure that rules and procedures are observed and adhered to by every staff member on the school premises. However, in doing so, SMTs must ensure that all staff members have freedom of expression. This entails respecting their views and opinions during meetings, sharing and practising good practices, and fostering collegial commitment to share solutions. Therefore, structural readiness for this case study refers to the availability of ICT infrastructure, including classroom buildings, computer labs, computers, laptops, projectors, smartboards, ICT policies, documents, and resources (Malatji *et al*., 2022) that can assist SMTs in integrating ICT into schools.

It also includes ensuring the physical infrastructure, such as reliable internet connectivity and adequate power sources, within the schooling environment (Malatji *et al*., 2022). Additionally, according to Archer (2003), the structure also includes the material conditions which would motivate action (Archer, 2003).

According to Shava and Heystek (2019), “School principals play a crucial role in guiding schools towards sustainable improvement by shaping a vision of academic success for all learners.” This further places emphasis on the fact that school principals must create conditions, learning environments, and structures to support efficient learning and teaching (Shava & Heystek, 2019). This involves having policies and guidelines in place to support the effective integration and use of ICT in education (Aluko, 2017).

In Dlamini and Mbatha (2018), to effectively transform education and enhance key educational practices using ICT, it is essential to supplement the implementation with purposeful and efficient ICT teacher development initiatives (Dlamini & Mbatha, 2018). In their view, these activities, in return, assist teachers in cultivating digital fluency and pedagogical skills (Dlamini & Mbatha, 2018). As a result, SMTs must ensure that teachers and school staff are adequately trained to use technology effectively to enhance school teaching and learning. Hence, it is essential for schools to regularly update their ICT resources and policies to keep up with technological advancements (Aluko, 2017).

ICT structure or resources further include textbooks, charts, maps, and audiovisual and electronic instructional materials, such as computers, radios, voice recorders, televisions, and video recorders (Ojo & Adu, 2018; Malatji *et al*., 2022). Therefore, if a school has all the ICT tools mentioned above, Archer (1995) alluded to the fact that the structure is a critical element for a successful project (Archer, 1995). Consequently, if the school structure and all necessary requirements are in place, the integration of ICT in schools can be easily supported. In essence, for this case study, 'structure' refers to buildings, computer laboratories, computers, smartphones, tablets, access to the Internet, and smartboards.

Nevertheless, the case study recognised that having these tools alone, without the support of qualified, trained SMTs and teachers, can also delay the integration of ICT. SMTs and teachers must receive proper training on how to incorporate technology into their teaching practices effectively (Dlamini & Mbatha, 2018). Without this guidance, SMTs and teachers may struggle to use ICT tools fully in the classroom, hindering learners' access to valuable learning opportunities. Moreover, ongoing professional development is essential to ensure that SMTs and teachers stay up to date with the latest advancements in educational technology. SMTs can also create a more engaging and interactive learning environment for their learners by continuously improving their skills and knowledge, for example, by using educational search engines such as Google Scholar.

Bush and Glover (2016) state that the principal's role includes ensuring the best possible achievement, allocation, and evaluation of resources, as well as the security of the site and property. Once again, without the necessary support, the principal's role alone can also delay the successful integration of ICT in schools. It is, therefore, crucial for school leaders to have access to ongoing professional development and resources to implement technology initiatives effectively. Collaboration among SMTs, teachers, staff, and other stakeholders is vital for establishing a culture of innovation and continuous improvement in the use of ICT in education, especially in primary schools. It is also crucial for school SMT members to provide teachers with resources, training, and encouragement to effectively implement ICT in the classroom.

Collaboration among principals, teachers, and school staff is essential to creating a supportive environment for ICT integration in schools. By working together, SMTs can identify and address challenges that may arise during implementation. Moreover, ongoing professional development opportunities should be offered to ensure SMTs and teachers are equipped with the necessary skills to effectively integrate and use ICT in their teaching practices. This kind of collaboration can also help create a shared vision and goals for integrating ICT into the curriculum. By aligning their efforts, the school can ensure a cohesive approach to ICT implementation that benefits both teachers and learners. Ultimately, this collaboration can lead to a more seamless and successful integration of ICT in the classroom. It also fosters a supportive environment in which SMTs and teachers feel empowered to explore new ways to incorporate ICT into their lessons.

Another critical agent of change that significantly influences ICT integration is the school culture.

2.2.2.2 School culture and ICT integration

According to Archer's RST, culture includes school climate, deeply rooted traditions, relationships with teachers, learners and parents, modelling the desired values of the school, developing a climate of high expectations, and a culture of teaching (Archer, 1995; Archer, 1996; Archer, 2003). This case study focused on school principals, DPs, and DHs in five primary schools.

In literature, "culture" refers to the way of life of a specific group of people, which involves behaviour, beliefs, values, customs, relationships, and special symbols (Shava & Heystek, 2019). School cultures include collective values, beliefs, attitudes, principles, standards, and behaviours that unite an educational institution, establish its unique character, and strongly oppose external change (Kaplan & Owings, 2013; Spiteri & Chang Rundgren, 2020). According to Archer (1995), school culture refers to the everyday behaviours and actions of the people inside the school community.

In this study, school culture includes the school climate, deeply rooted traditions, relationships with teachers, learners and parents, modelling the desired values of the school, developing a climate of high expectation, a culture of teaching, beliefs, values,

and norms (Archer, 1995; Archer, 1996; Archer, 2003) that influence how ICT is integrated into the learning environment. A positive school culture or school climate promotes innovation and collaboration, thereby supporting successful ICT integration initiatives. Furthermore, a healthy school culture provides a secure, nurturing, motivating, inclusive, and demanding atmosphere for school staff and learners (Adillo & Netshitangani, 2019). On the other hand, a school culture that is resistant to change or lacks support for professional development in technology may hinder efforts to integrate ICT effectively into teaching and learning.

SMTs must promote a culture that embraces ICT to enhance instructional activities in schools. Encouraging SMTs, teachers, staff, and students to use ICT in schools gives them the freedom to try out new ways to use technology in the classroom. Ultimately, SMTs have a duty to build a supportive school culture that leads to more meaningful and impactful use of ICT in the classroom. Hence, most schools have unique cultural settings defining their working patterns and success. Furthermore, SMTs have a duty to present a well-crafted school culture, which is essential for encouraging staff members to collaborate on implementing changes within the school.

When all staff members are grounded in the school culture and possess a strong understanding of its values and beliefs, the school tends to operate smoothly with fewer challenges and less resistance. Therefore, in this study, culture refers to the norms and values that the SMTs and teachers establish to manage their operations and efficiency. As a result, the cultural lens examines how shared beliefs, values, and norms influence the use of ICT in primary schools.

Strong school leadership, a secure and engaging learning environment, solid moral and trustworthy bonds, more teachers' professional capacity for teaching and leadership, learner-centred instruction, and connections to the community are among the many components that research strongly suggests are necessary for school improvement (Kaplan & Owings, 2013). Although school district officials, principals, and DHs are under constant pressure to improve learner success, many reform initiatives fail because teachers lack the knowledge needed to recognise the power of school culture.

Schools and communities accept new technologies according to their cultural values and beliefs. Integrating ICT into pedagogical practices requires considering school values, beliefs, and norms. SMTs' perceptions, attitudes, and behaviours can also influence ICT integration. Suppose the SMT members have a positive attitude towards integrating ICT in the school. In that case, the integration of ICT becomes smooth, but if their attitude is negative, it can be complex in classrooms. Ntsobi *et al*. (2025) articulate that if the education sector does not embrace the new technology, most schools will be left behind, relying on outdated teaching and learning methods. A positive attitude can increase teacher confidence in using technology and in implementing more effective strategies.

Overcoming resistance from staff members with negative attitudes may require extra support and training to ensure successful ICT integration. This is why Ntsobi *et al*. (2025) say the attitudes of teachers towards the use of ICT in teaching are crucial for its adoption and integration. Ultimately, the success of ICT in schools heavily depends on the willingness and enthusiasm of SMTs, teachers, administrative staff, school governing bodies, learners, and parents to embrace technology. If schools adopt a culture that values innovation and ongoing learning, they can create an environment where both teachers and learners can flourish in the digital age. This positive mindset can also motivate learners to be more engaged and driven in their studies, ultimately leading to better academic results.

Moreover, schools that prioritise technology integration to enhance teaching and learning are better equipped to prepare learners for success in an increasingly digital world. In addition, teachers who receive ongoing professional development and support in using technology effectively are more likely to feel confident and motivated to incorporate it into their lessons. This ultimately results in a more dynamic and engaging learning experience, setting learners up for success in the future. Furthermore, learners benefit from exposure to technology in the classroom, as it prepares them for the digital world they will enter upon graduation. Teachers can cater to different learning styles by incorporating technology into lessons and providing a more interactive and personalised educational experience.

The last lens by Archer is agency.

2.2.2.3 Agency in ICT integration

Agency refers to the principal as a change agent, shaping the vision, managing people, cultivating leadership in others, and teaching teachers as key players (Archer, 1995; Archer, 1996; Archer, 2003). In this study, a change agent refers to all SMT members, including principals, DPs, and DHs, who form part of the SMTs. SMTs are responsible for making decisions, setting policies, and providing resources to support technology implementation in education.

Their leadership and support are crucial to shaping the school's culture and ICT integration practices. Principals are among the most important agents and must attend to the needs of and provide personal attention to staff members, as the agents have direct contact with learners who play a central role in ensuring school improvement (Shava & Heystek, 2019). By understanding the role of these agents, researchers gained insight into how ICT was adopted and used within educational settings. Additionally, studying the influence of these key figures can offer helpful observations about the successes and challenges of ICT integration in schools.

SMTs' strategies, approaches, and decision-making offered valuable lessons for other schools looking to enhance their use of technology. Ultimately, the impact of these leaders significantly determines the effectiveness and sustainability of ICT integration efforts in educational institutions. Ultimately, the effectiveness of ICT integration in schools depends heavily on the collaboration and guidance of these key decision-makers. Their vision and commitment to leveraging technology for educational purposes significantly impact learners' overall learning experiences.

SMTs have a duty to shape the school's vision, manage staff, and cultivate leadership within them. Without their support, teachers may struggle to effectively incorporate ICT into their lessons, thereby hindering learners' access to valuable resources and tools. Therefore, fostering a strong partnership between SMTs and teachers is crucial for successful ICT integration in schools. This collaboration can lead to the development of comprehensive ICT plans that align with educational goals and priorities. Working together, SMTs and teachers can equip learners with the necessary skills to thrive in a digital world. In this, teachers play a key role because they are the initiators of the ICT curriculum. Furthermore, collaboration can also help identify and address any

challenges or barriers that may arise during the implementation of technology in the classroom. By working together to overcome these obstacles, SMTs and teachers can create a more seamless, efficient integration process, ultimately benefiting both teachers and learners.

The following section presents the SETI framework.

2.2.3 The Socio-Ecological Technology Integration Framework

The SETI framework first appeared in the literature in 2017 from a thematic systematic review of studies examining the integration of mobile learning in teaching and learning (Crompton, 2016). SETI is the best model for school leaders to use when they want to use technology in the classroom. It is a holistic systems approach that is best shown by the SETI framework (Crompton, Burke, Nickel & Chigona, 2024). While other models like TPACK and SAMR are valuable, they mainly focus on the teacher's role, whereas the SETI framework offers a comprehensive, school-wide perspective essential for effective leadership and implementation (Crompton etal., 2024).

The SETI framework is best suited for school leaders because it recognises that successful technology integration is not solely about what happens in the classroom. Instead, it perceives the school as a complex ecosystem with many interconnected parts that all influence the use of technology (Crompton et al., 2024).

2.2.3.1 Key Components of the Model Relevant for School Leaders

- **Leadership and Management:** This section is at the heart of the SETI model for school leaders. It highlights the need for a visionary e-leadership that extends beyond basic administrative tasks. School leaders must not only be digitally literate themselves but also foster a supportive culture and develop a strategic plan for technology integration. This includes securing funding, managing infrastructure, and developing policies.
- **Teacher Professional Development:** The SETI Framework emphasises that leaders must provide ongoing, relevant, and subject-specific professional development for teachers. This goes beyond just technical skills and includes training on how to use technology to enhance pedagogy and content knowledge

(CK). This component recognises that teachers are central to the process and require continuous support to grow their digital competencies.

- **School Culture and Context:** The model stresses the importance of fostering a culture of collaboration and innovation. This means encouraging teachers to work together, share best practices, and learn from one another. It also accounts for the specific context of the school, including available resources, existing infrastructure, and the attitudes of both staff and students towards technology.
- **Curriculum and Pedagogy:** School leaders must ensure that technology is not a mere add-on but is deeply embedded in the curriculum. The SETI model guides leaders to support pedagogical change that uses technology to transform teaching and learning, leading to higher-order thinking and improved student outcomes.

2.2.3.2 Why other models are less suitable for leaders

While the following frameworks are well-known, they are designed for different purposes and are less comprehensive for a school leader's role:

- **TPACK (Technological Pedagogical Content Knowledge):** This model is excellent for individual teachers as it helps them understand the intersection of technology, pedagogy, and CK. But it doesn't fully cover the systemic problems and leadership duties that a school principal or management team must deal with, such as policy, infrastructure, and school-wide culture.
- **SAMR (Substitution, Augmentation, Modification, Redefinition):** This framework helps teachers evaluate how they use technology in their lessons, ranging from simple substitution (e.g., using a word processor instead of a pen) to transformative redefinition (e.g., creating a collaborative, globally connected project). While useful for a teacher's self-assessment, it does not provide a roadmap for the broader strategic and administrative decisions required of school leaders.

2.2.3.3 Implications for theory, practice, and/or policy

- The SETI framework can be used to address the gaps left by the TPACK and SAMR frameworks, which emphasise the community effort needed for effective technology integration. SETI emphasises the importance of recognising the socio-ecological system surrounding teachers for successful technology integration.
- SETI emphasises the importance of various resources and frameworks, such as training, technology support, policies, and infrastructure, which are essential for successful integration.
- The framework also emphasises the importance of national and personal cultures and beliefs in the process of technology integration (Crompton, Burke, Nickel, & Chigona, 2024).

The application of the findings from the Crompton, Chigona and Burke (2023) study resulted in this updated version of the SETI framework in Figure 0.2.

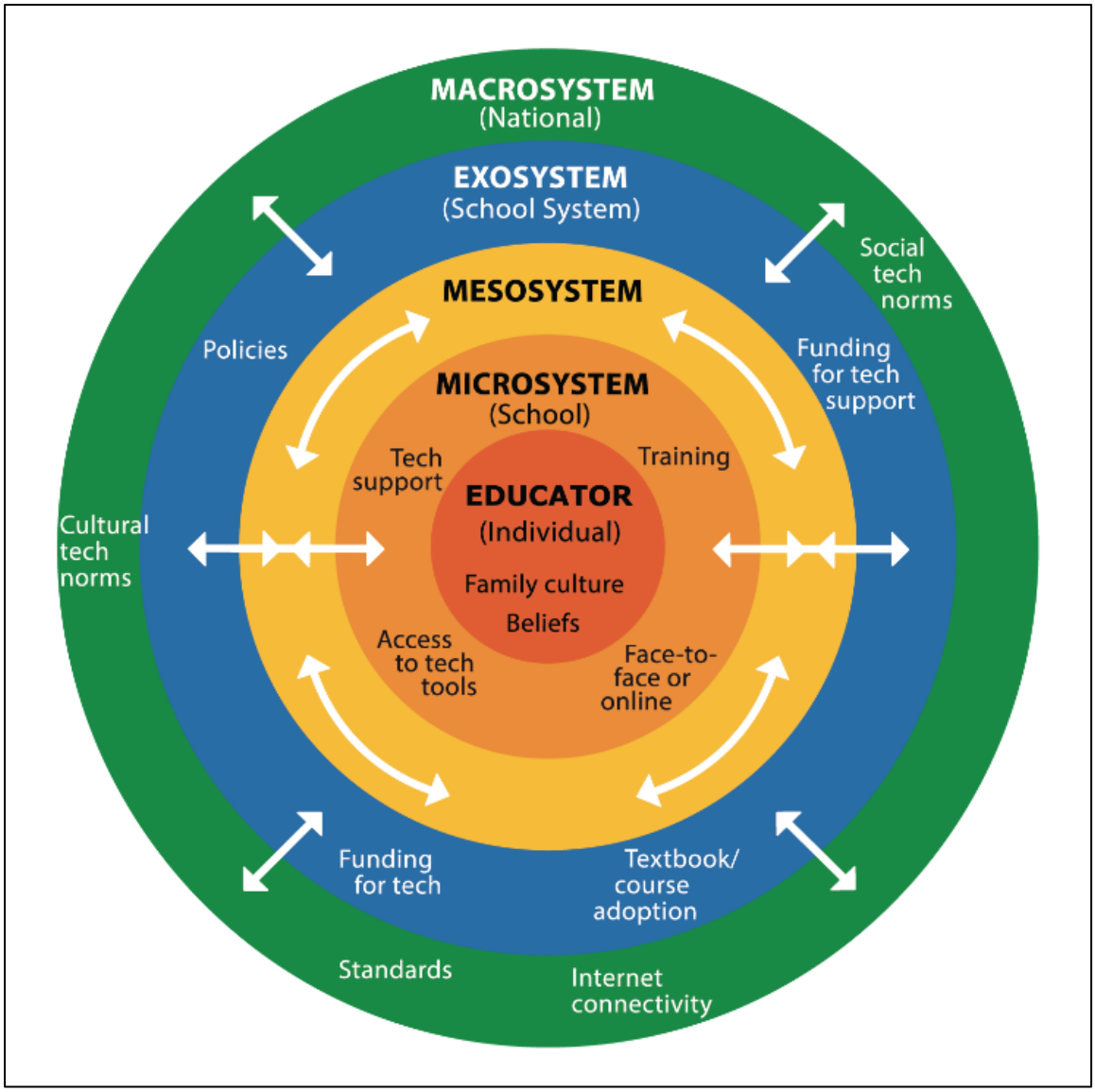


Figure 0.2: Social Ecological Technology Integration (SETI) Framework (Crompton, Chigona & Burke, 2023)

2.2.4 Summary of theoretical frameworks

The section introduced two theoretical frameworks that underpin the study: the RST and the SEMI framework. The RST, focused on three lenses: structure, culture, and agency, influenced the study. It presented a detailed explanation of how SMTs can use the lenses to integrate ICT in schools. The SEMI framework also explained how the model's key components are relevant to SMTs in implementing ICT in schools. The key components of the model include leadership and management, teacher professional development, school culture and context, and curriculum and pedagogy.

The study was designed to investigate and describe the experiences and challenges faced by SMTs (principals, DPs, and DHs) in integrating and implementing ICT into teaching and learning in South African primary schools.

The following section presents a literature review supporting the study.

2.3 REVIEW OF LITERATURE

A literature review is approached as a process of engaging with the discourse of scholarly communities to help graduate researchers refine, define, and express their own academic vision and voice (Harris, 2019). In essence, a literature review is research already carried out and published in books, journal articles, conference reports, government reports, and NGO reports (Quinlan, Babin, Carr, Griffin & Zikmund, 2019). Moreover, the literature review is further defined as a concise and comprehensive overview of existing research relevant to the current study (Efron & Ravid, 2013). Also in Ramdhani, Ramdhani and Amin (2014), a literature review methodically examines published works on a particular subject matter. A literature review refers to an assessment of previous works, including books, journals, and documents, that puts forth a logically constructed argument based on a thorough comprehension of the existing knowledge on a particular subject of inquiry (Machi & McEvoy, 2016).

To achieve the research's aim and objectives, with respect to the above definitions and explanations. The study critically reviewed existing literature on ICT integration to understand the body of knowledge and justify the research problem. This was achieved through exploring and examining online journal articles, online textbooks, textbooks, theses, government gazettes, NGO reports, and conference reports in the field of ICT in Education (Quinlan *et al*., 2019). As a result, the study ensured adherence to research ethics principles and maintained relevance. The study relied exclusively on peer-reviewed scholarly articles, textbooks, ICT policies, and documents published on reputable websites and databases worldwide (Machi & McEvoy, 2016).

In this study, reviewing literature also involved critical analysis and synthesis to develop personal expertise and scholarly understanding of a topic or phenomenon. It

further involved establishing the existing body of knowledge, identifying gaps for new studies, distinguishing between established and unknown information, and identifying knowledge gaps in the subject matter.

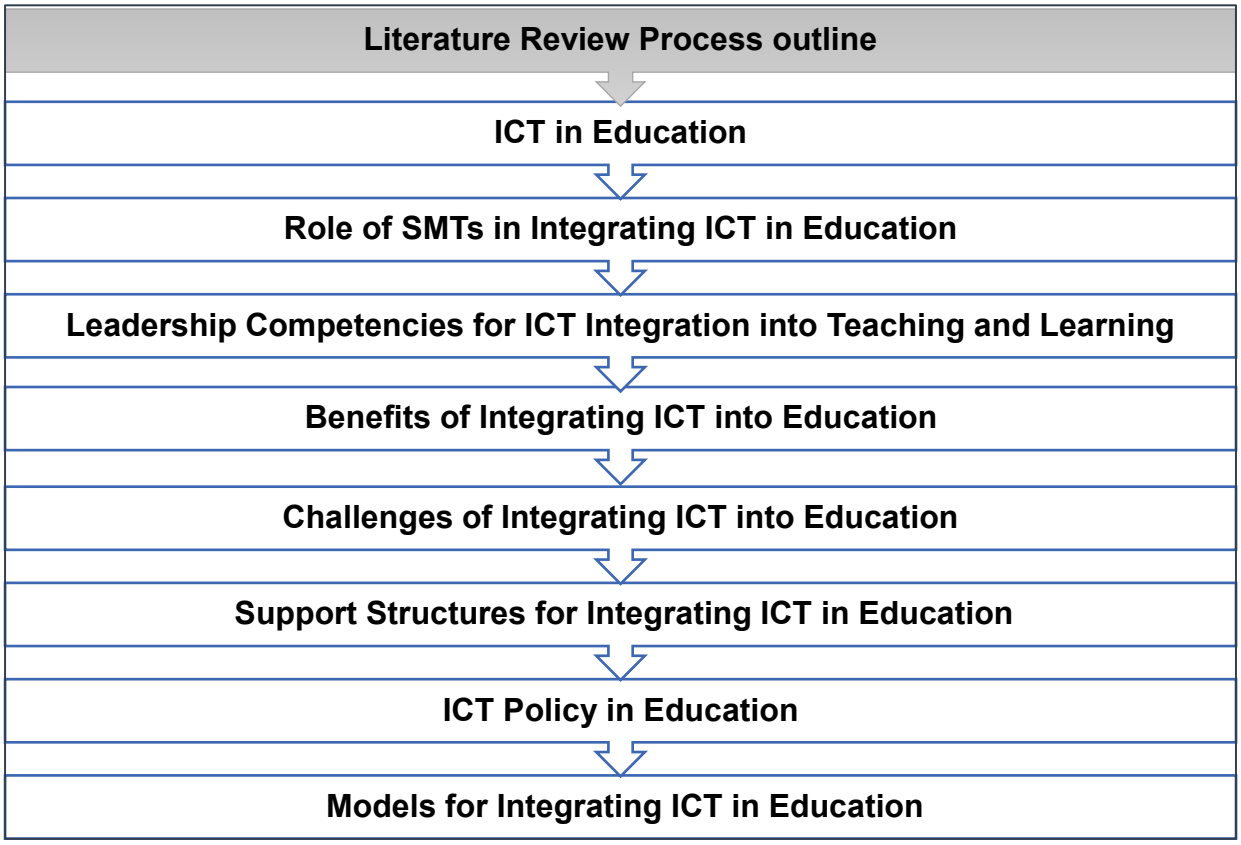
The following paragraphs explain how the researcher critically and systematically analysed the literature by presenting a detailed outline of the literature review process.

2.3.1 Literature review process outline

The researcher adopted a systematic approach to conduct a literature review for the case study. Furthermore, the researcher reviewed relevant literature on ICT integration in education to identify gaps, assess sources, and identify prevalent themes. A literature review outline was established to organise the review, and the writing procedure was initiated. The research examined studies on the experiences and challenges of SMTs in integrating ICT into schools, with a focus on both local and international integration.

The review examined the impact of ICT integration at regional and international levels, ensuring contemporary relevance. The literature review was limited to recent peer-reviewed papers, online journal articles, textbooks, government gazettes and reports. The qualitative case study sought to investigate the experiences, difficulties, and challenges encountered by SMTs in the integration and implementation of ICT in South African public schools. The literature was examined according to the literature review process outlined in Table 0.1 below.

Table 0.1: The literature review process outline



2.3.2 ICT in Education

The foreword by the Minister of Education, South Africa, highlights the transformative role of ICTs in global educational change. It emphasises that digital media has revolutionised the information society, significantly altering learning and teaching processes and creating new learning opportunities along with broader access to educational resources (Department of Education, 2004).

Information and Communication Technologies in educational contexts involves the application of digital tools and resources to enhance pedagogical practices and learning outcomes (Halili, Sulaiman & Razak, 2017). According to Gyaase, Gyamfi and Kuranchie (2019:2), “Information and Communication Technologies are computer-based tools and applications used in collecting, recording, preserving, processing, researching, transferring and receiving information for teaching and learning.” Literature shows that ICT has impacted various fields, including distance learning, professional development, teaching skills, and curriculum modification (Yeo

& Alias, 2021). It is also argued that ICT in education enriches teaching and learning processes in numerous ways (Rabah, 2015). Empirical literature believes the use of ICT in schools strongly impacts teaching and learning approaches, processes, quality and accessibility of education, learning motivation, learning environment, and academic performance (ViralSangat, 2013; Bariu, 2020). Therefore, ICT in education is the use of ICT by school leaders and teachers to support teaching and learning.

ICT in education is believed to assist teachers in aligning with research that indicates it facilitates improved assessment and feedback, enabling tailored instruction to address diverse learner needs (Ifenthaler & Yau, 2020). Moreover, the integration facilitates streamlined communication, data processing, and information dissemination through electronic media. The study by Chima *et al*. (2024) mentioned that ICT integration has become crucial in structuring learning experiences and promoting equal access to education in modern educational environments. Based on the literature, ICT in education can be used by SMTs and teachers to leverage teaching and learning experiences.

The existing body of research also provides robust evidence in support of the effectiveness of ICT in enhancing the learning process. Research consistently shows that ICT can facilitate the development of interactive and engaging learning environments, encourage collaboration and communication among learners, and provide teachers with valuable insights into learner performance and progress. (Halili *et al*., 2017). Therefore, if SMTs and teachers harness the potential of ICT, teachers can develop learning experiences that are more effective, efficient, and enjoyable.

In the United Kingdom, for instance, ICT integration into education has a positive influence that goes beyond improving classroom management efficiency and academic performance but has fundamentally transformed the process of teaching and learning (Cho, Mansfield & Claughhton, 2020; Galindo-Dominguez, 2021). According to the Department of Education (2004), advancements in ICT are expected to expand access to educational opportunities, address disparities, and enhance the quality of instruction and learning.

The Department of Education’s assertion that ICT can improve diverse learning styles and eliminate obstacles to learning is grounded in the understanding that technology

can provide enhanced opportunities and personalised learning experiences (Department of Education Government Gazette, 2004). As a result, SMTs must have a clear understanding of ICT tools that can help them realise ICT benefits in their schools. SMTs, school governing bodies, teachers, parents, and learners must start supporting each other to implement ICT in schools.

The systematic integration of ICT has fundamentally reshaped traditional classroom environments, transitioning from a teacher-centred instructional model to a learner-centred, interactive paradigm. This shift empowers learners with greater agency in their learning journeys and promotes active engagement. Supporting this integration are various theoretical frameworks, notably the TPACK framework. ICTs are increasingly having a positive effect on education, such as increased motivation among learners and teachers, greater autonomy in learning, and improved learner retention (Nyanja & Musonda, 2020).

TPACK is widely recognised for delineating the nuanced interplay of knowledge domains essential for teachers to integrate technology into their teaching practices effectively (Mishra & Koehler, 2006). It suggests that effective technology integration requires teachers to understand not only the content they teach and the pedagogical approaches for teaching it, but also how technology can intersect with and enhance both content and pedagogy (Koehler & Mishra, 2009). ICT integration in education plays a crucial role, which is discussed in the following paragraphs. Below is a definition of ICT.

2.3.2.1 ICT definition

ICT encompasses all technologies used to access, process, store, transmit, and exchange information. It merges information technology (IT) with communication technologies, facilitating the creation, management, and sharing of digital data. This broad definition includes everything from the internet and mobile phones to advanced computer systems and specialised software applications (Roblyer & Doering, 2014).

Information Technology (IT): Focuses on computing systems, data storage, retrieval, and manipulation. Moreover, IT refers to the hardware and software components that enable individuals to access, retrieve, store, organise, manipulate,

and present information electronically (Department of Education Government Gazette, 2004). Likewise, personal computers, scanners, and digital cameras are classified as hardware components (Msiza *et al*., 2020; Malatji *et al*., 2022).

Communication Technology (CT): Deals with the transmission of information through various channels. The term “communication technology” refers to the telecommunications devices that facilitate the acquisition, transmission, and retrieval of information (Department of Education Government Gazette, 2004). Such devices include telephones, fax machines, modems, and computers (Department of Education Government Gazette, 2004).

Information Communication Technology (ICT): This is built upon three foundational pillars: hardware, software, and connectivity. Hardware refers to the physical components, such as computers, servers, and mobile devices. Software comprises the programmes and applications that make these devices functional. Connectivity, through networks like the internet, enables the seamless exchange of information globally (Department of Education Government Gazette, 2004; Malatji *et al*., 2022; UNESCO, 2022).

- **Hardware:** Physical components enabling data processing and storage.
- **Software:** Programs and applications that operate hardware.
- **Connectivity:** Networks facilitating data transmission and communication.

Information and communication technology has revolutionised education, moving beyond traditional classrooms to create dynamic and accessible learning environments. E-learning platforms, virtual classrooms, and educational software provide learners with personalised learning experiences and access to a vast repository of knowledge. It empowers teachers with tools for more engaging instruction and efficient administration.

- **E-Learning Platforms:** Refer to online courses and resources for remote learning.
- **Virtual Classrooms:** refer to interactive live sessions connecting students and teachers globally.

- **Educational Software:** refers to tools for skill development, simulations, and interactive lessons.

Therefore, the term ‘information and communication technology’ (ICT) in this case study refers to any electronic product or system intended for storing, retrieving, manipulating, transmitting, or receiving digital information. Examples include personal computers, cloud service providers, social media platforms, and TV and radio (UNESCO, 2022).

2.3.2.2 ICT tools used in education

According to Talebian, Mohammadi and Rezvanfar (2014), ICT tools consist of hardware, software, networks, and media for collecting, storing, processing, transmitting, and presenting information in voice, data, text, and image, as well as related services (Talebian *et al*., 2014). ICT educational tools include computers, the internet, and electronic delivery systems such as radios, televisions, and projectors, widely used in today’s education field (Fu, 2013; Bingimlas, 2018; Fahm *et al.*, 2022).

Although there is a plethora of ICT tools worldwide, some of them are not user-friendly in schools. Below are a few ICT tools used to enhance teaching and learning, which include devices such as computers, cameras, TVs, videos, Compact Discs (CDs) and DVD players, MP3 and MP4 players, overhead projectors, data projectors, electronic whiteboards, cell phones, memory devices and printers (Gauteng Department of Education, 2011; Malatji *et al*., 2022; UNESCO, 2022).

ICT tools used in schools also include the Internet, CD-ROMs, software applications, multimedia resources, and telecommunications (Department of Education Government Gazette, 2004; Kandasamy, Bt & Shah, 2013; Wallet & Beatriz, 2015; UNESCO, 2022). These digital resources have become increasingly important in education, providing teachers and learners with access to a wealth of information and interactive learning tools. Incorporating digital resources in education enhances adaptability to various learning styles, promotes learner engagement, personalises learning experiences, and fosters essential digital literacy skills (Ghory & Ghafory, 2021). ICT resources have the potential to enhance the educational experience, making learning more engaging and accessible.

Academic research shows that a curriculum integrating ICT tools to improve teaching and learning offers many benefits, including motivation and enhanced learner achievement. (Nsolly & Charlotte, 2016). Furthermore, evidence in the literature reveals how ICT enhances the productivity of basic instructional tasks, such as preparing learner-centred lesson plans and class outlines, developing quizzes, games, and examinations, and writing comments on learner papers and reports (Uluyol & Şahin, 2016; Razak *et al*., 2019; Agyei, 2021).

The following section discusses the role of SMTs in integrating ICT in education.

2.3.1 Role of SMTs in integrating ICT in schools

SMTs act as agents of change in integrating ICT in schools. In a nutshell, SMTs play a vital role in successfully integrating ICT into education (Ghavifekr & Wong, 2022). Moreover, SMTs significantly influence the success of ICT implementation at the school level by making decisions on strategic plans, budgeting, organisational structures, curriculum, program evaluation, external relations, and ethical issues (Sun & Gao, 2019).

Their duties extend beyond merely providing equipment; they are the strategic leaders who establish the vision and policies, introduce change, provide stimulus, promote technology for educational purposes and deal with the highly stressful and troublesome characteristics and environments needed for effective technology use (Adillo & Netshitangani, 2019; Khumalo, 2019; Sun & Gao, 2019; Yeo & Alias, 2021). SMTs drive and influence change through encouraging teachers to be committed, remain motivated and inspired in their responsibilities, and create opportunities that enhance work satisfaction (Adillo & Netshitangani, 2019; Khumalo, 2019; Yeo & Alias, 2021).

However, education leaders, especially SMTs, should possess the necessary skills to lead and guide all staff members towards achieving intended educational purposes, including leading ICT integration in schools. In this case, SMTs' role is to ensure that the ICT implementation policy is fully integrated into schools.

In South Africa, the duties of all SMTs and teachers are enshrined in the Personnel Administrative Measures (PAM) document as follows:

- Principals ensure that the school is managed satisfactorily and in compliance with applicable legislation, regulations, and personnel administration measures as prescribed. Furthermore, they ensure that learners' education is adequately promoted and in accordance with approved policies.
- Deputy principals support the principal in managing the school and promoting proper education for learners. They also keep fully informed about administrative procedures across all school activities and functions.
- Departmental heads engage in class teaching, are responsible for the effective functioning of the department, and organise relevant/related extra-curricular activities to ensure that the subject, learning area, or phase, and the education of learners are promoted adequately.
- While teachers engage in classroom teaching, including academic, administrative, educational, and disciplinary aspects, and organise extracurricular and co-curricular activities to ensure that learners' education is properly promoted (Department of Education, 1999).

Some of the roles of SMTs in integrating ICT into schools include strategic planning and vision.

2.3.1.1 Strategic planning and vision

SMTs must take the lead on strategic planning, developing the school vision and developing a clear ICT policy that aligns with the school's overall mission and curriculum. Moreover, SMTs are deeply involved in articulating the school vision, introducing change, providing stimulus, and dealing with highly stressful and troublesome characteristics (Adillo & Netshitangani, 2019). In addition, SMTs must formulate a strategic plan to incorporate technology into the pedagogical process and disseminate this vision to the teaching staff members (Tigere & Netshitangani, 2022). SMTs also play a vital role in steering schools towards sustainable improvement by creating a vision of academic success for all learners (Shava & Heystek, 2019). It is also the duty of SMTs to ensure that the school's ICT vision, mission, values, and beliefs align with the opportunities for teachers and learners.

They are also responsible for identifying the core components of a successful school planning process. Furthermore, they must discuss how ICT implementation and

composite planning should be carried out in schools. Many schools emphasise the importance of school leaders' efforts in establishing a clear and comprehensive plan for integrating ICT aligned with the school's vision and mission for technology integration (Rabah, 2015). Equally, SMTs establish conditions, learning environments and frameworks to promote effective learning and teaching (Shava & Heystek, 2019).

The effectiveness of this role depends on its integration into the leadership structure and on the individual's status and personal attributes. (Newhouse, 2011). As a result, the effective integration of ICT in schools depends on school leaders' vision and understanding of its role in the curriculum, their objectives for ICT use, the school's historical and cultural context, and its overarching vision and mission (Yuen, Law & Wong, 2003). While the principal's role is important, a leadership team that includes a curriculum leader is more essential, especially for providing vision and support for ICT use.

Principals' technology leadership roles are vital factors in affecting the effective use of ICT in classrooms (Ghavifekr & Wong, 2022). Principals are among the most important agents and must attend to the needs of staff members, providing personal attention, as they are the agents' direct contact with learners, who play a central role in ensuring school improvement and curriculum coverage (Shava & Heystek, 2019). Therefore, SMTs must create a shared vision for how ICT will transform the school and communicate this vision to all stakeholders, including teachers, learners, and parents.

SMTs are responsible for providing learners with technologically advanced, resource-rich learning environments that cater to diverse needs (Tigere & Netshitangani, 2022). That will ensure ICT integration by involving relevant staff members in developing the vision and strategic plan (Newhouse, 2011). The success and failure of ICT integration in schools depend on how SMTs respond to their schools' ICT needs.

Another role of SMTs is to manage the resource procurement strategy as expressed below.

2.3.1.2 Resource management and procurement

Effective ICT integration demands substantial resources. Software costs and annual licence fees make it difficult for schools to afford them, unless they receive donations

or opt for open-source software (Mwangi & Ronge, 2014). According to Ajani and Dlomo (2025), “Rural schools often need help adopting technological innovations due to inadequate ICT infrastructure, limited access to technology, and a deficit in training and support for educators and administrators.” It is the role of SMTs to oversee the budget for acquiring, maintaining, and upgrading hardware and software in schools.

This involves making well-informed decisions about which technologies to invest in, ensuring a stable internet connection, and planning for continuous technical support. They also need to allocate resources fairly across the school to prevent the creation of a “digital divide”. A good example is the deployment and operational challenges of the South African School Administration and Management System (SA-SAMS) in rural schools (Ajani & Dlomo, 2025). Some rural schools are severely affected by power outages, and the app’s use may be significantly affected. In some cases, teachers often face several challenges when trying to use ICT effectively, such as a lack of training and technical difficulties (Yin, Yin & Mohamad, 2023).

SMTs must put in place measures to support schools and teachers facing technological challenges. This support can be at the school or district level. SMTS must provide ongoing professional development and resources to ensure that teachers have the necessary skills and tools to integrate ICT into their instruction effectively. Additionally, SMTs should establish a system for regular communication and feedback to address issues or concerns that may arise during classroom ICT implementation. By creating a collaborative environment where teachers can share best practices and troubleshoot together, SMTs can foster a culture of continuous improvement and innovation. This will ultimately lead to the successful integration of technology in the classroom and enhance learner learning outcomes.

SMTs also ensure that teachers are professionally developed and supported to build new skills and to remain relevant to the digital world.

2.3.1.3 Professional development and support

SMTs have a duty to provide ICT training courses for teachers at the school, and an effective ICT leader in the school makes a difference in the successful integration of ICT in the classroom to help them integrate technology into the classroom (Mirzajani

et al., 2016). By ensuring that teachers are equipped with the necessary skills and knowledge to use technology effectively in their teaching practices, SMTs can empower teachers to enhance learners' learning experiences. SMTs should also participate in ICT professional development to stay informed and to lead their schools (Uğur & Koç, 2019). An ICT leader who can inspire and support teachers in implementing innovative technology strategies can help foster a culture of digital fluency within the school community.

The effectiveness of ICT in educational environments relies fundamentally on the skills of its users. Therefore, SMTs must seek out professional development information and share it with teachers (Mwihaki, Kagema & Wambugu, 2019) to support the implementation of ICT for teaching and learning. Teacher training needs to acknowledge that CK is constantly changing, as information on the internet evolves, and that teachers need to adapt their pedagogical instruction (Spiteri & Chang Rundgren, 2020). As a result, SMTs have a duty to ensure that SMTs, teachers, and all staff members receive adequate professional development support to enable them to implement ICT in their schools. This can be achieved by developing an awareness of their unique school context to effectively help build their teaching staff's capacities for ICT integration (Mwawasi, 2014).

A thorough understanding of the determinants influencing both the effectiveness and cost-effectiveness of ICT use in training is indispensable for formulating impactful and sustainable educational technology strategies (Upadhayaya, 2023). Effective SMTs recognise that ICT integration depends on their staff's capabilities. Therefore, identifying teachers' training needs and offering ongoing professional development that emphasises not only technical skills but also pedagogical approaches and content integration (TPACK). SMTs should build a supportive culture, fostering a school environment where teachers feel safe experimenting with new technologies and can share best practices with colleagues. In addition, SMTs should create a system that enables more tech-savvy teachers to mentor their colleagues, fostering a collaborative and supportive learning environment.

To mitigate the challenges of ICT implementation in schools, Ajani and Govender (2023) suggested regular capacity building for teachers through ICT training, along

with the provision of ICT gadgets and resources. This view was also supported by Ogenyi, Eze and Ugwu (2023), who emphasised the need for a holistic approach to ICT integration, addressing teacher training, curriculum development, and organisational support to realise the full potential of ICT in education, especially at the primary school level.

Researchers agree that providing ICT training or workshops to teachers is an effective way to introduce ICT into teaching and learning (Li, Yamaguchi, Sukhbaatar & Takada, 2019; Schildkamp, Wopereis, Kat-De Jong, Peet & Hoetjes, 2020). Teachers are the drivers of the curriculum. Moreover, other researchers emphasised the significance of comprehensive ICT training for pre-service teachers to effectively use ICT in their classrooms, enhancing their knowledge and skills in content delivery and teaching methods (Ajani, 2020; Niemczyk, de Beer & Steyn, 2021; de Beer, 2023). This training is essential for preparing future teachers to adapt to the rapidly evolving technological landscape and meet the needs of 21st-century learners. Additionally, it can help bridge the digital divide and ensure equitable access to quality education for all learners.

In general, both SMTs and teachers must work together to create an institutional system and culture in the instructional reform supported by ICT (Sun & Gao, 2019). This collaboration can lead to a more seamless integration of ICT in the classroom, ultimately benefiting both teachers and learners. By fostering a supportive environment for innovation and professional development, schools can ensure that ICT is effectively leveraged to improve teaching practices and student learning outcomes.

Ajani and Govender (2023) validated the importance of ICT-based professional development for SMTs and teachers, focusing on integrating it into teaching and learning and on developing a positive attitude towards its practical use aligned with subject learning objectives. In doing so, the SMT trainers need to introduce them to the components of the TPACK framework, which discuss CK and pedagogy knowledge (Chigona & Chigona, 2013). The SMTs, on the other hand, should be familiar with RST and the SETI framework, which prescribe steps for integrating ICT in schools. The steps include how infrastructure can be used effectively and the role of the school vision for all relevant agents.

Consequently, SMTs bear the critical responsibility of instituting robust, high-quality teacher training and continuous professional development initiatives. Such training should transcend mere technical instruction, explicitly focusing on the pedagogical integration of technology to enhance teaching methodologies and ultimately improve learner learning outcomes. Likewise, SMTs must ensure the establishment of comprehensive support systems, such as dedicated ICT coordinators or technicians. These personnel are vital for providing timely troubleshooting assistance and fostering teacher confidence in the seamless integration of technology into daily classroom practices.

Still, the literature shows that teachers lacked sufficient ICT training to use technology confidently and effectively, and limited access and inadequate technical support further hindered their ability to integrate ICT into teaching (Mirzajani *et al*., 2016). As a result, many teachers struggled to incorporate technology into their lesson plans and to deliver engaging, interactive lessons to learners. This ultimately impacted the overall quality of education provided in the classroom. In addition, both SMTs and teachers must shift from passive recipients to active explorers of how to use ICT to improve pedagogical practices and optimise teaching and learning (Sun & Gao, 2019). Therefore, without the shift and proper training and support, teachers may feel overwhelmed and hesitant to embrace new technology in their teaching practices. This can lead to missed opportunities for learners to develop essential digital literacy skills and engage with educational content in innovative ways.

SMTs are also required to have leadership skills for ICT integration into teaching and learning. The following section reviewed the literature on leadership competencies for ICT integration into teaching and learning.

2.3.2 Leadership competencies for ICT integration into teaching and learning

SMTs require a range of competences to successfully integrate ICT into pedagogy, learning, and administrative functions. Nguyen, White, Hall, Bell and Ballentine (2019) argue that educational credentials and work experience are not enough to become an effective leader. As a result, SMTs are expected to possess qualities that include not only technical skills but also strategic leadership and management capabilities, as well as digital literacy.

2.3.2.1 Digital literacy

SMTs must achieve a level of digital literacy necessary and essential for societal participation, prompting schools and teachers to adapt to the challenges posed by digital technology in education delivery (LORDS, 2015; Mbalo, Jiyane, Neil & Evans, 2024). This is essential for preparing teachers and learners for success in the modern world. The South African government acknowledges the importance of digital literacies for teachers and learners, emphasising the need for digital competencies to prepare learners for the information age workforce (Department of Education Government Gazette, 2004; Chisango & Marongwe, 2021). As a response, the government has implemented various initiatives and programs to improve digital literacy in schools across the country (Padayachee, 2017). These efforts are crucial in ensuring that SMTs, teachers and learners are equipped with the necessary skills to thrive in a technology-driven world.

Fundamental skills, such as using word processors, presentation software, spreadsheets, and navigating online platforms, are the baseline for all other competencies. Chen (2015) insists that the use of ICT is a crucial skill for both teachers and learners, as it facilitates teaching and learning. Although a significant majority of SMTs have the necessary knowledge and skills to use technology, many are not adept at employing it effectively. In particular, the majority of older teachers show a lack of competence in using and integrating technology into the classroom (Öznacar & Dericioglu, 2017). This lack of competence can hinder learners' learning and engagement. It is therefore essential to note that a lack of digital literacy among teachers can lead to differences in accessibility and knowledge among learners (Duma, Mlambo, Mbambo-Mkwanazi & Morgan, 2021). This can ultimately widen the achievement gap and limit learners' opportunities. Therefore, it is crucial for teachers to continuously improve their digital literacy skills to effectively support all learners on their learning journey. By addressing this issue, teachers can create a more inclusive and equitable learning environment for all learners.

Digital literacy is a fundamental skill necessary for supporting various subjects and most jobs, and it should be taught as a core subject alongside numeracy and literacy, integrated throughout the curriculum. (LORDS, 2015). SMTs and teachers need

substantial support for ICT integration. Another crucial area of focus for SMTs is pedagogical competence. Pedagogical competence involves understanding how to teach and effectively engage learners in the learning process. It includes skills such as lesson planning, classroom management, and assessing learners' progress to ensure successful learning outcomes.

2.3.2.2 Pedagogical competence

Pedagogical competence is the ability to select and use appropriate ICT tools for different learning objectives and learner needs (Mirzajani *et al*., 2016). This includes designing and implementing ICT-rich lesson plans and adapting instruction to meet the needs of diverse learners. SMTs and teachers must be familiar with TPACK (Koehler & Mishra, 2009; Gyaase *et al*., 2019). This framework helps teachers integrate technology effectively into their teaching practices by understanding how technology, pedagogy, and CK intersect (Mishra & Koehler, 2006; Crompton, Burke, Nickel & Chigona, 2024). It provides a structured approach to designing and implementing technology-enhanced learning experiences aligned with educational goals and objectives (Crompton, Chigona & Burke, 2023).

The TPACK framework emphasises that teachers must understand the interplay among technology, pedagogy, and content to effectively integrate ICT into education, resulting in a knowledge form that transcends these individual areas (Koehler & Mishra, 2009; Koehler *et al*., 2014). Understanding the TPACK framework among SMTs and teachers outlines the essential knowledge required for effective technology integration, as it highlights the interplay among teachers' understanding of content, pedagogy, and technology in fostering effective teaching (Koehler *et al*., 2014).

School leaders must ensure that technology is not a mere add-on but is deeply embedded in the curriculum. The SETI model guides leaders to support pedagogical change that leverages technology to transform teaching and learning, fostering higher-order thinking and improved learner outcomes (Crompton et al., 2024). It is therefore essential for SMTs to be knowledgeable about TPACK, digital citizenship, and safety.

2.3.2.3 Digital citizenship and safety

The practice of digital citizenship among principals prioritises the safe, legal and ethical use of ICT in all activities, especially in the use of resources in cyberspace (Uğur & Koç, 2019). The SMTs should filter unwanted websites, but to truly protect learners from negative online experiences, teachers must provide guidance. Engaging and organising community talks can help clarify the school's ICT policies, enabling everyone to use technology with greater confidence (Spiteri & Chang Rundgren, 2020). SMTs should have knowledge and skills to teach learners about the responsible, ethical, and safe use of technology. This includes topics like online privacy, cyberbullying, and evaluating the credibility of online sources.

SMTs should focus on fostering a digital-age learning environment and digital citizenship frameworks to enhance teachers' integration of technology in schools (Raman & Thannimalai, 2019). Concurrently, principals should emphasise the safe, legal, and ethical use of ICT in all activities, particularly in cyberspace (Uğur & Koç, 2019). This view emphasises the importance of equipping learners with the skills to navigate the digital world responsibly. It further suggests that promoting digital responsibility in schools better prepares learners for success in a technology-driven society. Digital citizenship includes policies, procedures, legislation, professional development, and personal beliefs about technology. It also involves the responsible use of technology and ethical decision-making among teachers and learners. This is crucial because it also addresses issues of misuse of technology and the Internet.

2.3.2.4 Strategic leadership and vision

SMTs have a significant influence on ICT use in schools, with effective school administration being shaped by their vision and understanding of ICT integration within the curriculum (Sun & Gao, 2019). Strategic leaders improve existing educational systems by positively influencing the integration of ICT in schools (Schmitz et al., 2023). In general terms, management refers to getting things done through people (Shaikh, Bisschoff & Botha, 2018). Hence, SMTs must have a clear vision for how ICT can transform schools, more so teaching and learning pedagogies. Furthermore, SMTs should encourage and motivate teachers to adopt new technologies and innovative teaching methods.

SMTs also require a clear vision and must take the necessary steps to realise it, which includes setting priorities, making compromises, and making choices (Millar, Hind & Magala, 2012). Also, a compelling vision, formulated and promoted among an organisation's members, provides a clear strategy that guides daily work (Chhotray, Sivertsson & Tell, 2018). Moreover, effective teaching practices are heavily influenced by a committed group of employees who support the organisation's vision (Chhotray *et al*., 2018). As a result, SMTs should ensure that teachers are familiar with the school vision, particularly in relation to integrating ICT in classrooms. Where they shift from traditional models to learner-centred learning environments, becoming decentralised facilitators in collaborative activities, rather than taking an authoritative role (Sun & Gao, 2019). This often means acting as a mentor and providing a supportive environment, formulating and implementing a school-wide ICT policy that covers everything from acceptable use and internet safety to infrastructure maintenance and software licensing.

Vision is considered the starting point for any transformation process toward sustainability (Kantabutra, 2020). With this idea in mind, SMTs must create a competitive and realistic vision for an organisation that engages all stakeholders, supported by strategic plans. Moreover, Haque, Titi Amayah and Liu (2016) believe that SMTs should be trained to develop a vision that contributes to the organisation's growth, and that the vision must be communicated to teachers through multiple channels to convince them to support it. In this context, communication during vision formation is central to vision assimilation and the creation of the shared vision owned by organisation members (Kantabutra, 2020). Hence, the school vision should reflect a culture that supports teachers' daily activities and decisions (Chhotray *et al*., 2018). This approach significantly enhances the effective adoption of ICT in schools by establishing a clear vision and a comprehensive implementation strategy (Safrida, Tannady, Solissa, Sapulete & Haddar, 2023). This includes developing a shared vision and a strategic plan that aligns ICT integration with the school's overall educational goals.

Consequently, strategic leaders should be able to motivate teachers to integrate technology into the teaching and learning process (Yeo & Alias, 2021). This can be achieved by providing ongoing support and professional development opportunities to

ensure that teachers feel confident and competent in using technology effectively in their classrooms. A vision should be clearly articulated to consistently connect the current and future needs and values of organisational members with a unified vision (Kantabutra, 2020). As a result, it will help to create a culture of innovation and continuous improvement within the school community. Therefore, effective ICT learning leaders show the ability to create a shared vision, stay pedagogically focused, and seek as well as contribute to ongoing professional development (Christensen *et al.*, 2018). SMTs are also supposed to take the lead in administrative and managerial competencies.

2.3.2.5 Administrative and managerial competence

Besides teaching duties, SMTs also perform administrative duties, including communicating with teachers, planning, and supporting teachers with curriculum coverage, which enables them to manage schools effectively. Among the duties performed by SMTs, they implement the policy and legislation according to SASA, section 16A(2)(a)(i)-(vi) (Department of Basic Education, 2016). SMTs have a significant influence on ICT use in schools, with effective school administration being shaped by their vision and understanding of ICT integration within the curriculum (Sun & Gao, 2019).

In South Africa, schools use the SA-SAMS to improve administrative efficiency (Ajani & Dlomo, 2025). Research conducted by Botha and Van der Westhuizen (2021) shows that SA-SAMS offers an efficient approach to school administration, providing real-time data access, effective record-keeping, and prompt reporting. Moreover, the use of SA-SAMS reduces the administrative burden on SMTs, teachers and staff, allowing them to dedicate more time to teaching duties and focus on direct learner engagement (Ajani & Dlomo, 2025). However, Öznacar and Dericioglu (2017) are of the view that school administrators are not anxious about the use of technology at a school level. They believe that administrators may not fully understand the benefits of technology integration in education or may be hesitant to invest in new tools and resources.

The following section reviewed the literature on the benefits and challenges of integrating ICT into education.

2.3.3 Benefits and challenges of integrating ICT in schools

The study aimed to explore and describe the experiences and challenges faced by SMTs (principals, DPs, and DHs) in integrating and implementing ICT into teaching and learning in South African primary schools. In every educational setting, SMTs and teachers would take advantage of any resources and tools that can promote teaching and learning. The integration of ICT into education is one such example. However, its implementation comes with benefits and challenges. This section drew on previous research to review the benefits and challenges of ICT in education.

2.3.4 Benefits of integrating ICT into education

The use of ICT in education offers many benefits. Key benefits include accommodating diverse learners, ensuring equal opportunities, promoting engagement and motivation, updating teachers' skills, guiding learners, encouraging independence, facilitating assessment, enhancing communication among stakeholders, diversifying teaching methods, and allowing flexibility in learning and teaching (Kumi-Yeboah, Kim, Sallar, & Kiramba, 2020; Hughes *et al*., 2022; Bhat, 2023; Chima *et al*., 2024).

The study reviewed improved access to educational information, enhanced interaction during lessons, increased collaboration and communication, and a richer individual learning experience.

2.3.4.1 ICT improves access to educational information.

Integrating ICT into education enhances learners' language acquisition, substantially motivates them to continue their learning, and stimulates their creativity and passion (Azmi, 2017). ICT is a global network that facilitates the exchange of ideas and the sharing of information and knowledge among individuals through devices such as cell phones and computers (Mdlongwa, 2012). Furthermore, ICT provides teachers and learners with access to a wealth of information and resources on a wide range of subjects worldwide, enabling them to learn beyond traditional textbooks.

Through the use of ICT, learners can not only access vast amounts of information but also participate in collaborative projects and activities with learners from different cultures and backgrounds (Al-Ansi, Garad & Al-Ansi, 2021). Moreover, online projects

and activities provide learners with valuable insights and experiences, broadening their perspectives and enhancing global awareness through accessible educational resources, thereby reducing the need for printed materials in libraries (Al-Ansi *et al*., 2021). Also, ICT enables teachers and learners to access many books and articles covering a wide range of subjects online with just a single click.

Although this is a huge success in most developed countries, schools in South Africa, particularly those disadvantaged in terms of infrastructure, face numerous constraints, ranging from parents' inability to pay learners' school fees to the government's neglect of schools (Ojo & Adu, 2018). As a result, most schools in South Africa face the challenge of connecting learners so they can enjoy the benefits of ICT. However, this does not rule out the possibility that ICT empowers teachers to adapt their instructional materials and resources to learners' unique requirements and preferred learning methods, leading to enhanced comprehension and improved knowledge retention. The literature revealed that digital technology, multimedia presentations, and social network tools enhance teachers' and learners' educational experiences and accomplishments in asynchronous online learning environments (Kumi-Yeboah *et al*., 2020). Through online learning, virtual environments, exercises, and self-assessment tools, learners identify their own learning process and develop critical thinking for self-assessment.

According to Kumi-Yeboah *et al*. (2020), online education relies on ICT to enable individuals to engage without being limited by time or space. Their study further reported that the majority of learners indicated that using ICT enhanced their knowledge acquisition in the online learning setting (Kumi-Yeboah *et al*., 2020). Additionally, the flexibility of online education allows learners to balance their lessons with other commitments. As a result, this convenience can contribute to the growing popularity of online learning programmes worldwide.

Their view was similar to Chima *et al*. (2024), who mentioned that ICT integration has become crucial in structuring learning experiences and promoting equal access to education in modern educational environments. Consequently, teachers use ICT in education to optimise learning results and promote equality by merging various tools and platforms to create personalised learning experiences (Chima *et al*., 2024;

Gimenez & Vargas-Montoya, 2021). Furthermore, successful ICT integration involves not just incorporating devices and applications but also aligning ICT resources with educational goals, fostering digital literacy in learners, and promoting critical thinking and creativity through ICT-enabled activities (Chima *et al*., 2024).

It is therefore fundamental to note that integrating ICT in remote rural areas also yields substantial and beneficial educational benefits for all learners. By granting learners in remote rural regions access to digital resources and computer laboratories, their geographical location will no longer be a limitation (Gimenez & Vargas-Montoya, 2021). Through bridging the digital divide, learners from remote rural areas are guaranteed equitable educational possibilities for every learner, irrespective of their background or geographical location, so they can gain access to instructional resources and use online platforms that were inaccessible to them (Gimenez & Vargas-Montoya, 2021).

Besides, integrating ICT further empowers teachers in rural communities to enhance their teaching techniques and stay updated with the newest educational advancements (Gimenez & Vargas-Montoya, 2021). In the United Kingdom (UK), for instance, ICT integration into education has a positive influence that goes beyond improving classroom management efficiency and academic performance but has fundamentally transformed the process of teaching and learning (Cho *et al*., 2020; Galindo-Dominguez, 2021; Shen *et al*., 2020; Özdemir *et al*., 2020; Iglesias-Pradas, Hernandez-García, Chaparro-Pelaez & Prieto, 2020; Lee & Gauge, 2020).

Learners nowadays have the opportunity to engage in virtual field trips, where they can explore three-dimensional simulations and participate in gamified learning experiences (Galindo-Dominguez, 2021; Cho *et al*., 2020). Moreover, the innovative approaches enhance the learning experience by making it more engaging and stimulating, effectively captivating learners' focus and promoting curiosity and the development of critical thinking abilities (Cho *et al*., 2020). Besides, ICT empowers teachers to precisely track learners' advancement and offer prompt feedback, facilitating prompt intervention and personalised assistance (Galindo-Dominguez, 2021; Cho *et al*., 2020).

Overall, integrating ICT into education offers limitless opportunities for learners worldwide. It enables individuals to become proactive learners with the aptitude and expertise required to thrive in the digital age. ICT facilitates connections between regional and rural schools and enhances classroom management, thereby promoting a more inclusive and fair education system.

It creates a future in which every learner, regardless of their circumstances, can access high-quality education and reach their maximum potential (Hu *et al.*, 2021). Due to advances in technology and ongoing initiatives to enhance information accessibility, the educational sector is currently experiencing a significant transformation that adds value to academic standards (Hu *et al.*, 2021; Ali *et al.*, 2024). This transition is necessary to ensure that the education offered meets current demands, enhances digital literacy, cultivates technological proficiency, and establishes a flexible and innovative learning environment, creating new opportunities and possibilities for learners worldwide (Ali *et al.*, 2024).

ICT in education further enhances interaction and engagement during lessons.

2.3.4.2 ICT enhances interaction, engagement and motivation in education

Research shows that using ICT in the classroom was enjoyable, increased motivation, activity, and enthusiasm, and improved critical thinking skills, thereby enhancing learners' learning quality (Ibanez, Portillo, Cabada & Barron, 2019; Jannah, Prasojo & Jerusalem, 2020). Literature further states that digital technologies provide interactive and compelling information that grabs learners' attention and encourages active engagement (Yin, Yin & Mohamad, 2023). Furthermore, empirical literature showed that ICT integration provides interactive and engaging lessons by establishing a more captivating and efficient learning atmosphere for learners (Gimenez & Vargas-Montoya, 2021). An interactive and engaging lesson needs proper planning from teachers. Teachers should include lessons that stimulate learners' interest and build a culture of engaging in group activities.

The integration of mobile technology devices, such as tablets, in educational settings has been shown to promote learner motivation, sustain conversations, and support seamless learning experiences (Chen, 2015). Furthermore, teachers can enhance

their effectiveness by using ICT to access a variety of educational resources such as lesson plans, software, and journals, which helps them to organise lessons and meet diverse learner needs efficiently (Kilag *et al.*, 2022).

ICT heightened learner engagement (Laronde *et al.*, 2017). In 2015, Rabah's qualitative research indicated that integrating ICT in selected schools enhanced learner engagement, contributed to the globalisation of 21st-century education, and improved the learning process (Rabah, 2015). The use of ICT has the potential to facilitate educational reform by empowering learners and teachers to depart from conventional teaching and learning methods and enter modernised education systems that transform educational settings. ICT tools such as educational software, interactive whiteboards, and online resources can help make learning more engaging and effective for learners. It also improves access to academic information.

However, without sufficient access to ICT, teachers may be compelled to rely on traditional teaching methodologies, potentially limiting the benefits of technology-enhanced learning (Chisango & Marongwe, 2021). Besides, teachers cannot retrieve educational data from learners via Canvas to analyse classroom performance and plan personalised, engaging lessons for each learner (Kilag *et al.*, 2022). This has a ripple effect because learners cannot receive adequate feedback from teachers. This lack of feedback can hinder learners' understanding of the material and ultimately impact their academic performance. As a result, teachers should find alternative ways to provide feedback and support to ensure learner success.

Another way to engage learners is through games during lessons. Gamification, for instance, transforms learning into a game with rewards and challenges, motivating learners to participate in their own learning journey actively.

The integration of ICT promotes collaboration and communication in education.

2.3.4.3 ICT promotes richer individual learning experiences

The integration of ICT in teaching and learning classrooms enhances self-directed learning, optimises the achievement of specific objectives, stimulates learners, and improves their progress in the school (Azmi, 2017). This helps capture and maintain learners' attention, leading to deeper understanding and better retention of

information. ICT enables a personalised learning experience by adapting to individual learner needs and learning styles through online assessments, adaptive learning platforms, and educational apps.

ICT prepares learners for a technology-driven digital age, reduces teacher workload, and accelerates processes. Additionally, the case study found that ICT integration improves access to resources, enabling learners to find extensive educational materials online. Still, research shows that ICT integration empowers teachers to precisely track learners' progress and provide prompt feedback, facilitating prompt intervention and personalised support (Galindo-Dominguez, 2021; Cho *et al*., 2020). Besides, the potential benefits of using digital tools include the ability to deliver dynamic, engaging content, personalised learning experiences, collaboration opportunities, and access to a wide range of resources (Yin, Yin & Mohamad, 2023).

ICT provides benefits such as encouraging creativity, enhancing academic results, boosting motivation and responsibility, and supporting teamwork (Ogenyi *et al*., 2023). Furthermore, empirical evidence shows that the integration of ICT in teaching and learning classrooms enhances self-directed learning, optimises specific objectives, stimulates learners, and improves their progress (Azmi, 2017). This is also evident in the study by Mwendwa (2017) in Kenya, which found that ICT is seen as a crucial tool for improving performance, collaboration, and learning outcomes in primary schools.

As a result, emerging technologies have the potential to foster active learning, enabling learners to assume a more active and autonomous role. This allows them to engage with initiatives that go beyond conventional approaches and promote personalised learning experiences. Furthermore, a greater emphasis on learner-centred approaches, with the teacher assuming a facilitative role within the classroom (Laronde *et al.*, 2017; Kolobe & Mihai, 2021) rather than a lecturer.

Implementing ICT is vital for enhancing communication and collaboration in a global knowledge society, and its practical application is key to supporting teachers' methodologies (Razak *et al*., 2019). No doubt, using ICT in schools offers various advantages that enhance teaching and learning processes by improving learning experiences and access to vast information, promoting collaboration and communication, developing digital skills, increasing efficiency, and encouraging

creativity and innovation in schools. Overall, integrating ICT in schools helps create a more dynamic, engaging, and effective learning environment that prepares learners and teachers for success in the digital age.

ICT further enhances teaching and learning strategies.

2.3.4.4 Enhanced teaching and learning strategies

ICT enables teachers to go beyond traditional lecture-style teaching by incorporating a range of engaging digital tools. Teachers can use interactive whiteboards, multimedia presentations, and educational apps to explain complex concepts, making lessons more lively and engaging for learners. Chima *et al*. (2024) mentioned that successful ICT integration involves more than just using devices and applications in classrooms. It requires aligning ICT resources with lesson objectives, promoting learners' digital literacy, and promoting critical thinking and creativity through ICT-facilitated activities (Chima *et al*., 2024).

This highlights the multifaceted nature of successful ICT integration in educational settings. The authors emphasise the need to integrate ICT resources with lesson objectives to enhance digital literacy while promoting critical thinking and creativity, underlining the importance of a pedagogically sound approach to ICT integration. This view is reinforced by research indicating that successful ICT integration necessitates a comprehensive understanding of how technology can enhance educational goals and promote learner-centred approaches. (Kozma, 2013). Teachers can improve digital literacy, critical thinking, and creativity in learners, equipping them for success in a digital age.

While the study by Chima *et al*. (2024) offers a comprehensive view of successful ICT integration, it can be argued that the authors overlooked the importance of contextual factors that influence effective ICT integration. For example, the availability of ICT infrastructure, technical support, and teacher training can significantly affect the success of ICT initiatives (Law, Pelgrum & Plomp, 2018). Furthermore, the authors' focus on aligning ICT resources with lesson objectives may not always be practical in environments where curriculum requirements and assessment structures are rigid and inflexible (Law et al., 2018). Therefore, a more nuanced understanding of the complex

interaction between pedagogical, technical, and contextual factors is essential to achieving successful ICT integration. This can be achieved by also empowering teachers in rural communities to enhance their teaching techniques and stay updated with the newest educational advancements (Gimenez & Vargas-Montoya, 2021).

Despite the significant benefits of ICT integration in education, ICT has its own challenges, which are discussed in the following paragraphs.

2.3.5 Challenges of integrating ICT into education

Despite the numerous benefits of integrating ICT for teaching and learning discussed in the previous paragraphs, it is also essential to acknowledge that its many disadvantages can undermine these benefits in the teaching and learning spaces (Talebian *et al*., 2014). Some disadvantages include the high cost of integrating ICT into education systems, ICT infrastructure in schools, inequality in ICT access, and the potential for distractions in the classroom when learners have access to technology (Rahiem, 2020). Additionally, there may be challenges in providing adequate training and support for teachers to use ICT tools effectively in their teaching practices.

Furthermore, cybersecurity threats and privacy concerns arising from the use of ICT in education must be addressed to ensure a safe and secure learning environment for learners. While ICT offers numerous benefits, addressing these challenges effectively to maximise its potential in enhancing teaching and learning experiences is crucial. Teachers need to establish clear guidelines and boundaries for technology use in the classroom to minimise distractions and promote focused learning (Aluko, 2017). Additionally, ongoing professional development opportunities should be provided to help teachers stay current with the latest ICT tools and best practices (Ojo & Adu, 2018). Also, according to their study in 2018, the government should take an active role in promoting the successful use of ICTs in schools (Ojo & Adu, 2018). This may be achieved by providing funds for ICTs, educating and retraining teachers, and raising awareness among stakeholders about the importance of using ICTs for teaching and learning (Ojo & Adu, 2018).

One way to mitigate distractions in the classroom is to establish clear guidelines and expectations for technology use. Ongoing professional development opportunities can

also help teachers feel more confident in integrating ICT tools into their lessons. Addressing these challenges will ultimately lead to a more productive and engaging learning environment for learners. Implementing strategies such as setting specific time limits for technology use and providing alternative activities can also help minimise distractions in the classroom. Furthermore, fostering a culture of collaboration among teachers to share successful ICT integration strategies can enhance overall effectiveness in using technology for learning purposes. The following paragraphs discuss some of the disadvantages of ICT in schools.

2.3.5.1 Absence of teacher in the classroom

In e-learning, face-to-face and energetic communication, which are present in traditional approaches, are absent (Talebian *et al*., 2014). This can have detrimental effects on learners' academic progress and personal growth. Nevertheless, this issue is becoming increasingly rare due to ongoing, rapid technical progress. In the present era, learners can effectively engage and collaborate with one another by using information and communication technologies.

2.3.5.2 Cost of integrating ICT in education

One prominent disadvantage of ICT integration is the high initial cost of implementing ICT in school settings. Rahiem (2020) revealed that the technology barriers and challenges in using ICT included technology costs, device issues, internet connectivity, and a lack of technology skills. Typically, this involves the cost of procuring computers, projectors, hardware, software, and other crucial technological tools needed to support teaching and learning (Talebian *et al*., 2014; Al-Ansi *et al*., 2021; Sarosa, 2021). Under certain circumstances, schools, parents, and learners may lack the financial means to purchase laptops or cell phones for school use. Even schools lack the resources to me*et al*l learners' needs adequately. Furthermore, not only is technological equipment expensive, but the cost of Wi-Fi and internet bundles is also prohibitively high (Al-Ansi *et al*., 2021). Despite schools' provision of ICT learning infrastructure, there are still issues with Wi-Fi connectivity. Additionally, the restricted coverage in rural areas is a challenge.

The rigidity of funding for ICT integration in schools hinders schools' ability to buy the resources needed for integration (Rabah, 2015). This lack of flexibility in funding can result in schools being unable to keep up with rapidly evolving technology, ultimately hindering learners' access to modern educational tools. It may also limit teachers' ability to effectively incorporate ICT into their teaching methods, impacting learners' overall learning experience. To address this issue, policymakers and education stakeholders should consider implementing more flexible funding models that enable schools to adapt to evolving technology needs.

2.3.5.3 Lack of ICT infrastructure and resources in schools

ICT infrastructure and resources are fundamental to integrating ICT into schools. The key aspects of the infrastructure that need to be considered are the arrangement of classroom space, the availability and distribution of resources, and the support and upkeep of integrating ICT in schools (Rabah, 2015). The study by Rabah (2015) in a Québec English school identified that inadequate backing from school leadership, irregular allocation of resources towards ICT equipment, infrastructure, and resources, rigidity in funding, the requirement for additional professional development and support, and integration of ICT in assessments and educational plans are considerable obstacles in integrating ICT in schools (Rabah, 2015).

Empirical evidence reveals that ICT integration in schools is impeded by a lack of internet connectivity, theft of devices and access to non-academic materials by learners (Ghavifekr *et al*., 2016; Msiza *et al*., 2020). The challenge was also highlighted in the study by Rahiem (2020), who revealed that the technology barriers and challenges in using ICT included device issues, internet connectivity, technology costs, and a lack of technology skills. These barriers can hinder SMTs, teachers and learners from fully using the benefits of ICT, such as increased efficiency, productivity and access to information. Overcoming these challenges often requires investment in training programmes, infrastructure improvements, and ongoing user support.

Msiza *et al*. (2020) attributed the challenges to inadequate planning by the DBE, which led to various difficulties that have impeded the successful execution of e-learning initiatives. Their findings reveal that inadequate infrastructure and insufficient policies

implemented by some governments worsen the problem, making it even more difficult to use ICT in educational settings.

Another challenge in the classroom pertains to learners engaging in off-task behaviour using their cell phones during instructional time (Laronde *et al.*, 2017; Msiza *et al*., 2020). The study by Msiza *et al*. (2020) acknowledged that school leaders tried to address the challenges by implementing a policy prohibiting the use of cell phones to stop learners from misusing the Internet. However, the study found that the school leaders' efforts were ineffective because learners could still find ways of accessing the school's Wi-Fi network to use their devices for recreational purposes, such as playing games and using Snapchat (Msiza *et al*., 2020).

To mitigate learners' unlawful and illegal Wi-Fi network connectivity, the school leaders introduced password security measures, prohibiting them from using their mobile devices on the school's wireless infrastructure (Laronde *et al.*, 2017; Msiza *et al*., 2020). This decision was made to ensure that learners remain focused on their studies and are not distracted by non-educational activities during school hours. Implementing these measures, the school aimed to create a more conducive learning environment for all learners.

Some challenges or disadvantages of using ICT in educational settings include inequality in ICT access, ICT dependency, the digital divide, and privacy and security concerns.

2.3.5.4 Digital divide and inequality in ICT access in education

The integration of ICT into education is a powerful tool for teaching and learning, as noted by Tauson and Stannard (2018). However, this potential is not universally realised in South Africa due to significant socio-economic disparities and the digital divide. According to Omojola (2009), the digital divide is more than just accessibility; it represents a social division between those highly engaged with technology and those who are not. As a result, many educational institutions, particularly in poor nations, lack the essential hardware, software, and internet access required to effectively use ICT in the classroom (Shi, 2016; Campado, Toquero & Ulanday, 2023).

Inequality in access to ICT for education is a significant concern, especially for learners in disadvantaged communities and rural areas.

Individuals with reliable internet and quality technology thrive in learning, whereas those lacking these resources encounter challenges (Rahiem, 2020). The literature shows that the digital divide was associated with schools with lower family incomes, smaller sizes, and greater geographical remoteness (Chen, 2015). With the rise of the internet, education has expanded beyond traditional classrooms, yet the digital divide became more pronounced during school closures due to COVID-19 (Chisango & Marongwe, 2021). Most of the digital divide in the education sector worldwide was exposed during the COVID-19 pandemic. Whereas in South Africa, the digital divide exists between schools in affluent suburbs and those in poor areas (Department of Education, 2004). On the other hand, geographic factors and differences in motivation for ICT usage and technology adoption contribute to the worsening of the digital divide across nations and cultures (Qadikolaei, Zali & Soltani, 2024).

Additionally, challenges include inadequate network infrastructure and unstable wireless access. The digital divide captures the existing or potential gap between groups with appropriate access to digital technologies and those with insufficient or no access (Rughinis & Hosszu, 2020). The focus should be on addressing the digital divide. There is a need to focus on the provision of ICT resources to all schools, irrespective of quintile level, and to provide teachers with proper training (Filita & Jita, 2022). If the Department of Education does not adequately address these challenges, it may hinder learners' ability to succeed in an online learning environment. Access to technology and internet connectivity are crucial factors that can significantly impact a learner's performance in online learning. Without these resources, individuals may struggle to keep up with coursework, participate in virtual classes, and access necessary educational materials.

South Africa faces significant challenges due to the digital divide, which affects many people's access to ICT tools essential for improving performance (Durodolu & Mojapelo, 2020). To address the digital divide, Chen (2015) suggested that resources should be directed to schools without adequate infrastructure and a continual need for high-quality professional development to help teachers integrate ICT into classroom

teaching and learning, ensuring equitable ICT access (Chen, 2015). This view was supported by Tigere and Netshitangani (2022), who suggested that in addressing the issue of the digital divide, the DBE needs to prioritise all schools, regardless of quintile level, when distributing ICT resources. This is a fundamental point since many public schools rely on government funding for their existence. Schools must invest in bridging the digital literacy gap and the digital divide that separates populations and work in favour of equal opportunities (Taam *et al*., 2024).

Unequal access to technology creates an unfair advantage for learners with resources, who can continue their learning outside school hours, while their peers are left behind. The literature shows that approximately 12% of households in South Africa have internet access, creating a digital divide that particularly affects citizens in remote rural areas, limiting their access to information (Frans & Pather, 2022). This inequality, as Kennedy and Cronjé (2024) state, can widen the gap in academic achievement and opportunities. The argument for emphasising ICT access is therefore justified. Padmanabhanunni and Pretorius (2023) reinforce this by arguing that technology-mediated instruction is only feasible in educational settings with sufficient access to ICT.

Given the persistent inequalities within South African society, focusing on equitable access to ICT is not just a technological concern but a fundamental matter of social justice and educational parity. Therefore, schools and SMTs must emphasise the significance of leveraging technology to improve learning outcomes, bridge the digital divide, and advance equity in education (Chima *et al*., 2024).

The following section focuses on challenges related to technical support and maintenance.

2.3.5.5 Technical support and maintenance issues

The integration of technology in educational settings is often hindered by technical issues that can disrupt lessons and affect the effectiveness of teaching and learning. A common frustration for SMTS is ensuring that technology functions properly once it is in place. Research has shown that a significant challenge facing schools is the lack of ICT maintenance and technical support (Adytiansyah & Wibowo, 2019). Literature

further revealed that many schools lacked dedicated ICT technical staff and technical and pedagogical support, instead outsourcing the maintenance and repair of technological tools (Öznacar & Dericioglu, 2017; Dlamini, 2022).

This often leads to delays in resolving technical issues, causing frustration among SMTs, teachers, and learners. Research shows that insufficient technical support discouraged teachers from using ICT in teaching, whereas adequate equipment and technical support in schools encouraged them in this respect (Mirzajani *et al*., 2016). Moreover, limited accessibility and network connection, limited technical support, lack of practical training, limited time and lack of teachers' competency affect ICT integration in schools (Ghavifekr *et al*., 2016). Without a dedicated and capable ICT technical support team, schools may struggle to provide prompt assistance to SMTs, teachers, and learners, potentially leading to a decrease in technology use (Ntsobi *et al*., 2025).

However, in some instances, computing hardware will be available, but there will be no appropriate educational software or technical support on the ground (Dlamini, 2022). At times, delays are caused by the proper selection of vendors to perform ICT maintenance (Adytiansyah & Wibowo, 2019). Also, ensuring that the SGB's directives on the maintenance of facilities must be in line with the provisions of the Schools Act and related policies on school facilities maintenance (Nhlapo, 2020). Therefore, the empirical evidence shows that technical issues can significantly impact the effectiveness of technology integration in educational settings.

To address this challenge, SMT must prioritise budgeting for technical support. This might involve hiring a full-time ICT technician or managing a reliable external support service. Both options have their own challenges and costs, but investing in technical support is essential for ensuring that technology functions properly and supports teaching and learning. By prioritising technical support, schools can create a more efficient and effective learning environment. Perhaps it's time for SMTs to take a proactive approach to technical support and budgeting for ICT maintenance and repair. In doing so, they can ensure that technology enhances the educational experience and supports the success of both learners and teachers.

Another challenge of ICT integration in schools relates to electricity and load shedding.

2.3.5.6 Electricity challenges/load shedding

According to Al-Ansi *et al*. (2021), power outages are a significant challenge, following internet speed and bandwidth constraints. Furthermore, challenges included a shortage of computers relative to learner enrolment, poor internet connectivity, power interruptions due to load shedding, outdated school rules, and insufficient teacher training (Tigere, 2020). While specific schools own generators, not all of them can resolve the issue, particularly schools in rural areas and some in poor communities. In most public schools, administrative staff are significantly disrupted by electricity outages, as they rely heavily on internet technology (Al-Ansi *et al*., 2021).

During prolonged power outages, individuals are compelled to abstain from using electronic apps and resort to manually preparing documents and paperwork. However, this approach is time-consuming and no longer efficient (Al-Ansi *et al*., 2021). In South Africa, power cuts or load shedding are prevalent in almost every city and township (Dlamini, 2022). This has had a significant negative impact on both the public and private sectors, with schools operating for hours without electricity. Most educational institutions that depend on electricity and the Internet can hardly function effectively during power outages.

At times, schools have no choice but to offer a preference for both traditional and ICT-based teaching due to factors such as learners not having their own ICT tools, a lack of resources such as textbooks, power cuts, and no internet access (Ersoy & Bozkurt, 2015; Filita & Jita, 2022). Without electricity or generators, schools can hardly perform duties that require electricity or Internet access. This can significantly impact administration staff and teachers who rely on technology for tasks such as grading, communication, and lesson planning. Load shedding leads to inoperable devices, poor connectivity challenges, and/or smart equipment theft (Silva, Kavai & de Villiers, 2023). Additionally, learners may struggle to access online resources and complete assignments without the necessary technology during load shedding periods.

Rural schools should also consider solar power to mitigate power cuts caused by incessant rain during the rainy season (Hlilokela & Cefas Zimuto, 2024). This would assist because, in some instances, power cuts last a long time (Ngandeu, 2020). There was a period when the whole of South Africa was experiencing power cuts due

to problems at Eskom, which was hurting schools, and the Department of Education has arguably no control or influence on the utility's operations (Tigere & Netshitangani, 2022). During that period, schools and businesses in South Africa were significantly affected, and the use of ICT in schools was a huge challenge.

2.3.5.7 Cybersecurity and cyberbullying learner safety concerns

With increased use of technology comes a greater risk of cybersecurity threats and online safety issues (LORDS, 2015; Mohd, Zulkifli, Hamzah & Tamuri, 2024). Nowadays, social media is a powerful tool for developing and enhancing educational settings; however, it is also a breeding ground for cyberbullying and cyberstalking (Al-Rahmi *et al.*, 2022). Therefore, SMTs, teachers and parents need to monitor and address these negative aspects of social media to ensure a safe online environment for learners and teenagers.

Cyberbullying refers to aggressive or harmful behaviour directed towards an individual or a group, carried out through electronic technologies (Patchin & Hinduja, 2006). Cyberbullying victimisation may lead to school dropout for learners who are being victimised (Lee, Chun, Kim & Lee, 2020). Furthermore, cyberbullying has become one of the most common threats to personal privacy, safety, identity, and well-being (Cuesta Medina, Hennig Manzuoli, Duque & Malfasi, 2020). As a result, schools fear to use ICT because of both cybersecurity and cyberbullying.

Cyberbullying is a growing problem among youth, involving harassment via electronic communication that instils significant fear in victims. Its manifestations include flaming, harassment, cyberstalking, and exclusion. The anonymity of offenders exacerbates the distress felt by victims, leading to an increase in online harassment incidents (Cantone *et al.*, 2015; Schütz, Schipper & Koglin, 2022). Cyberbullying can have serious consequences on the mental health and well-being of those targeted, often resulting in anxiety, depression, and even suicidal thoughts. Therefore, SMTs, teachers, parents and authorities need to take proactive measures to address and prevent cyberbullying to create a safer online environment for all individuals.

Abidin, Mathrani, Hunter and Parsons (2017) revealed that the risks of cyberbullying, sexting, and fraud present significant challenges for teachers in schools to use ICT in

schools. As a result, some schools opted to ban learners from using mobile devices for classroom learning due to cyber threats, which indirectly restricts teachers' ability to diversify their teaching strategies (Mohd, Zulkifli, Hamzah & Tamuri, 2024). Still, literature revealed the challenges of ICT integration, including distractions, excessive usage, exposure to false information, data theft, reduced human interaction, and cyberbullying (Ogenyi *et al*., 2023). The challenges of cyberbullying and data theft pressure SMTs to be responsible for protecting sensitive learner and staff data from breaches and ensuring learners are safe from cyberbullying, inappropriate content, and online predators. This involves implementing and maintaining robust security measures, such as firewalls, content filters, and data protection policies.

However, SMTs, teachers and parents are fighting a losing battle against cyberbullying. Sometimes, persecution also occurs on the way to and from school, because cyberbullying, by definition, can happen anywhere (Cantone *et al.*, 2015). Again, bullying in schools and cyberbullying are highly relevant and prevalent in schools (Schütz *et al*., 2022). Cyberbullying is also prevalent among undergraduate students at times due to social pressure and presence, which makes one vulnerable to cyberbullying (Mooketsi, 2018).

Another challenge schools face is that there is very limited guidance and training for teachers on how to address cyberbullying in the classroom (Cilliers & Chinyamurindi, 2020). Due to the limited guidance on cyberbullying in schools, it can take a very long time to get fixed in schools. Bell, Silvia Caravita, Keles, Furenes Klippen and Fandrem (2025) suggested the involvement of diverse stakeholders within educational communities as essential for developing cooperative strategies to address and overcome cyberbullying effectively. Whereas the study by Cilliers and Chinyamurindi (2020) recommended that the DBE develop a standardised policy and curriculum that schools can use to implement and enforce cyber safety behaviour.

It also requires educating learners and staff on digital citizenship and online safety, which adds another layer of responsibility to an SMT's role. The challenges of data theft and cyberbullying are not isolated from the need for policymakers to develop policies that assist SMTs, teachers, parents and learners to address cybersecurity, cyberbullying and bullying in schools.

The following section focuses on ICT policy for education.

2.3.6 ICT policy for education

The South African educational policy aims to enhance educational opportunities across various academic disciplines by developing technical skills and using ICT (Department of Education Government Gazette, 2004). An ICT Policy for Education is a strategic document that outlines the aims, principles, and guidelines for the use of ICT within a school or educational institution.

The South Africa Connect policy, published in 2013 by the Department of Communications (DoC) and now led by the newly established 2019 Department of Communications and Digital Technologies (DCDT), advocates for a digital society characterised by widespread ICT knowledge and use among individuals, communities, organisations, and society (DoC, 2013; Hankel *et al*., 2017; Mwapwele *et al*., 2019). Furthermore, it provides a clear framework for all stakeholders, including school leaders, teachers, and learners, on how to use technology effectively and responsibly to support teaching, learning, and administrative tasks. The policy ensures that ICT integration aligns with the school's overall educational vision and objectives.

According to Machmud *et al*. (2021), Singapore, Thailand, Indonesia, and Myanmar are integrating ICT into education, with each country having unique policies. Singapore has sector-wide ICT plans, while Thailand, Indonesia, and Myanmar include ICT in their national plans, aiming for sustainability and participation in the digital economy. In Mongolia, new policies are emphasising the use of ICT for teacher training and the implementation of a learner-centred approach. To promote learner-centred education in the curriculum, the Ministry of Education, Culture, Science, and Sports (MECSS) released the "New Education Standard" in 2003, specifically targeting the primary education sector. Regarding ICT introduction, the Master Plan to Develop Education of Mongolia in 2006-2015 established guidelines for integrating ICT into teacher training and classroom instruction (UNESCO-IBE, 2010; Li *et al*., 2019).

2.4 Models for Integrating ICT in Education

There is no universal approach to integrating ICT in education. Several models provide frameworks for SMTS to thoughtfully and effectively implement technology into their

teaching. These models assist teachers in moving beyond merely replacing traditional tools with technology and instead using it to transform the learning experience. To successfully incorporate technology, teachers can use various models that guide the process from simple to transformative use.

2.4.1 The SAMR model

The SAMR model was developed to examine how technology is integrated into teaching and learning activities. Additionally, it aims to motivate teachers to optimise instructional activities through technology (Wahyuni, Mujiyanto, Rukmini, & Fitriati, 2020). Developed by Puentedura (2006), the SAMR (Substitution, Augmentation, Modification, Redefinition) model is a widely used framework that assists teachers in evaluating their use of technology in the classroom (Crompton, 2016). It outlines a hierarchy of four levels of technology integration, which are categorised into two main groups (Crompton, 2016; Bajracharya, 2021). The SAMR model can help teachers consider technology integration, but it approaches the topic differently than the TPACK framework (Crompton, 2016). It is used to categorise four distinct ways technology can be employed for teaching and learning (Crompton, 2016; Crompton et al., 2024).

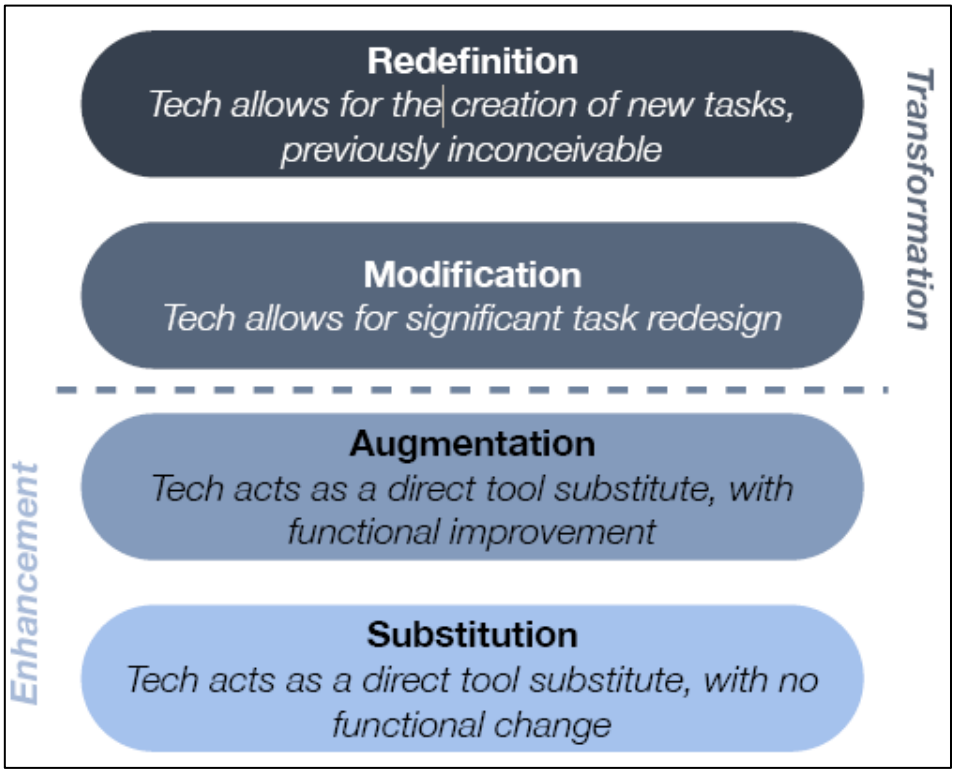


Figure 0.3: SAMR Model (Puentedura, 2006, 2013)

Enhancement (Substitution and Augmentation): At this level, technology improves an existing task. In the augmentation category, technology has some functional improvements (Crompton, 2016).

Substitution: Technology functions as a direct replacement for a non-digital tool without any change in its function. For instance, instead of writing an essay with a pen and paper, a student types it on a computer.

Augmentation: Technology acts as a direct substitute but offers some functional improvements. For instance, a learner using a word processor with a spell-checker and grammar tools receives feedback that a pen and paper cannot provide.

Transformation (Modification and Redefinition): At this stage, technology allows the creation of new tasks that were previously impossible. This refers to activities where technology facilitates a major redesign of the task (Crompton, 2016).

Modification: Technology greatly transforms a task. For instance, learners use a collaborative online document to co-write an essay and provide real-time peer feedback, a task that would be much harder with paper.

Redefinition: Technology enables the creation of entirely new tasks that were previously unthinkable (Crompton, 2016). For example, learners produce a video documentary, conducting interviews with experts from around the world via video conferencing and publishing their work on a global platform.

2.4.2 ADDIE's model

The Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model is a systematic framework used in instructional design to develop effective training and educational programmes. It is an acronym for the five sequential phases: Analysis, Design, Development, Implementation, and Evaluation. Although often presented as a linear process, it is an iterative model, meaning that feedback from later stages can be used to refine and enhance earlier stages. The five phases of ADDIE's model are:

Phase 1. Analysis: This is the foundational stage where you gather all the information needed to develop the training. You identify the learning goals, the target audience, their existing knowledge, and the learning environment. The analysis stage involves

answering key questions like, 'What is the problem we're aiming to solve?' Who are the learners? What are the intended learning outcomes? What resources are available, and what are the constraints (budget, time)?

Phase 2. Design: In this stage, you create a blueprint for the instruction. Based on the analysis, you develop the learning objectives, outline the content, plan the instructional strategies, and decide how you will assess learning. This procedure is where you determine the structure of the course, the activities, and the types of media that will be used. The design stage is a detailed plan for how the learning will be delivered.

Phase 3. Development: This step is the production phase where you develop the instructional materials. Using the blueprint from the design phase, instructional designers and content creators assemble all the course assets. This may include writing scripts, creating presentations, building e-learning modules, and developing assessments. The content is created and assembled, and often a pilot test is conducted to ensure everything functions as intended.

Phase 4. Implementation: The implementation phase involves delivering the training to learners. This includes preparing the learners, instructors, and the learning environment. It covers activities such as conducting training sessions, supporting learners, and managing the course via a learning management system (LMS). During this phase, instructional materials are put into practice.

Phase 5. Evaluation: Evaluation is a continuous process that takes place throughout the entire ADDIE model, but it also serves as a distinct final phase. It involves assessing the effectiveness and efficiency of the training.

There are two main types of evaluation:

- Formative evaluation occurs at each stage of the process to gather feedback and make improvements as you progress.
- Summative evaluation is a final assessment carried out after the training concludes, measuring whether the learning objectives were achieved and if the training had the intended impact. This feedback is then used to enhance future iterations of the course.

2.4.3 Technology Integration Matrix (TIM)

This framework connects five levels of technology integration (entry, adoption, adaptation, infusion, and transformation) with five characteristics of meaningful learning environments (active, collaborative, constructive, authentic, and goal-directed). It provides a more detailed structure for evaluating and improving technology use in the classroom.

2.4.4 Technological Pedagogical Content Knowledge Framework (TPACK)

The TPACK framework is a widely recognised model that serves as a cornerstone for understanding the essential knowledge teachers need for effective ICT integration. It identifies three core knowledge areas and their intersections.

Content Knowledge (CK): The teacher's profound understanding of the subject matter they teach.

Pedagogical Knowledge (PK): The teacher's knowledge of teaching and learning methods, strategies, and classroom management.

Technological Knowledge (TK): The teacher's understanding of how to use various ICT tools and resources (Voogt, Fisser, Pareja Roblin, Tondeur & van Braak, 2013; Bingimlas, 2018; Farjon, Smits & Voogt, 2019).

The real power of this framework lies in the intersections: (TPK): This involves understanding how to utilise technology to enhance specific teaching methods. For instance, one could use a collaborative online document to enhance group work.

Technological Content Knowledge (TCK): Knowing how to use technology to represent and teach subject-specific content. For instance, you could use simulation software to teach scientific concepts.

Pedagogical Content Knowledge (PCK): The knowledge of how to teach specific subject matter effectively.

Technological Pedagogical Content Knowledge (TPACK): The ultimate goal, representing a holistic understanding of how to use technology to enhance teaching

and learning in a particular subject area, considering both the content and the pedagogy. (Koehler & Mishra, 2009; Drummond & Sweeney, 2017; Padmavathi, 2017; de Freitas & Spangenberg, 2019).

The TPACK framework is derived from Shulman's (1986, 1987) PCK explanations (Shulman, 1986; Shulman, 1987). These descriptions pertain to how the teacher understands educational technologies and the relationship between the many parts of PCK when they construct a successful teaching session through the use of technology (Shulman, 1987). The Technological, Pedagogical, and Content Knowledge (TPACK) model describes a framework consisting of different kinds of knowledge domains teachers need to become proficient in in order to successfully integrate digital technology into teaching and learning processes (Koehler *et al*., 2014). According to TPACK, knowledge can be categorised into three primary aspects: content, pedagogy, and technology (Shulman, 1986; Shulman, 1987; Koehler & Mishra, 2009).

The TPACK framework combines technology, pedagogy, and CK as a guideline to integrate new technologies into learning environments (Bingimlas, 2018; Ngandeu, 2020). It is a framework of reference that describes the different types of knowledge necessary for a teacher to integrate technologies into education (Ngandeu, 2020). Using appropriate technologies, teachers can use the model to translate specific subject matter knowledge into a cross-platform format. The model is centred on three fundamental components: technology, content, and pedagogy, and the relationships between and among them, as shown in Figure 0.4 below.

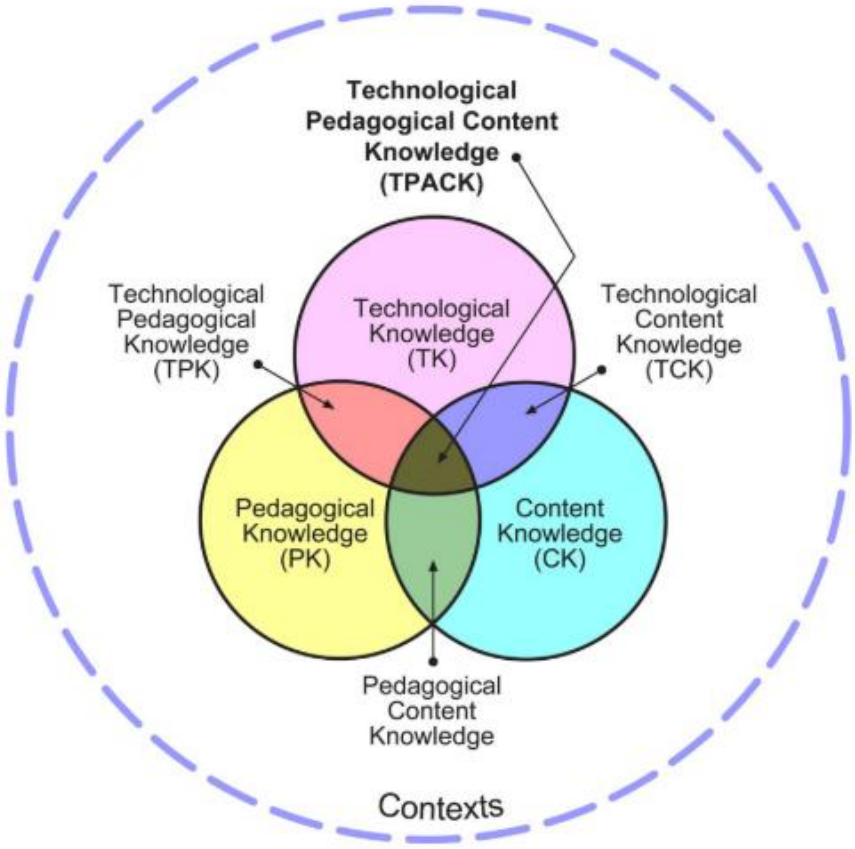


Figure 0.4: The TPACK framework and its knowledge components (Koehler & Mishra, 2009:63)

The TPACK model describes a framework of different knowledge domains teachers need to become proficient in to incorporate digital technology into teaching and learning processes successfully (Koehler, Mishra & Cain, 2013; Koehler *et al*., 2014; Ngandeu, 2020). The framework derives its strength from the concepts of PCK, TCK, and TPK (Mishra & Koehler, 2006; Koehler & Mishra, 2009; Brueck & Lenhart, 2015; Drummond & Sweeney, 2017; Bingimlas, 2018; de Freitas & Spangenberg, 2019; Ngandeu, 2020).

Content Knowledge (CK): CK concerns teachers' knowledge about the subject matter or discipline (Mishra & Koehler, 2006). This knowledge would include understanding theories, concepts, ideas, organisational frameworks, evidence and proof, and established practices towards developing such knowledge (Koehler & Mishra, 2009; Brueck & Lenhart, 2015; Drummond & Sweeney, 2017). It may also

incorporate the field's best practices and reputable methodologies to communicate this information to learners (Drummond & Sweeney, 2017; Ngandeu, 2020).

It is also essential for teachers to have a thorough understanding of the nature of learning and inquiry in various disciplines. Consider, for example, how proof in mathematics differs from a historical explanation or an interpretation in literature (Mishra & Koehler, 2006; Koehler & Mishra, 2009; Drummond & Sweeney, 2017; de Freitas & Spangenberg, 2019). A teacher who does not possess this understanding of the subject is likely to misrepresent it to their learners.

Pedagogical Knowledge (PK): PK concerns how teachers teach and encompasses, among other things, overall educational purposes, values, and aims (Bingimlas, 2018). This generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment (Koehler & Mishra, 2009). In other words, PK is related to the mastery of teaching strategies and theories.

A teacher should be familiar with the techniques or methodologies used in the classroom, the nature of the target audience, and how to evaluate learners' understanding (Mishra & Koehler, 2006; Koehler & Mishra, 2009). Pedagogical knowledge also encompasses the cognitive, social, and developmental theories of learning and their actual implementation in the classroom (Koehler & Mishra, 2009). Consequently, if the teacher's teaching approaches are rooted in understanding the subject or content area, the learners will benefit from the content.

The TPACK model is a more comprehensive framework that emphasises the interconnected knowledge a teacher requires to effectively incorporate technology. It is commonly illustrated as a Venn diagram with three overlapping circles.

2.4.5 The blended learning model

Blended learning is a versatile instructional approach that combines face-to-face, in-person teaching with online education. This method provides the advantages of traditional classroom engagement while also taking advantage of the flexibility and customisable pace offered by digital learning. There are numerous variations of the blended learning model, including:

Station Rotation: Learners rotate through various stations according to a fixed timetable, with at least one station involving online learning. Other stations may be teacher-led or focus on collaborative group work.

Flipped Classroom: This model "flips" the traditional classroom dynamic. Learners watch pre-recorded lectures or complete readings at home (the online portion) and then use class time for practical activities, discussions, and problem-solving with the teacher's guidance.

Flex Model: In this highly flexible model, online learning serves as the main mode of instruction. Teachers are available for individual or small-group support as needed, but students largely manage their own pace and learning pathway.

A La Carte Model: This model allows learners to attend some courses online and others in person, providing them with more flexibility in their learning schedule and curriculum.

Each of these models provides a different way to use ICT to establish more engaging, personalised, and effective learning environments. The selection of a model often depends on the specific learning goals, available resources, and the needs of the learners.

2.5 SUMMARY OF CHAPTER 2

Chapter 2 introduced the two theoretical frameworks underpinning the study: the RST and the SETI Framework. This was followed by a review of the literature, which focused on ICT in education, the role of SMTs in integrating ICT in schools, leadership competences for ICT integration, benefits of integrating ICT into education, challenges of integrating ICT in education, ICT policy for education, support structures in schools and models for ICT integration. Chapter 3 focused on the methodology that assisted the study in exploring and describing the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Chapter 2 discussed the theoretical framework underpinning the study. It also thoroughly reviewed international, regional, and national literature related to the experiences and challenges SMTs faced when integrating ICT in schools to enhance teaching and learning in classrooms.

This chapter presents a detailed outline of the research methodology used to investigate the experiences and challenges SMTs faced when integrating ICT into teaching and learning in public primary schools. The chapter also talks about the research approach and design, as well as the research paradigm. Additionally, this chapter describes population and sampling techniques to illustrate how participants were selected for the study. This chapter also discusses how the data was gathered, analysed, and interpreted. Furthermore, the chapter demonstrates how the researcher addressed issues related to data trustworthiness. Likewise, the chapter elaborates on how the researcher addressed issues related to ethical considerations, as illustrated in the flow diagram below. The chapter ends with a summary of Chapter 3.

Figure 0.5: Chapter Layout

3.2 RESEARCH APPROACH: QUALITATIVE

The study used a qualitative approach to investigate the experiences and challenges South African SMTs faced in integrating ICT into public primary schools to enhance teaching and learning. Literature reveals that the ultimate determination and the choice of methodology to investigate a subject matter rely on the researcher's philosophical assumptions, research designs, and specific data collection, analysis, and interpretation methods (De Vos, Delport, Fouche & Strydom, 2011; Creswell & Creswell, 2018). Moreover, the research methodology selection is influenced by the research problem or topic, the researchers' background, and the intended study

participants (Creswell & Creswell, 2018). Therefore, the research design, paradigm, population and sampling procedures, and data collection instruments necessitated using a quantitative approach to interpret the study's results (De Vos *et al*., 2011).

The research approach involves identifying suitable methodologies for a research topic, including initial assumptions and data collection, analysis, and interpretation techniques (Creswell & Creswell, 2018). The literature suggests that researchers typically use three standard research approaches: qualitative, quantitative, and mixed methods, to answer their research questions. (De Vos *et al*., 2011; McMillan, 2012; Kabir, 2016; Leavy, 2017; Creswell & Creswell, 2018). The next session extensively discusses the qualitative approach and justifies why the researcher chose it over other approaches.

3.2.1 Qualitative approach

This qualitative case study investigated the experiences and challenges South African SMTs faced in integrating ICT into public primary schools to enhance teaching and learning. Qualitative researchers investigate the depth of human experiences, characteristics and perspectives about any phenomenon, often called a 'whole-world experience' (du Plooy, Davis & Bezuidenhout, 2021). Moreover, the empirical evidence in the literature reveals that the qualitative approach allows researchers to investigate the complexities and nuances of human behaviour and emotions, providing a rich understanding of the context in which these experiences occur (du Plooy *et al*., 2021).

Qualitative research aims to gather insights from participants on a problem or topic, directing the research towards obtaining such knowledge (Creswell & Creswell, 2018). The study used a quantitative approach to investigate the SMTs' level of knowledge of ICT integration, the challenges they experience when integrating ICT, and the support structure and systems available to assist them in integrating ICT into their primary schools. Moreover, the study used a qualitative approach to investigate whether the educational ICT National Policy helped the SMTs integrate ICT into teaching and learning.

Thus, acquiring insights on the problem allows qualitative researchers to uncover valuable insights that may not be captured through quantitative methods by investigating the unique perspectives and meanings individuals attach to their experiences (du Plooy *et al*., 2021). Furthermore, qualitative research allows for flexibility in data collection methods, such as interviews, observations, and focus groups, which can capture the richness and diversity of human experiences (De Vos *et al*., 2011). Hence, this qualitative case study chose semi-structured interviews, document analysis and observations to gather relevant data for the study results.

Literature shows that the qualitative approach is instrumental in fields such as psychology, sociology, and anthropology, where understanding the intricacies of human behaviour is essential (Creswell & Creswell, 2018). Qualitative researchers use research design, data collection, analysis and interpretation methods and culminate in the representation and presentation of findings in the form of a capstone report, publication or thesis (du Plooy *et al*., 2021). According to Creswell and Creswell (2018:43), “Qualitative research is an approach for investigating and understanding the meaning individuals or groups ascribe to a social or human problem.” Thus, the study investigated participants to understand their experiences and challenges in integrating ICT into the classrooms to augment teaching and learning.

Quinlan *et al*. (2019) state that qualitative data represents feelings, thoughts, ideas, understandings, and non-numeric data. The researcher considered the participants’ feelings and ideas during the interviews and the data interpretation stage. Du Plooy *et al*. (2021) emphasise that qualitative research is interested in investigating the participants’ experiences and perceptions of where meaning is attached to participants and how they make sense of the world and realities. This approach is suitable for this study because the study aimed to investigate the experiences and challenges SMTs faced in integrating ICT into public primary schools for enhanced teaching and learning. Furthermore, the qualitative approach aims to investigate and comprehend, not measure, quantify, and predict or generalise (Yin, 2016). Creswell (2009) defines qualitative research as investigating and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures.

Qualitative research collects data in the participant's setting, often through document analysis, observation, or interviews, allowing researchers to gather independent information (Creswell & Creswell, 2018). In a qualitative approach, inductive data analysis involves constructing general themes from specific data points, with the researcher interpreting the data's meaning. Besides, qualitative research is usually non-numerical and typically descriptive or nominal, narrative and the multiple perspectives of the participants (McMillan, 2012; Kabir, 2016; Leavy, 2017; Rahman, 2017; Creswell & Creswell, 2018). Most of the data collected using the qualitative approach are words and sentences used in the documentation (Yilmaz, 2013; Leavy, 2017; Creswell & Creswell, 2018). Often, such data capture something's emotions, feelings, or subjective perceptions (Kabir, 2016; Leavy, 2017; Rahman, 2017).

In reality, the qualitative approach addresses a program's 'how' and 'why' questions and uses unstructured processes and collection methods to investigate the topic being investigated thoroughly (Creswell & Creswell, 2018). The research process entails formulating questions and procedures where data collection is usually inside the participant's environment (Creswell, 2009; Yilmaz, 2013; Creswell & Creswell, 2018). The data is progressively analysed, deriving general themes from specific instances.

Usually, qualitative questions are open-ended, and the techniques include group discussions, focus groups and interviews (Kabir, 2016; Leavy, 2017; Rahman, 2017; Creswell & Creswell, 2018). Researchers who advocate using a qualitative approach support the value of an inductive methodology, emphasise individual interpretation, and recognise the significance of accurately representing the complex nature of a given scenario (Creswell, 1994; Creswell, 2009; Leavy, 2017; Rahman, 2017; Creswell & Creswell, 2018). Qualitative approaches are suitable for further investigating a programme's effects and unintended consequences (Kabir, 2016; Creswell & Creswell, 2018). Its characteristics include the researcher's involvement, the construction of social reality, authenticity as the key criterion of scientific excellence, situational content, few cases or subjective involvement, and thematic analysis as the method of choice (Kreuger & Neuman, 2006; De Vos *et al*., 2011).

Qualitative researchers primarily work within interpretivism or constructivist perspectives (du Plooy *et al*., 2021). The most widely applied perspectives in

qualitative research include phenomenology, narratology, ethnography, grounded theory, and case study.

3.2.1.1 Phenomenology perspective

Investigates everyday phenomena. It aims to understand people's perceptions and perspectives of a particular situation. It uses field research, interviews, focus groups, field notes and participant observation to collect data (du Plooy *et al*., 2021).

3.2.1.2 Narratology perspective

Chronicles stories and sequences events. It can be biographical or autobiographical. It collects data through field research, interviews, field notes, focus groups, and unobtrusive research methods (du Plooy *et al*., 2021).

3.2.1.3 Ethnography perspective

Investigates social phenomena in their natural and cultural environments or contexts for a lengthy period, often several months or years. To collect data, field research uses interviews, focus groups, field notes, participant observation, and unobtrusive research (du Plooy *et al*., 2021).

3.2.1.4 Grounded theory perspective

It creates a theory from the dynamic interplay between data collection and analysis. Data are gathered through interviews, field notes, focus groups, and participant observations (du Plooy *et al*., 2021).

3.2.1.5 Case study research perspective

It studies a particular individual, programme, or event in-depth for a defined period. It uses interviews, focus groups, field notes, participant observation, and unobtrusive research to gather data (du Plooy *et al*., 2021).

The study investigated the experiences and challenges SMTs faced in integrating ICT into public primary schools for enhanced teaching and learning. It used a case study research perspective because it focused on a particular group of individuals for a defined period. It also used interviews, observations, and document analysis.

3.2.2 Benefits of using a qualitative approach

- Rahman (2017) highlights the advantages of qualitative research approaches, which involve detailed descriptions of participants' emotions, opinions, experiences, and interpretations of their actions. The semi-structured interviews allowed SMTs to express themselves freely, and they were open to sharing more during the interview period.
- Qualitative research approaches allow researchers to study complex phenomena in their contexts, as shown in this case study, where participants directly experienced the investigated phenomenon (Creswell, 2013; Creswell & Creswell, 2018). The study involved directly engaging principals, DPs, and DHs to share their experiences integrating ICT in schools, ensuring data authenticity and appropriateness.
- In the qualitative research approach, the researcher assumes the role of the principal instrument for data collection (Young & Wayne, 2019). The researcher used self-designed data collection methods for sampled participants, conducted face-to-face interviews with principals, DPs, and DHs, and analysed their responses. In addition, the researcher independently analysed all relevant ICT school policy documents to verify the study results. Thus, this method allowed the researcher to analyse the significance of the participants' contributions to the study subjectively. Consequently, the researcher has promptly resolved any confusion or uncertainty that emerged to ensure the integrity of the data is not compromised.

This qualitative case study investigated the experiences and challenges SMTs faced in integrating ICT into public primary schools to enhance teaching and learning. The following section discusses the study's research design.

3.3.RESEARCH DESIGN: A CASE STUDY

This qualitative study used a case study design to investigate the experiences and challenges SMTs faced in integrating ICT into public primary schools to enhance teaching and learning. Using a case study to investigate this particular case, the researcher gained valuable insights into the experiences and challenges of SMTs

integrating ICT into teaching pedagogies and its potential for broader application in other educational settings.

Blaikie (2000) and Babbie (2021) define research design as a cohesive statement and rationale for technical decisions in research projects, considering topic, population, methods, and purpose. In other words, both Blaikie and Babbie agree that the study's research design has a significant relationship to the research topic, population, sampling procedure, and purpose of the study. Whereas De Vos *et al*. (2011) and du Plooy *et al*. (2021) define research design as a systematic approach focusing on the end product, addressing the problem, answering questions, and guiding data collection, analysis, and interpretation. Similarly, they also view the study's research design as a significant blueprint of the study that guides the data collection methods, data interpretation and analysis.

Fundamentally, a research design serves as a blueprint, a map for researchers to follow throughout the research process, providing a framework for collecting, analysing, and interpreting data (du Plooy *et al*., 2021). Therefore, the research design is crucial in guiding the overall direction of a study and ensuring that the research objectives are met effectively. Furthermore, it helps researchers structure their investigations systematically and organise them, ultimately leading to more reliable and valid results. By carefully selecting and implementing a correct research design, researchers can enhance the credibility and rigour of their study findings. Moreover, a well-thought-out research design can also help researchers identify potential biases and limitations in their study, allowing for adjustments to be made to improve the overall quality of the research. Ultimately, a strong research design is essential for producing meaningful and impactful results that contribute to the existing body of knowledge in a particular field.

Since research is a continuous and cumulative process, the researcher's decision choices determine the choice of research design and data collection methods (du Plooy *et al*., 2021). Moreover, the data collection method must allow the researcher to achieve the desired study results, as anticipated in the research problem, goals, and formulated questions (du Plooy *et al*., 2021). The researcher's choice of data collection, analysis and interpretation methods determines the study results. As a

result, the alignment of data collection methods, analysis and interpretation results in design and methodological coherence (du Plooy *et al*., 2021).

Researchers can use many research designs to support their studies, including phenomenology, narratology, ethnography, grounded theory and case-study designs, which are discussed in detail below. However, each type of research design has its strengths and weaknesses, and researchers must carefully consider which design will best suit their study objectives. By selecting the most appropriate research design, researchers can enhance the validity and reliability of their findings, ultimately leading to more robust conclusions (Creswell & Creswell, 2018).

When choosing a research design, researchers should also consider factors such as sample size, data collection methods, and potential biases. In addressing these considerations, researchers can ensure their study is methodologically sound and contributes valuable insights. Furthermore, researchers should also consider ethical considerations and potential limitations of the chosen research design to ensure the integrity of their study. By acknowledging these factors, researchers can conduct a comprehensive and well-rounded investigation that upholds the highest standards of research ethics.

3.3.1 Phenomenology design

The design investigates everyday phenomena and participants' conscious awareness of their life worlds in the 'real world'. It aims to understand people's perceptions and perspectives of a particular situation (du Plooy *et al*., 2021). The design collects data from field research interviews, focus groups, field notes, and participant observation.

3.3.2 Narratology design

Chronicles stories and sequences of events. This design can be either biographical or autobiographical (du Plooy *et al*., 2021). The design uses field research interviews, focus groups, field notes and unobtrusive research to gather data.

3.3.3 Ethnography design

Investigates social phenomena in their 'natural' and cultural environments or contexts for a lengthy period, often several months or several years (du Plooy *et al*., 2021). It

uses field research interviews, focus groups, field notes, participant observation and unobtrusive research.

3.3.4 Grounded theory design

The grounded theory creates theory from the dynamic interplay between data collection and analysis (du Plooy *et al*., 2021). It uses field research interviews, focus groups, field notes and participant observation.

3.3.5 Case study designs

The qualitative study used a case study design to investigate the experiences and challenges SMTs faced in integrating ICT into teaching and learning and to provide a thorough understanding of their experiences. The qualitative study chose a case study design to develop a holistic understanding of the SMTs' experiences and challenges since a case study is commonly used in social sciences, business, and medicine to provide rich, detailed insights into real-life situations. Using a case study design provided valuable insights into the experiences and challenges SMTs faced in integrating ICT into teaching pedagogies and its potential for broader application in other educational settings.

Literature showed that a case study is a research design with multiple definitions and interpretations that can be contested (Yazan, 2015; Yazan & De Vasconcelos, 2016). Despite several definitions, the literature shows that it is suitable to study a particular individual, programme, or event in depth for a defined period to understand its complexities and unique characteristics (Creswell & Creswell, 2018; du Plooy *et al*., 2021). McMillan (2012:279) defines a case study as "… an in-depth analysis of one or more events, settings, programs, social groups, communities, individuals, or other "bounded systems" in their natural context." Moreover, a case study often involves gathering data through various methods such as interviews, focus groups, field notes, participant observations, and document analysis (du Plooy *et al*., 2021).

This qualitative case study used semi-structured interviews, document analysis, and participant observations to investigate the experiences and challenges SMTs faced in integrating ICT into teaching and learning, as it is instrumental in focusing on understanding the experiences and problems of a specific context or situation

(Creswell & Creswell, 2018). Moreover, the case study design allowed the study to delve deep into a single case, where researchers could uncover valuable insights that may not be easily captured through other research designs (Creswell & Creswell, 2018).

A case study research design helped the study thoroughly investigate SMTs' experiences and challenges, examining their functioning within significant contexts. It comprehensively investigates a real-world project, policy, institution, programme, or system from multiple perspectives to capture its complexity and distinctiveness (Simons, 2009; Cohen, Manion & Morrison, 2018). According to Creswell (1994), a case study is a singular instance of a confined system, such as a child, a clique, a class, a school, or a community.

This means that a case study design can investigate different categories of people and events. For example, a case study design could focus on how a specific school implements ICT into teaching and learning to investigate its impact on learner-learning outcomes. Besides, a case study design is a research method that examines a specific case within its context, often involving extensive descriptions and details. It can be a method, process, methodology, research design, outcome, strategy, or focus (Verschuren, 2003; Yin, 2009; Thomas, 2011; Leedy & Ormrod, 2015; Yazan, 2015). This case study design used semi-structured interviews and document analysis to investigate the experiences and challenges SMTs face when integrating ICT into teaching and learning in primary schools.

Notwithstanding several definitions, a case study serves as a significant source of research data, either alone or as an addition to other data types, and represents a distinct research methodology (Cohen *et al*., 2018). Since a case study includes experiments, action research, surveys, naturalistic research, participatory research, and historical research, among others, and employs multiple data-gathering and analysis methodologies (Cohen *et al*., 2018). It functions similarly to various other forms of research designs. The case study approach is a widely used form of qualitative research that entails rigorous and comprehensive observation of a social unit, which may consist of an individual, a family, an organisation, a cultural group, or an entire community (Kothari, 2004). This qualitative case study focused on SMTs

from five schools. Case studies are a method of in-depth analysis that focuses on a limited number of events or conditions and their interrelations. They aim to identify factors influencing the behaviour patterns of a particular unit as an integrated whole.

According to Yin (2003), a case study design should be considered when the focus of the study is to answer “how” and “why” questions; you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; you cannot manipulate the behaviour of those involved in the study; or the boundaries are not clear between the phenomenon and context. Hence, a case study is an in-depth analysis of one or more events, programmes, settings, social groups, communities, and individuals (McMillan, 2012; Sam, 2012). Moreover, a case study research method collects data at one or several sites, usually over time; data is generally obtained from multiple sources of evidence, including interviews and documents. (Yin, 1994 cited in Sam, 2012:36). One of the questions this case study intends to answer is how the ICT Policy and other relevant policies assist SMTs in effectively integrating ICT in schools. There are different types of case studies, which are discussed in detail in the following paragraphs.

As mentioned, many case studies exist in educational and social science research. Yin (2009) identifies three types: exploratory, descriptive, and explanatory. Yin's classification aligns with Merriam (1998), who outlines three distinct categories: descriptive, interpretative, and evaluative case studies.

3.3.5.1 Exploratory case study

Exploratory case studies can be used to generate ideas tested in larger-scale surveys, experiments, or other forms of research, such as observational ones. It also investigates scenarios where the intervention under evaluation lacks a definitive, singular set of outcomes (Yin, 2003). An exploratory case study does not only investigate but also rigorously describes the case within a broader context to understand its nature (du Plooy *et al*., 2021). It aims to provide a detailed case analysis, investigating various perspectives and factors that may influence the outcomes. This approach allows for a deeper understanding of the complexities and nuances of the case under study. Moreover, an exploratory case study can uncover hidden patterns or relationships that may not be immediately apparent by examining

the case from multiple angles. This in-depth analysis can lead to valuable insights and contribute to the existing body of knowledge in the field.

3.3.5.2 Descriptive case study

This case study method describes an intervention or phenomenon and its real-world setting (Yin, 2003). It provides narrative accounts. Furthermore, it allows a researcher to probe into topical areas that researchers might have missed, enhancing inquiry validity. Understanding the range of issues and perspectives on a topic within a population often leads to a desire to delve deeper into each item or thing.

3.3.5.3 Explanatory case study

An explanatory case study attempts to explain the circumstances and nuances of a specific phenomenon (du Plooy *et al*., 2021). It often involves detailed analysis and interpretation of data to provide a comprehensive understanding of the subject at hand. This type of study is commonly used in the social sciences and psychology to investigate complex human behaviours and interactions. Social and behavioural researchers frequently seek to elucidate the reasons behind people's actions or inactions, the functioning of social systems, or the interrelation among several processes. Qualitative inquiry lets researchers directly capture the reasons behind individuals' behaviours, as participants can explicitly articulate those causal connections.

3.3.5.4 Interpretive case study

It helps in developing conceptual categories inductively to examine initial assumptions.

3.3.5.5 Evaluative case study

Quantitative approaches and experimental or quasi-experimental designs can be employed to assess a product, intervention, or programme. These meticulously organised methodologies are often appropriate, and the requisite resources for their implementation are accessible. Qualitative assessments aim to comprehend participants’ experiences inside a programme and their judgements of its successes and failures. A qualitative assessment study typically encompasses one or more previously described purposes.

Case studies have historically been perceived as lacking rigour and objectivity relative to other social research methodologies (Gerring, 2004). Despite the negativity associated with case studies, they are frequently used, as they can provide insights unattainable through alternative methodologies. Case studies are frequently seen as valuable instruments for the initial exploratory phase of a research project, serving as a foundation for creating the more formal tools required in experiments and surveys.

The primary benefit of a case study is that it enables a researcher to elucidate how various circumstances have interacted to shape the distinctive nature of the object under investigation. Assuming that each individual, group, organisation, or event possesses distinct characteristics, the case study is appropriate for illustrating that uniqueness (Thomas, 2011). A significant restriction of the case technique is that generalisations or principles derived from one example may be transferred to other cases only with a substantial risk of inaccuracy (Thomas, 2011). This constraint is significant when individuals reading research reports want the results of a specific study and insights that can aid in comprehending other analogous individuals, institutions, or events.

The researcher chose a case study design to investigate the experiences and challenges School Management Teachers (SMTs) face when integrating ICT into teaching and learning in schools. This design was chosen due to its long research history and convenience in studying participants in their natural environments (du Plooy *et al*., 2021). The interviews were conducted in a school, allowing for repeated interactions and an in-depth understanding of participants' perspectives on their environment.

Even though a case study design was preferred, the researcher’s full involvement in the field event to gather data through interviews, observations, and document analysis did not affect the study’s validity. The researcher was able to guard against losing objectivity and was mindful of not losing perspective throughout the interviews. Instead, the researcher assured all the participants that their identities would be protected and that confidentiality would always be assured. Using a case study greatly benefited the researcher in investigating a topic in greater detail than possible when dealing with many research participants.

The researcher used semi-structured interviews, document analysis, and observations to investigate the challenges that prevent SMTs from fully integrating ICT into schools. Case studies were used to investigate programmes, events, activities, and processes from a single perspective (McMillan, 2012; Sam, 2012). The data was analysed using grounded theory and interpretative phenomenological analysis, which led to a comprehensive discussion of the research paradigm or philosophy.

3.4 RESEARCH PARADIGM/ PHILOSOPHY: INTERPRETIVE

The interpretive paradigm was used to investigate the experiences and challenges faced by SMTs when integrating ICT into teaching and learning in public primary schools in South Africa. The paradigm allowed the researcher to use qualitative methods to gather data, including interviews, observations, document reviews, and visual data analysis (Mackenzie & Knipe, 2006). According to Leavy (2017), the paradigm studies how people participate in processes of constructing and reconstructing meanings through daily interactions.

Leavy (2017) also claims that when the researcher works within this paradigm, attention must be drawn to people's patterns of interaction and the interpretive processes by which they assign meanings to events and situations. As a result, the researcher used the interpretive paradigm to prioritise individuals' subjective interpretations and diverse meanings during the study process. In this study, the interpretive paradigm assisted the researcher in conducting interviews, making observations, and reviewing documents to investigate the experiences and challenges SMTs faced when integrating ICT into classrooms to enhance teaching and learning.

3.4.1 Research paradigm

Different research studies are grounded in a specific philosophical perspective, sometimes called a paradigm. This study's philosophical perspective is interpretive. In educational research, the term 'paradigm' describes a researcher's 'worldview' on a topic being researched (Mackenzie & Knipe, 2006). A paradigm could also refer to beliefs or commonly held assumptions shaping how a study or investigation is conducted to provide meaningful results (Guba & Lincoln, 1994). It is also a research culture with a set of beliefs, values and assumptions that a community of researchers

have in common regarding the nature and the conduct of research (Scotland, 2012; Kivunja & Kuyini, 2017). Moreover, a paradigm refers to a set of shared beliefs and agreements between scientists about how problems should be understood and addressed (Yazan & De Vasconcelos, 2016; Kivunja and Kuyini, 2017). Subsequently, a paradigm refers to a coherent and comprehensive set of scientific and academic ideas, attitudes, and assumptions that form a pattern, structure, or framework which consists of four essential elements: ontology, epistemology, methodology, and methodologies (Scotland, 2012).

An essential aspect of any research is the careful choice of a suitable paradigm, which is regarded as the primary methodological consideration that shapes the course of the study (Guba & Lincoln, 1994). As mentioned above, a research paradigm includes three fundamental assumptions on ontology, epistemology, and methodology, which aid the researcher in comprehending and investigating the nature of reality. The three fundamental assumptions of a paradigm are briefly discussed below.

3.4.1.1 Ontology

Bryan and Bell (2007) assert that ontology concerns the nature of human perceptions about reality and investigates the concerns of its existence and characteristics. This is fundamental for the study because it investigated the SMTs' perceptions regarding the integration of ICT in their schools. Crotty (1998:10) states, "Ontology is the study of being." As it studies 'being', the researcher must also understand SMTs' behaviour regarding ICT integration. As a result, understanding the SMTs' beliefs and attitudes and being assisted with the nature of existence and the structure of reality (Crotty, 1998).

Ontology is a philosophical discipline that focuses on the fundamental assumptions researchers rely on to establish the coherence or existence of anything and the inherent nature or essence of the social phenomena under investigation or study. (Scotland, 2012; Kivunja & Kuyini, 2017). Ontology also relates to the study of being, nature, and our ways of being in the world (Quinlan *et al*., 2019). Researchers adopt a stance of investigation regarding their understanding of the true nature of reality and the underlying mechanisms at play (Kivunja & Kuyini, 2017). Hence, ontology enables the researcher to determine the nature of reality, whether it be objective or socially

produced (Scotland, 2012). Ontology is necessary in research because it studies the nature of existence, reality, and basic categories of things. It examines the researcher's beliefs and assumptions about reality, focusing on the essence of social phenomena and helping conceptualise reality's form and nature (Kivunja & Kuyini, 2017). Another fundamental assumption of the research paradigm is epistemology.

3.4.1.2 Epistemology

Epistemology examines the critical characteristics of knowledge (Leavy, 2017). It also refers to knowledge, what constitutes knowledge, and how knowledge is created (Quinlan *et al*., 2019). Crotty (1998) portrays epistemology as a framework for understanding and explaining the nature of knowledge acquisition. He defines the epistemology of constructionism as:

"*The view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interactions between human beings and their world, and developed and transmitted within an essentially social context." (Crotty, 1998)*

Meaning is socially created, so I adopted interpretivism as my epistemological framework to investigate the experiences and challenges SMTs faced when integrating ICT in their schools. An essential element of interpretivist epistemology is that individuals shape their realities through interactions with their social environments. Thus, meaning is not discovered but instead interpreted (Crotty, 1998; Patton, 2002; Merriam, 2009; Glesne, 2011). Crotty (1998: 8) states, "There is no objective truth waiting for us to discover it. Truth, or meaning, comes into existence in and out of our engagement with the realities in our world." Furthermore, epistemology emphasises acquiring and validating knowledge, facilitating comprehension of the probability and desirability of fairness, prejudice, causation, authenticity, and generalisability in a study (Gall, Borg & Gall, 1996). An additional crucial truth is that meaning-making is not an individual experience but arises from a social reality of meaning. According to Patton, "'truth' then becomes a matter of consensus among informed and sophisticated constructors" (Patton, 2002: 96).

A researcher adhering to an interpretivism epistemology examines how individuals interpret their experiences, construct their realities, and the meanings they ascribe to those experiences (Merriam, 2009). Crotty (1998) asserts, “What interpretivism unequivocally emphasises is that there are no authentic or valid interpretations.” “Nonetheless, there exist valuable interpretations” (Crotty, 1998: 47). Therefore, the study adopted interpretivism as the epistemological framework to investigate the experiences and challenges SMTs faced in integrating ICT into schools to enhance teaching and learning. As a result, it is essential to discuss the methodology the study used to investigate the experiences and problems SMTs face when integrating ICT into teaching and learning.

3.4.1.3 Methodology

Methodology is a strategy or design used to carry out the study (Quinlan *et al*., 2019). It is a systematic and well-defined approach to examining a subject's familiar and unfamiliar characteristics (Leavy, 2017; Creswell & Creswell, 2018). Meanwhile, the study adopted a qualitative approach and a case study design to investigate the experiences and challenges SMTs faced when integrating ICT into classrooms. Moreover, it accurately examines the methodologies and approaches employed to generate the necessary data for the research undertaken (Zikmund, 2003). Consequently, the researcher's theoretical perspective and the chosen research design significantly impact the methodologies used, as research methodology is contingent upon the nature of the study, the design, and the researchers themselves. Another significant feature of a qualitative case study is the population and sampling procedures.

3.5 POPULATION AND SAMPLING PROCEDURES

The study involved five principals, five DPs, and ten DHs from five public primary schools in the Ekurhuleni North District in the Gauteng Province, selected through a sampling process.

3.5.1 Population

The study's target population comprised 364 SMT members from 52 public primary schools in Ekurhuleni North District, and the accessible population comprised 35 SMT

members from 5 public primary schools in Tembisa Township in Ekurhuleni North District. The target population refers to everyone or everything that falls within the population parameters (364 SMTs), whereas the accessible population refers only to the section of the population included in the study (35 SMT members) (du Plooy *et al*., 2021). The population was chosen from public primary schools in the Ekurhuleni North District in Gauteng Province.

A population is a set of elements, subjects, or observations about a specific study phenomenon (Shank, Brown & Pringle, 2014). Welman, Kruger, and Mitchell (2005) define a population as study objects of individuals, organisations, or human products that conform to specific generalisation criteria. Babbie (2021) described a population as the theoretically specified aggregation of the elements of the study where the elements represent people or artefacts from where the sampling unit is selected. In every research, researchers identify the elements or subjects of interest and the population of interest, then determine the sampling frame for the study, resulting in a sample that provides the necessary information to answer research questions (Efron & Ravid, 2013; Kabir, 2016).

The researcher identified school principals, DPs, and DHs as population representatives in this study because of their experiences in school management matters. Moreover, the study's participant selection was influenced by the research problem and questions to identify and define the population effectively (du Plooy *et al*., 2021). Furthermore, it was influenced by their shared characteristics as school leaders in the same school and at the same level, whose duties include implementing curriculum and ICT policies in schools. The next session discussed the sample and sampling procedures.

3.5.2 Sample and sampling procedures

A sample is a subset of the accessible population which is selected from the chosen accessible population, and it should be representative of the target population (du Plooy *et al*., 2021). Moreover, the final sample must have the same relevant characteristics as the population in order to be considered representative of the population (du Plooy *et al*., 2021).

The study used purposive and convenience sampling to select 20 SMT members from 35 SMT members in five schools in Tembisa Township in Ekurhuleni North District, Gauteng Province. The sample includes five principals, five DPs, and ten DHs, representing the total number of active SMT members in Tembisa Township, Ekurhuleni North District, Gauteng Province. The sample represents 57.14% of the accessible population, representing 10% of the target population.

Sampling is a method a researcher uses to deliberately choose a limited number of participants from a specified group to participate in the study (Sharma, 2017). The term ‘sample’ refers to the subset of the entire population examined by the researcher and whose characteristics will be generalised for the whole population (McMillan, 2012; Sharma, 2017). It is a technique, procedure or device employed by a researcher to systematically select a relatively minor number of representative items or individuals (a subset) from a pre-defined population to serve as subjects (data source) for observation or experimentation as per the objectives of their study (Sharma, 2017). The method involves selecting population segments to participate in a research project (O'Leary, 2017).

Sampling procedures are used to select a sample following the research objectives, methodology, and design. This study implemented purposive and convenience sampling to choose participants for data gathering. Purposive sampling means the researcher purposefully chooses the participants based on a set list of characteristics relevant to the research questions (Maree & Molepo, 2013; Etikah & Musa, 2016; du Plooy *et al*., 2021). Therefore, purposive sampling has facilitated the selection of SMTs with specialised expertise and experience in school management.

Besides, the researcher determines what information he needs and whether the participants will provide that knowledge to answer research questions. Thus, this selection approach facilitated the acquisition of comprehensive material for thorough analysis (Lopez & Whitehead, 2013). Most importantly, the purposeful selection of participants and schools helped the researcher better understand the SMTs’ knowledge, experiences and challenges of ICT integration in primary schools in South Africa (Creswell & Creswell, 2018).

The sampling was done because it was impossible to test every single individual in the population (Sharma, 2017). Hence, due to time and logistic constraints, some public schools within Tembisa Township in the Ekurhuleni North District were not selected for the study. Only five (5) schools within Tembisa's immediate geographical boundaries were considered for the study. The researcher opted for a limited cohort of schools and participants to streamline the research process and save expenses, as examining a sizable number of participants can be time-consuming for the researcher (du Plooy *et al*., 2021). Table 0.2 outlines the sample's breakdown matrix. Below, a comprehensive discussion of data collection instruments will follow.

Table 0.2 Breakdown matrix of the sample

ICT Schools in the Case Study	Number of participants per Level			Total Number of participants in the case study
	Number of principals (P)	Number of deputy principals (DP)	Number of Departmental Heads (DH)	
School A	1	1	2	4
School B	1	1	2	4
School C	1	1	2	4
School D	1	1	2	4
School E	1	1	2	4
Total	5	5	10	20

3.6 DATA COLLECTION INSTRUMENTS

This qualitative case study used individual semi-structured interviews, document analysis, and observations to gather accurate and reliable data. It investigated the experiences and challenges faced by SMTs in integrating ICT into teaching and learning in South Africa.

Data collection instruments are crucial in research studies, and incorrect instruments and methods can lead to invalid results and findings (du Plooy *et al*., 2021). Data collection is a systematic process of gathering and measuring qualitative information to answer research questions, test hypotheses, and evaluate outcomes, aiming to capture quality evidence for rich analysis (McMillan, 2012). Data collection instruments may vary by discipline, but the emphasis on ensuring accurate and authentic collection remains the same. The goal for all data collection is to capture quality evidence that translates to rich data analysis and allows the development of a convincing and credible answer to research questions (du Plooy *et al*., 2021; McMillan, 2012).

3.6.1 Interviews

This study used semi-structured interviews to collect data to investigate the experiences and challenges SMTs faced in integrating ICT to enhance teaching and learning in their schools. To facilitate a smooth process of semi-structured interviews,

all participants (SMT members) were given two sets of semi-structured interview guides. The semi-structured interviews were followed by the document analysis, which was used as supplementary information. The documents analysed include the National Policy on ICT integration, school-based ICT policy documents, Annual Teacher Planning (ATP) and ICT lesson plans. Both techniques facilitated the researcher's triangulation and collection of appropriate data for the case study.

3.6.1.1 Individual semi-structured interviews

The researcher preferred individual semi-structured interviews for flexibility, interaction, and discussion opportunities, allowing for supplementary questions (De Vos *et al*., 2011; Belliappa, Taylor & Francis, 2019). Individual semi-structured interviews allowed me to ask the participants specific questions without predetermined response options; instead, the questions were open-ended yet specific in intent, allowing specific responses (McMillan, 2012; Efron & Ravid, 2013). Moreover, semi-structured questions are designed to be open-ended, which provided the researcher with a detailed picture of participants' experiences, beliefs and perceptions on account of the research topic and questions.

This view was well presented and supported by Belliappa *et al*. (2019), who further argued that individual semi-structured interviews offer a greater chance for interpersonal engagement and discourse between the interviewer and interviewee than structured interviews or enquiries. As a result, the use of individual semi-structured interviews allowed the researcher to dig deeper into the interviewees during question time for further clarity on some areas that needed clarification through follow-up questions. Also, an attempt was made to probe the participant's minds thoroughly, enabling the interviewees to articulate their ideas instead of being limited to the predetermined response choices (Dubey & Kothari, 2022). Moreover, individual semi-structured interviews usually occur when the researcher has only one chance to interview the participants and sends several interviewers out to gather data in the field (Dubey & Kothari, 2022).

The researcher guided participants with pre-planned core questions, allowing them to elaborate or provide more information. To generate trustworthy qualitative data, the researcher used individual semi-structured interviews. Individual semi-structured

interviews afforded depth of data because SMTs were encouraged to discuss, reflect, and share their thoughts, beliefs, and experiences on roles, responsibilities, challenges, learning, and use of knowledge to initiate and manage ICT (Stringer & Hourani, 2016). Five principals, five DPs, and ten DHs were interviewed using individual semi-structured interviews to gather relevant data regarding ICT integration in their schools. The researcher acquired insights from a technical perspective regarding the influence of ICT use in education.

Using an individual semi-structured interview data-gathering instrument facilitated participants' elaborate responses to my questions using their own words. Consequently, interviews included a set of essential questions that identify specific topics for investigation and gather detailed information as outlined in the research questions (Stringer & Hourani, 2016). Furthermore, individual semi-structured or open-ended interview questions were adopted and used during interviews to obtain substantial information from the participants, providing the researcher with valuable insights into the topic under investigation. The individual semi-structured interviews aimed to get the participants' perceptions, emotions, attitudes, and thoughts regarding the chosen topic (Krueger & Casey, 2014). Thus, the experiences and challenges SMTs face when integrating ICT into teaching and learning in Ekurhuleni North District in Gauteng province in South Africa.

The participants freely consented to participate and attached their signatures to the consent documents. They expressed their desire for the interviews to take place at their school offices and specified their less hectic periods to minimise interruptions. As the researcher, I arranged school staff rooms for individual interviews with the principals, DPs, and DHs. Every interview was allocated a 45-minute time slot for each participant. However, not all the interviews adhered to the specified time frame, as several participants found it necessary to investigate specific questions deeper than initially anticipated. Even though the participants were allowed time to express themselves freely, the researcher adhered to Majid, Othman, Mohamed, Lim and Yusof's (2017) belief that interviews should not exceed 90 minutes so that the researcher is cognisant of the fact that participants might have other commitments.

The individual semi-structured interviews were conducted at the school level, with all participants interviewed on the same day in each school. Every participant was presented with identical questions. The participants' appointments were scheduled, and all necessary arrangements were made before the actual meetings. A smartphone was used to record and document the interviews to ensure precise transcription of the verbal exchange. This was in line with Creswell and Creswell (2018), who mentioned that the last classification of qualitative data comprises audiovisual and digital resources, including social media materials. Furthermore, they noted that data can be in the form of images, art items, audiotapes, videotapes, website main pages, e-mails, text messages, social media text, or any other form of sound (Creswell & Creswell, 2018).

3.6.1.2 Advantages of individual semi-structured interviews

According to recent studies (Rashidi, Ara Begum, Mokhtar & Pereira, 2014; du Plooy *et al*., 2021; Dubey & Kothari, 2022), the advantages of semi-structured interviews include:

- Individual semi-structured interviews allow the interviewer to probe the participant for complex answers. Through the follow-up questions, in line with the research questions, the researcher could dig deeper into the participants' knowledge of ICT and its integration into teaching and learning. Furthermore, this enabled the researcher to probe more for further in-depth clarity to clearly understand the phenomenon under investigation.
- Interviews help the researcher capture behaviour and emotions. In the context of this study’s questions, the researcher rigorously analysed participants’ experiences, attitudes, and challenges regarding ICT integration during the interview session.
- Individual semi-structured interviews offer a chance to address interviewees' concerns and ensure confidentiality for those hesitant to share sensitive information. During the interview session, the researcher read the purpose of the interview to all participants, giving a clear outline of how the university would use and keep their information as part of the research ethics.

- Individual semi-structured interviews allow face-to-face contact with participants. In the context of this study, having direct contact with participants enabled the researcher to collect quality data about participants' experiences and challenges in integrating ICT to enhance teaching and learning.
- Individual semi-structured interviews allow the researcher to accommodate a wide range of people. In this study, the individual semi-structured interviews enabled the researcher to gain insight into various participants and their personalities regardless of their academic qualifications.
- Individual semi-structured interviews are significantly more extended in personal interviews than in other surveys due to the ease of avoiding responses from reluctant participants. Participants were given adequate time to relax and prepare for the interview questions.

3.6.1.3 Disadvantages of using individual semi-structured interviews

According to recent studies (Rashidi, Ara Begum, Mokhtar & Pereira, 2014; du Plooy *et al*., 2021; Dubey & Kothari, 2022), the advantages of semi-structured interviews include.

- Individual semi-structured interviews are more expensive than other methods due to the number of interviewees, workforce quality, participants' reach, question complexity, non-availability, and non-response. Therefore, individual semi-structured interviews can be time-consuming.
- Individual semi-structured interviews can be costly in that, at times, the researcher has to travel to access participants.
- In individual semi-structured interviews, interviewers face social desirability bias, as participants may hesitate to provide accurate information.
- They are a great deal of concern to participants uncomfortable with direct contact.

According to Yin (2016), one-on-one conversation with participants is beneficial as it allows room for follow-up questions where necessary. This method also helped build rapport and establish trust with the participants, leading to more honest and insightful responses during the research process. Additionally, it provided a more personalised experience for each participant, making them feel valued and heard. To mitigate the

above-mentioned concerns of interviews, the researcher set pre-planned core questions to provide guidance in important areas of the study and also to save time. This structured approach ensured that key information was gathered efficiently while allowing flexibility in investigating unexpected insights that may arise during the conversation. Overall, this method helped to strike a balance between structure and spontaneity in the research process.

According to Miller and Crabtree (2015), semi-structured interviews provide interesting, consistent, and reliable first-hand data from taking turns in conversations with participants. This allowed me to delve deeper into specific topics while still maintaining a level of flexibility to adapt to the flow of the conversation. By combining structure with open-ended questions, I could gather rich and detailed information that may not have been uncovered through a strictly structured interview format. In the context of this study, I ensured that participants were comfortable and at ease so they could share their experiences without fear. This approach ultimately led to a more natural and authentic exchange, resulting in a more comprehensive understanding of the participants' experiences, challenges and perspectives. Additionally, creating a comfortable environment helped build trust between me and the participants, leading to more honest and insightful responses.

The distance among the sampled schools was approximately 8 to 10 kilometres, and this made it easy for the researcher to access the schools. This convenience allowed for efficient data collection and minimised any potential logistical challenges that could have arisen. Overall, the researcher's thoughtful approach to creating a comfortable setting and easy access for participants contributed to the study's success. This thorough preparation likely played a key role in fostering a positive and productive relationship with participants throughout the data collection process. Additionally, the researcher's proactive communication and organisation skills ensured that participants were well informed and prepared for their involvement in the study. This level of professionalism likely contributed to high levels of participant engagement and cooperation, ultimately enhancing the quality of the data collected.

3.6.2 Document analysis

This study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools. To achieve this, the study conducted semi-structured interviews with SMTs. It also analysed the National ICT Policy integration plan, school-based ICT policy documents, ATPs, and lesson plans.

Document analysis is a methodical process used to examine and assess various documents, including physical copies and digital materials (Bowen, Erickson, Martens & Crockett, 2009; McMillan, 2012). Analysing the documents helps uncover hidden matters, especially when minority groups are under-represented, or their historical information is less documented in textbooks or curricula (McMillan, 2012; Leavy, 2017). The study combined individual semi-structured interviews with document analysis to explore the experiences and challenges faced by SMT members in integrating ICT into teaching and learning processes. This mixed-methods approach enhances the validity and reliability of the findings by triangulating data from multiple sources, providing a more nuanced understanding of the complexities involved in integrating ICT into educational practices.

The researcher thoroughly analysed the National Policy on ICT integration, school-based ICT policies, ATPs and lesson plans. The data collected provided a comprehensive understanding of the current state of ICT integration in schools. This is in line with what Bowen, Erickson, Martens and Crockett (2009) mentioned: that papers, regardless of their nature, can aid researchers in gaining understanding, revealing meaning, and uncovering insights pertinent to their study concerns. The insights gained from the document analysis provided valuable context to the data collected from lesson plans and ATPs. Their views were also supported by Leavy (2017), who mentioned that the researcher had the opportunity to gather qualitative documentation throughout the research process. This documentation helped in triangulating the data and ensuring the credibility of the findings.

Overall, the combination of interviews with SMTs and qualitative document analysis enriched the research process and enhanced the depth of analysis. These documents can be categorised as either public (such as newspapers, meeting minutes, and official

reports) or private (such as personal journals, diaries, letters, and emails) (Leavy, 2017). By using both public and private qualitative documentation, the researcher was able to capture a comprehensive view of the subject matter and the study's objectives.

This multi-faceted approach not only strengthened the credibility of the findings but also provided a rich source of data for analysis. Therefore, the researcher analysed the school-based ICT policies, the national school policy, ATP and lesson plans in every school participating in the current case study. This allowed for a thorough examination of how ICT was being implemented and integrated into the curriculum at various levels in primary schools.

By comparing and contrasting the different sources of qualitative documentation, the researcher identified patterns, inconsistencies, and areas for improvement in the use of ICT in South African primary schools to enhance teaching and learning. These documents were analysed to determine the experiences and challenges SMTs face when integrating ICT into teaching and learning. The researcher also interviewed SMTs to gather firsthand perspectives on the experiences, challenges and successes of implementing ICT in education. By triangulating data from multiple sources, a comprehensive understanding of the current state of ICT integration in schools was achieved. The study analysed the data in the following section.

3.7 DATA ANALYSIS

The data analysis procedure is a systematic process that involves interpreting obtained data to generate answers to research questions (Creswell, 2009; Creswell, 2013; Creswell & Creswell, 2018). Dey (2005) states that data analysis is the systematic procedure of breaking down data into its fundamental components to uncover its distinctive characteristics and organisation. At the same time, Singh (2006) asserts that data analysis involves examining tabulated material to identify inherent facts or meanings.

Vosloo (2014) defines data analysis as the process of organising, interpreting, and structuring the extensive data gathered in a study. Moreover, Sileyew (2019) asserts that data analysis is the process through which researchers synthesise and interpret data, resulting in identifying categories and patterns in specific datasets. This study

employed theme analysis. Maguire and Delahun (2017) assert that identifying patterns in a qualitative investigation is called thematic analysis. The researcher selected thematic data analysis to align with the interpretivism research paradigm guiding this case study.

Themes in data analysis are patterns of shared meaning underpinned or united by a core concept (Braun & Clarke, 2019). Constructing or developing categories and themes involves the identification of patterns by grouping related codes (Braun & Clarke, 2019). As a result, data analysis for the qualitative study consists of preparing and organising text data for analysis, then reducing it to themes through coding, condensing, and finally presenting the data in figures, tables, or a discussion (Creswell & Creswell, 2018).

Data gathered through interviews and document analysis were categorised into themes following the conceptual outline established by Van Den Holland (2012). Nowell (2017) suggests that qualitative data analysis converts gathered raw data into research findings. This entails simplifying the gathering of raw data, differentiating relevance from insignificant issues, recognising patterns, and conveying the core of the insights derived from the collected data. The present study employed content analysis for data analysis. Slejiham (2018) argues that content analysis is a replicable, systematic approach for condensing extensive text into fewer topic categories using explicit coding protocols. Gant (2019) suggests that content analysis allows researchers to efficiently navigate extensive amounts of data using a methodical approach. Hence, the researcher grouped related coding units together to form categories of codes and themes to answer the research questions for the current qualitative case study.

3.7.1 Transcribing

According to McMillan and Schumacher (2010), transcribing transforms data obtained from interviews, observation, note-taking, and recorded interviews into a format suitable for analysis. Transcribing data means copying and converting information into a written or visual format to enable data analysis using a systemic method (du Plooy *et al*., 2021). When transcribing data obtained by digital methods, it is essential not to overlook elements like laughter or gestures, as these might contribute to the overall

meaning of the spoken words. It is crucial to transcribe everything precisely as it was said to prevent bias. The researcher carefully listened to the audio recordings and converted them into written words by retyping the whole interview word for word before analysing all written statements (du Plooy *et al*., 2021). The process was repeated several times to avoid any omissions and biases.

The pages of field notes and semi-structured interview audio recordings and transcripts were critically examined and synthesised through a thematic approach following the order of research questions. The analysis was done during data collection after all data had been gathered. This critical and vigorous data analysis helped us discover ideas, patterns, and explanations and understand specific data elements. Some data was reorganised and then synthesised to derive patterns and ideas that form the basis of the conclusions (McMillan, 2012). The analysis followed three steps: organising the data, summarising it as codes, and interpreting it to search for patterns and themes (McMillan, 2012). These themes were analysed and detailed by describing individual participants in the setting.

3.8 TRUSTWORTHINESS

The field of educational research has recently experienced a growth in qualitative research. Unlike other types of research, qualitative research provides researchers with process-based, narrated, storied data that are more closely related to the real-world experience of individuals (Stahl & King, 2020). The adventures of others and their fascinating stories can provide us with a wealth of information. However, the story's confidence level is mostly based on how much trust one has in the storyteller. Therefore, every study must build research trust since the trustworthiness of the research is one of those shared realities that readers and writers share, even if that reality is subjective (Stahl & King, 2020). Qualitative researchers generally hold the belief that truth is a product of creation, and therefore, they do not focus on the quantitative concept of validity.

Hence, every credible research project should ensure that its findings meet the requirements for trustworthiness (Creswell, 2014). This research ensured trustworthiness by employing multiple data collection methods, such as semi-structured interviews and document analysis. The research process was explained

and concisely to every party involved. According to Cresswell (2014), trustworthiness may be achieved when the researcher, the participant, and the readers of the research findings agree that the findings are accurate and correct. This means that all possible weaknesses should be revealed and that all research methods and decisions should be appropriate, justifiable, and in line with the research paradigms used (Swanborn, 2010). As an alternative, qualitative researchers aim to achieve the less explicit goal of trustworthiness by ensuring that when readers interpret the written work, they have confidence in the conclusions drawn by the researcher (Stahl & King, 2020). This purpose is clearly expressed in the Concise Oxford English Dictionary, which defines trustworthiness as reliable, honest and truthful (Stevenson & Waite, 2011).

To ensure the trustworthiness of the research results, the researcher triangulated the data collected from the semi-structured interviews and document analysis. The Appendix contains a copy of the semi-structured interview schedule. Trustworthiness also implies the study's replicability. The methodology steps, decisions, and their justification were clearly explained so that anyone can redo the research. Interview transcripts were given back to participants for verification.

As part of their approach to trustworthiness, Lincoln and Guba (1985) relied upon credibility, transferability, dependability, and confirmability (Stahl & King, 2020). These factors and perspectives from others who have written about trustworthiness in qualitative research are examined in the following sessions. A research study's credibility, transferability, dependability, and conformity determine its value, reliability, and richness. Therefore, it is prudent for this study to express how readers and other authors may use the findings as evidence for future research projects. The next section of this paper discusses how to apply the trustworthiness criteria for qualitative research such as this one.

3.8.1 Credibility

The confidence in the truth of the research findings is known as credibility (Lincoln & Guba, 1982; Shenton, 2004; Anney, 2015). Usually, a researcher's credibility is determined by whether the research findings represent credible information drawn from participants' original data and are accurate interpretations of their actual opinions (Anney, 2015). An essential aspect of credibility is the question, “Do the findings align

with reality?" Credibility is a crucial element in establishing trustworthiness. As such, the specific procedures incorporated, such as the line of questioning employed during data collection sessions and the data analysis methods, should, whenever possible, be derived from previous comparable projects that were carried out successfully (Shenton, 2004; Cope, 2014). Ideally, the researcher cautiously consulted with relevant participants, reviewed relevant documents, and visited the school before initiating the first data collection dialogues.

The prior visits and discussions with the school participants helped us understand the organisation and establish trust between the parties. It is conceivable, however, that if too many demands are placed on staff, gatekeepers who grant researchers access to the organisation may be deterred from cooperating (Anney, 2015). I successfully mitigated all potential negative influences on the participants, thereby yielding positive outcomes.

In this case, I followed all steps required to avoid inconveniences and allow data collection to be more efficiently conducted for effective results. Data triangulation involved using different methods, including observations, document analysis, and semi-structured interviews, which are the primary strategies for collecting qualitative data (Cope, 2014; Anney, 2015; Stahl & King, 2020). Even though document analysis and semi-structured interviews are both forms of interviews, they exhibit some similarities in terms of methodological shortcomings. However, they also possess some distinct characteristics essential for the study.

It was possible to optimise the benefits of different methods by combining them to compensate for their specific limitations (Stahl & King, 2020). In some cases, observations, photographs, and documents provided supporting data that provided a background for the attitudes and behaviour of the participants in the group under examination and verified the details they provided. Also, it was necessary to take advantage of any opportunities to examine documents referenced by informants during interviews, as these offered additional insight into the behaviour of those involved (Anney, 2015; Stahl & King, 2020). With this in mind, transferability was the second concept of trustworthiness to be discussed.

3.8.2 Transferability

In qualitative research, transferability refers to applying the findings to other contexts and settings and with other respondents (Lincoln & Guba, 1982; Anney, 2015; Stahl & King, 2020). Results are transferred from one context to another to expand understanding. A transfer can be accomplished only when a thick description provides a rich interpretation of the circumstance that can be applied to other situations (Stahl & King, 2020). Similarly, any excluded applicants who may have influenced the data collection were documented. To ensure transferability, a detailed description of the methods and timelines for collecting data in this study and the length of the field study was provided. These factors led to the study's dependability.

3.8.3 Dependability

Bitsch (2005:89) defines dependability as "the stability of findings over time." The reliability of a study is determined by whether or not the same or similar results would be obtained in a similar environment with the same or similar participants. The researcher ensured that the study's findings, interpretations, and recommendations were based on reliable and credible data obtained from the study participants (Anney, 2015). Furthermore, the researcher assures dependability by establishing an audit trail, recording the code, replicating step-by-step, and peer-reviewing.

A research audit trail involved examining the inquiry process and product to validate the information collected, recorded, and analysed to validate the information gathered. To cross-check the process of inquiry, raw data, interview and observation notes, documents and records collected from the field, test scores, and other necessary documents should be kept for further analysis and reference (Stahl & King, 2020). To meet the requirements for reliable data, the researcher gave all participants adequate time to observe carefully the data transcribed for an extended period in order to determine if any changes have occurred and whether they can be explained.

A stepwise replication strategy is a qualitative research data evaluation procedure where two or multiple researchers analyse the same data separately and compare the results (Cope, 2014; Anney, 2015). Where inconsistencies arise, if any, from the analysis by various analyses, the researchers must address them to improve the

dependability of the inquiry (Anney, 2015). If the results are trustworthy, it helps other users to depend on them and use the results to support their studies.

In order to maximise the effectiveness of a code-recode strategy, the researcher should give at least one or two weeks between each code to assist the researcher in coding the same data twice (Cope, 2014). The results from the two coding methods should be compared during the evaluation process to establish if they are the same or different. It allows the researcher to gain a deeper understanding of the data patterns and improve their knowledge of the participant narratives (Anney, 2015; Stahl & King, 2020). Another crucial stage of dependability is peer examination, where the researcher discusses their research process and findings with neutral colleagues such as doctoral students who are either doing qualitative research or have experience (Anney, 2015). Peer examination helps the researcher be honest with their study. Peers contribute to the researcher's deeper reflexive analysis (Anney, 2015). Furthermore, colleagues help identify categories that are outside the research question framework or identify negative cases. Confirmability was also used to assist in the study.

3.8.4 Confirmability

Confirmability, in its simplest form, refers to the extent to which other researchers can confirm or corroborate the results of an inquiry. According to Bitsch (2005), the concept of confirmability is closely related to objectivity in that it concerns bias and prejudices on the researcher's part. Data, interpretations, and findings must be grounded in individuals and contexts apart from the researcher's views. If the process is followed correctly, the results will be independent of values, motives, or political beliefs.

Since qualitative investigation deeply immerses participants in their own worldview, they may feel uncomfortable with the questions posed by the researcher or may hesitate to engage, which could lead them to provide misleading information (Anney, 2015). To avoid all unknown challenges from the participants, the researcher kept all electronic records, tape-recorded and non-electronic, field notes, and documentary materials during the investigation. These documents enabled the researcher to cross-check the data and write a final report based on his findings. Furthermore, the researcher verified that the participants did not fabricate any data.

When confronted with misleading, evasive, and false information, the researcher maintained a sceptical attitude by engaging for an extended period, building rapport and trust, triangulating data across various sources and methods, employing effective interviewing techniques, protecting informant identities, and conducting self-analysis and introspection. Due to the significance of trustworthiness in a qualitative study, the researcher strictly adhered to all trustworthy steps when investigating the experiences and challenges SMTs faced in integrating ICT into schools to enhance teaching and learning. Also, I ensured that the processes used were trustworthy and reliable for obtaining quality and authentic results. Therefore, I made sure to test all data collection instruments against the necessary information. The researcher provided support where tools have loopholes or if the participants need more clarity in any area. Other contingency measures, such as safeguarding information identity and proper interviewing techniques, will be implemented to guarantee the validity of the results.

3.9 ETHICAL CONSIDERATIONS

Ethical issues are paramount in primary research, particularly when using primary data sets, because they relate to the fair and unbiased selection of sources and analysis (Farrimond, 2013; Rahman, 2017). Credible research does not necessarily involve selecting participants and research strategies but requires a researcher to adhere to research ethics (Juta & Van Wyk, 2020). I used three general ethical considerations for the study to adhere to correct research ethics.

Firstly, I applied for ethical clearance from the College of Education at the University of South Africa (UNISA) and the University of South Africa (UNISA) Ethics Committee before conducting the case study in Ekurhuleni North District public primary schools. I also sought authorisation from the DBE in Gauteng province to gain access to their schools and conduct semi-structured individual interviews and document analysis for the study.

Secondly, all the participants were fully informed of the time commitment and any risks associated with the study. I also informed all participants that they could withdraw or drop out of the study at any given time if they wished to do so without giving any reasons. I also assured them that their real names and school names would not appear in any part of the study results or publication; only pseudonyms would be used.

The third ethical consideration concerns the data analysis process. I had to acknowledge my position and biases during the transcribing process. Charmaz (2014) observes that we are integral to the data analysis process and are responsible for the coding. I remained acutely conscious that the objective is to remain focused on the evidence, avoiding pursuing personal desires or the influence of preconceived notions. Denzin and Lincoln (2008) assert that a researcher's personal history impacts their perception of reality: "The interpretive bricoleur recognises that research is an interactive process influenced by their own personal history, biography, gender, social class, race, and ethnicity, as well as those of individuals in the setting." I consistently considered Denzin and Lincoln's insights, endeavouring to let the evidence reveal itself autonomously.

3.9.1 Informed consent as a dialogue

Every academic researcher must obtain permission from relevant authorities before proceeding with the research. As a result, the researcher requested consent from the GDE to conduct the study in Gauteng province schools and completed a case study of face-to-face interviews in their schools. To meet this academic requirement, I employed five steps mentioned in Hammersley and Traianou (2012), i.e., minimising harm, respecting autonomy, protecting privacy, offering reciprocity, and treating people equitably (cited in Rahman, 2017). Consequently, I sent written consent letters to five principals, the School Governing Board (SGB) members, and all relevant stakeholders representing the five schools selected for the study. Only after obtaining consent or clearance from all appropriate parties can academic research proceed.

3.9.2 Confidentiality and anonymity

Authorisation for the design of this study was granted after validating the methodologies and minimising known risks to ensure the protection of human participants' rights, in accordance with the guidelines provided by the University of South Africa (UNISA) School of Education research confidentiality guidelines. All potentially selected participants were provided with an informed consent form approved by the University of South Africa (UNISA) outlining the boundaries of the study, potential risks to the participants, and how the confidentiality of their identity would be protected throughout the study.

Furthermore, the confidentiality clause was explicitly outlined and explained to the participants before obtaining consent. A detailed description of the study and an open invitation to participate were communicated at a school level at the beginning of the school year, with the district officials indicating their support. As the school year progressed, all participants were constantly reminded of the opportunity to participate in the interview process. To protect the participants' identities, participants were then approached individually in their empty classrooms to agree or disagree with the interview process. After participants decided to complete the interview forms for the study, they were given a copy of the consent form and a time and place for the interview to be conducted.

I guaranteed anonymity and confidentiality to all participants. The final version of the thesis will not identify places and names where the study is conducted; only pseudonyms were used. I assured them that we would keep the collected data safe and not share it with anyone. The raw data will not be used in any write-up or presentation again. Only transcribed data with pseudonyms will be used. I reassured participants that the data would be documented in a research report. It is predicted that the research findings will be used for academic purposes only, including books, journals, and conference proceedings. All data will be entirely destroyed within 2-5 years after the completion of the research project.

3.9.3 Caring and fairness

As an academic researcher, I am committed to ensuring that my participants will not be harmed by taking action to prevent such harm. I reserve the right not to ask questions that may cause embarrassment or make the participants uncomfortable during the research process. I used simple and understandable academic language to ensure that all survey participants understood the content of the case study.

3.10 LIMITATIONS AND DELIMITATIONS OF THE STUDY

Several limitations may affect the results of this study. Identifying and acknowledging the study's shortcomings is imperative to provide an objective perspective and authentic results.

3.10.1 Limitations by design

It is important to note that this study's findings may not be generalisable to all educational institutions in South Africa due to its specific focus on selected public schools. Therefore, it is essential to carefully analyse and validate the collected data to ensure its accuracy and reliability. Additionally, incorporating multiple data sources can help mitigate potential errors or biases in the research findings. However, the insights gained from this research can still provide valuable information for schools looking to integrate ICT into their teaching practices effectively.

Consequently, the findings cannot be generalised to participants outside the program and are limited to the group participants. The absence of some principals, DPs, and DHs during the observation and individual semi-structured interview days may negatively affect data collection processes. As a result, the study attempts to mitigate these problems by providing a flexible research program schedule that allows all participants to take part.

3.11 SUMMARY OF CHAPTER 3

The chapter has comprehensively described the research methodology employed in this study. The literature cited in the chapter substantiated the selected approaches and strategies. This study was based on an interpretive paradigm to investigate the experiences and challenges of SMTs in South Africa regarding integrating ICT into teaching and learning. The study established a qualitative approach and case study design to investigate the experiences and challenges SMTs faced when integrating ICT into teaching and learning. The study used a purposeful and convenient sampling procedure to select five principals, five DPs, and ten DHs from the Ekurhuleni North District. Semi-structured interviews and document analysis were used to gather the data for the study, which was transcribed rigorously to maintain validity and trustworthiness. Moreover, this chapter elucidated the methodologies employed for data collection and the procedures used for data processing. This chapter also addressed validity, dependability, confirmability, and ethical considerations. Chapter 4 provides an overview of the presentation and analysis of the results.

CHAPTER 4

PRESENTATION AND INTERPRETATION OF THE FINDINGS

4.1 INTRODUCTION

This study sought to enquire about and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

Chapter 3 thoroughly explained and discussed the research methodology, approach, design, paradigm, population, sample, data collection tools, and data analysis methods used in the study. Additionally, the previous chapter adequately addressed ethical issues and trustworthiness in research.

Chapter 4 begins by presenting the schools' and participants' biographical data. This is followed by document analysis, which is followed by themes, sub-themes, and emerging themes from the subsequent primary research question:

- What are the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools?

The chapter also presented and interpreted the findings based on the four subquestions, which were as follows:

- What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?
- What challenges do SMTs face when integrating ICT in primary schools?
- What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?
- How do the National ICT policy and the school-based policy support SMTs in effectively integrating ICT in primary schools?

Every study or research aims to produce results (Shank *et al*., 2014). In this study, semi-structured interviews were the primary data collection method. However, observations and document analysis were also used to enhance the reliability of the findings and ensure triangulation. The participants included five principals, five DPs

and ten DHs, who were chosen to explore the experiences and challenges faced by SMTs in integrating ICT in South African primary schools to enhance teaching and learning.

Thematic analysis and inductive grounded theory were employed to accurately present and interpret the study's findings. Thematic analysis presupposes that more extensive and abstract hierarchical themes inherently organise all pieces of qualitative data (Shank *et al*., 2014). However, qualitative analysis becomes the discovery and testing of the themes, which are then presented with corroborating support and evidence (Shank *et al*., 2014). Using themes, sub-themes, and emerging sub-themes made it easier to tackle and apply complex concepts and situations. In essence, breaking down a complex whole into a set of simpler explanatory themes is one of the primary goals of qualitative research (Shank *et al*., 2014).

Since the qualitative study has briefly described thematic analysis, the next step is to explain how grounded theory was used. Despite being the oldest and most established type of thematic analysis, grounded theory depends on the careful bottom-up coding of data to create working codes (called open codes), more refined and broader codes (usually called axial codes), and eventually a smaller number of final inclusive code areas called themes (Shank *et al*., 2014).

Based on thematic analysis and grounded theory, the qualitative case study used codes as pseudonyms for participants' true identities to uphold anonymity and ethical standards. Besides, the chapter applied a thematic analysis and grounded theory to present and interpret the findings. Subsequently, the data were systematically organised, condensed, and analysed to address the experiences and challenges SMTS faced when integrating ICT in South African primary schools to enhance teaching and learning. The data presentation and interpretation process combined familiarisation with the data, code generation, thematic exploration, review, definitions, terminology, and comprehension of the acquired data.

4.2 SCHOOLS AND PARTICIPANTS (SMTS) BIOGRAPHICAL DATA

Table 0.3 Schools and participants (SMTs) Biographical Data and Codes

School Code	Name Code and Role	Gender	Highest Education Qualification	Number of Years in Leadership
School A	P-A	F	BED Honours Curriculum Studies	6
	DP-A	M	BA	6
	DH-A1	F	F.E.D	5
	DH-A2	F	Honours Degree in Education	6
School B	P-B	F	BED	3
	DP-B	M	BED	6
	DH-B1	F	BED Honours	5
	DH-B2	F	BED Honours	5
School C	P-C	F	PTC	10
	DP-C	F	BED Honours	11
	DH-C1	F	BED	5
	DH-C2	M	SPTD	7
School D	P-D	F	BED Honours	12
	DP-D	M	B-TECH in Education	6
	DH-D1	M	Advance Certificate in Intermediate Phase (ACT)	5
	DH-D2	M	Honours Bachelor of Education in Leadership and Management	6
School E	P-E	M	PhD	11
	DP-E	F	Honours Degree in Education	6
	DH-E1	F	BED	5
	DH-E2	M	BED	8
Total		Females 12		Males 8
			Total Participants	20

4.2.1 Summary of participants' profiles

Table 0.4 Summary of Participants' Profiles

ABBREVIATION	REPRESENTATION
M	Male
F	Female
B.Ed.	Bachelor of Education
D.Ed.Hons	Bachelor of Education Honours
BA	Bachelor of Arts
SPTD	Senior Primary Teacher Diploma
BTech in Education	Bachelor of Technology
ACT	Advanced Certificate in Teaching
PhD	Doctor of Philosophy

Key: M = Male, F = Female, ACT = Advanced Certificate in Teaching, BA = Bachelor of Arts, B.Ed. = Bachelor of Education, B.Ed. Honours Curriculum Studies, B.Ed.Hons = Bachelor of Education Honours, H.B.E.L.M = Honours Bachelor of Education in Leadership and Management, SPTD = Senior Primary Teacher Diploma, BTech in Education = Bachelor of Technology in Education, PhD = Doctor of Philosophy

4.2.2 Demographic information of participants

The qualitative case study was conducted in five public primary schools in the Ekurhuleni North District, Gauteng Province. The schools are in Tembisa township in the Municipality of Ekurhuleni North. The schools are approximately 8–10 kilometres apart. The selected schools were given codes to adhere to ethical research standards, ensure anonymity in the study, and protect participants' data. Similarly, the study participants were provided with codes that aligned with their school codes.

The five schools were coded as follows: School A, School B, School C, School D, and School E. Four participants were chosen from each of the five schools and assigned name codes: P-A, P-B, P-C, P-D, P-E, DP-A, DP-B, DP-C, DP-D, DP-E, The name codes for the participants include DH-A1, DH-A2, DH-B1, DH-B2, DH-C1, DH-C2, DH-D1, DH-D2, DH-E1, and DH-E2, as shown in Table 4.1. The qualitative case study involved participants from five schools, A, B, C, D, and E, with varying gender

compositions, as illustrated in Table 0.3. The table below displays participants' biographical information, with schools assigned codes to represent both genders. It includes the school code, the codes for participants' names and roles, their gender, highest educational qualifications, years of leadership experience, training institutions, and participation in district ICT leadership workshops.

4.2.3 Description of gender representatives

In school A, the participants were three females and one male; in school B, they were three females and one male; in school C, they were three females and one male; in school D, they were one female and three males; and in school E, they were two females and two males.

4.2.4 Description of research sites

In this qualitative case study, research sites represent natural environments from which data were gathered (Maxwell, 2016; Creswell & Creswell, 2018). This is the actual location and venue where the qualitative study was conducted. De Vos *et al*., (2011) state that qualitative researchers should collect data in the field at the site where participants experience the issue or problem under study. Hence, for this qualitative case study, the research sites were the five sampled public primary schools where the study explored the experiences and challenges the SMTS faced when integrating ICT into the teaching and learning process. Collecting data at the participants' comfort zones made the principals, DPs, and DHs express their experiences and challenges pertinent to the research topic freely (Creswell & Creswell, 2018; Creswell, 2013).

The data collected from five different schools offered extensive and varied contextual information for analysis and interpretation (Creswell & Creswell, 2018). This qualitative case study provided an extensive description of the research sites in accordance with research studies, which should include the geographical, socioeconomic, and cultural environment within which they were conducted (DBE, 2001). The case study involved five public primary schools, two of which integrated ICT into teaching and learning and three of which did not. The students in all five schools ranged from grades R to 7. The school buildings in all five schools are in acceptable condition, with all classrooms

secured with a locking system. All school entrances are controlled, and every visitor entering the premises registers their name in the access control logbook.

4.3 DESCRIPTION OF SCHOOLS INVOLVED IN THE CASE STUDY

4.3.1 School A

School A, a quintile three public primary school in Tembisa, Ekurhuleni North Municipality, is a no-fee, government-funded school with 7 SMT members, 25 teachers, and 1,251 learners. The foundation phase uses isiZulu, while the intermediate phase uses English as a home language. Despite a non-functional computer lab, the school offers extracurricular activities, such as sports and cultural clubs, to support its diverse learner population and provide quality education.

4.3.2 School B

School B, a quintile three public primary school in Tembisa in Ekurhuleni North Municipality, is a no-fee, majority government-funded institution with 7 SMT members, 38 teachers, and 1,598 learners. The foundation phase uses isiZulu and Sepedi, while the intermediate phase uses English, even though the computer lab is not functioning. The school also has a vegetable garden for educational purposes and to supplement the school feeding scheme. Despite challenges with infrastructure and resources, the school has maintained strong academic performance over the years.

4.3.3 School C

School C, located in Tembisa, Ekurhuleni North Municipality, is a no-fee, government-funded quintile three school with 7 SMT members, 27 teachers, and 1,256 learners. The foundation phase uses Xitsonga, while the intermediate phase uses English. The school had a functioning computer lab. The school also offers extramural activities such as sports and cultural clubs to enhance the overall development of its learners. Additionally, School C strongly emphasises community engagement and regularly participates in outreach programs that benefit the surrounding community.

3.4.4 School D

School D is a government-funded, no-fee public primary school in Tembisa, Ekurhuleni North Municipality. It has 7 SMT members, 24 teachers, and 1,149 learners. The foundation phase uses isiZulu and Sepedi, while the intermediate phase uses English. The school has a non-functioning lab. Despite challenges with a non-functioning lab, School D offers extramural activities, academic support, and a supportive learning environment. It actively engages with parents and the community to ensure learner success.

3.4.5 School E

School E is located in Tembisa, within the Ekurhuleni North Municipality, in the Ekurhuleni North District. It is also a quantile three public primary school with no fee; the government fully funds it. The foundation phase uses Sepedi, while the intermediate phase uses English. The school had 7 SMT members, 26 teachers, and 1,046 learners. It has a fully functioning computer lab. The school also offers extramural activities, such as soccer, netball, and choir, to enhance the overall development of its learners. School E intensely focuses on academic excellence and strives to provide a well-rounded education for all its learners.

4.4 PRESENTATION AND INTERPRETATION OF DATA FROM INTERVIEWS

This study sought to enquire about and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools. To achieve the study's aim, the researcher conducted interviews with SMTs from five schools in the Ekurhuleni North District.

The data were presented using inductive thematic analysis, where themes, sub-themes, and emerging interview sub-themes were presented and interpreted in separate sections. Themes, sub-themes, and emerging sub-themes from interview responses were presented and interpreted separately to facilitate an accurate discussion, as well as recommendations and conclusions in their respective chapters. The data analysed, interpreted, and presented were gathered through semi-structured interviews, the primary data collection instruments.

The qualitative case study also used document analysis and observations to ensure the trustworthiness of the findings and facilitate triangulation. The participants comprised SMTs, and the documents analysed included the National ICT Policy, the School-Based ICT Policy, ATPs, and lesson plans. Participants and document analysis were chosen to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT in teaching and learning in South African primary schools. The interview responses from the research questions generated primary themes, resulting in sub-themes and emerging themes. The following is a list of themes, sub-themes, and emerging sub-themes presented and interpreted from the participants' responses and replies to the research questions, as gathered in the presentations. This information is necessary for the study's discussions, recommendations and conclusions.

4.4.1 Theme 1: The SMTs' knowledge of ICT integration in teaching and learning

This case study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

Theme 1 was derived from the following research question:

- What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?

The objective of this question was to establish the SMTs' understanding of ICT integration in teaching and learning.

To help answer the above research question and the objective, Theme 1 comprised three sub-themes:

- The Level of Computer Knowledge Possessed by SMTs
- SMTs' Understanding and Perspectives on ICT Integration and Implementation in Schools
- The Training SMTs Received to Prepare Them to Integrate ICT in Schools.

The first sub-theme was to establish the SMTs' general knowledge of computers and the kind of skills and competencies they possessed. General computer knowledge and skills include essential technical abilities and digital literacy needed to operate computer hardware, software, and the internet effectively for personal, professional, and educational purposes. These include the ability to perform word processing and create, edit, and format professional documents such as reports, letters, and policy drafts using software like Microsoft Word or Google Docs; additionally, being able to use spreadsheets with programs like Microsoft Excel or Google Sheets for data organisation, financial management, budgeting, creating basic formulas, and analysing data; furthermore, being able to develop engaging presentations with text, images, and multimedia, such as PowerPoint or Google Slides, for staff meetings, workshops, and school events.

The second sub-theme was to establish the SMTs' understanding and perspectives on ICT integration and implementation in schools. SMTs' understanding and perspectives on ICT integration are the most crucial factors in determining the successful integration of ICT in schools. SMTs' general perspective encompasses understanding the school's vision and goals related to ICT integration. It also highlights their knowledge of national, provincial, and school policies on ICT integration, as well as what success in improved learning looks like.

Most SMTs hold a positive theoretical perception of ICT, recognising its essential role in preparing learners for the 21st century and modernising classroom practices. Also, the SMTs' view of ICT's value in schools. It is generally acknowledged that ICT can enhance the quality of teaching and learning, make lessons more interactive, and improve learner motivation and skills such as critical thinking, collaboration, communication, and creativity, thereby facilitating personalised learning and shifting from teacher-centred to learner-centred approaches to instruction. This theme also helped determine whether SMTs are aware of emerging educational technologies and effective models like technological ones and how ICT's pedagogical value involves SMTs' understanding of why ICT is integrated to promote TPACK and successful case studies of technology use.

Sub-theme 3's objective was to establish the kind of training SMTs received to prepare them to integrate ICT in schools. In this sub-theme, the researcher aimed to further establish whether SMTs received formal academic training modules and programmes from any higher education institutions or colleges regarding ICT integration. It is assumed that SMTs typically acquire ICT integration knowledge through structured learning environments, especially at the tertiary level through university-level modules or many educational leadership, administration, or management degree programmes, such as Advanced Diplomas and M.Ed. degrees, which cover the theoretical basis for using ICT to enhance teaching and learning, often introducing models like TPACK. Furthermore, the sub-theme sought to establish whether the SMTs received Accredited Short Learning Programmes (SLPs) from external providers, often endorsed by national education authorities such as SACE, that offer specialised programmes for school leaders.

Therefore, determining ICT knowledge of ICT integration in teaching and learning is an essential foundation for this case study's results. SMTs' computer knowledge and skills are vital in assessing whether SMTs can effectively use their laptops or computers for basic administrative tasks and personal use. This case study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

The SMTs' responses from the semi-structured face-to-face interviews are presented and interpreted in detail through a thematic analysis in the following sections. The thematic analysis of the interview data revealed several sub-themes that emerged from participants' reactions, as summarised in Table 4:3 below. Verbatim quotes from the interviews are presented subsequently, cited accurately in accordance with academic conventions, and formatted in italics and quotation marks.

4.4.1.1 Sub-Theme 1: The Level of Computer Knowledge Possessed by SMTs

The level of computer and TK SMTs possess in an academic context can be achieved by first framing its significance within the broader educational landscape. In modern schooling, the SMT, including principals, DPs and department heads, is a crucial agent of change in leading and implementing educational change.

This sub-theme presents and interprets the specific responses collected from the SMTs regarding their TK, moving beyond simple computer literacy to examine the pedagogical, technical, and management-related skills they possess in relation to ICT integration. Understanding the SMT's knowledge base is essential for assessing a school's capacity to foster a technology-rich learning environment and for designing effective professional development programmes that support their leadership role in integrating ICT in schools.

The interview responses raised three emerging subthemes, as presented in Table 0.5 below.

Table 0.5 Participants' Responses on the Type of Computer and Technological Knowledge SMTs Possess

SUB-THEME 1	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**
The Level of Computer Knowledge Held by SMTs	• Lack of computer knowledge and skills • Intermediate computer knowledge and skills • Advanced computer knowledge and software applications

- **Lack of computer knowledge and skills**

The data from the SMTs' responses, collected during the qualitative case-study interviews, indicate that many SMTs struggle with basic computer literacy and rely on others for assistance. This highlights a significant knowledge gap in fundamental computer skills, particularly with standard software such as Word, Excel, and presentation tools. Several SMTs reported possessing only basic or limited computer knowledge. One SMT member said they can't use Excel, and another said they don't know how to use some computer features. The lack of skills is most apparent in specific application areas. SMTs frequently locate it challenging to complete tasks such as creating their own presentations from scratch and using Excel.

The SMTs shared some of their responses during the interviews.

P-D said*, "The little knowledge that I have is just the basics of computers. I've got a problem when it comes to Excel. I cannot even use Excel."*

In addition, DH-A1 said, "*I'm struggling a bit, but I'm getting there because to utilise the laptop, we were introduced to laptops last year, so we're a bit struggling."*

DH-A1 further added*, "A lot of unskilled teachers can be a challenge because we can have laptops and whiteboards, but if we don't know how to use them, it will remain a white elephant."*

To support this assertion, DH-A2 and DH-D1 said*, "I have very little knowledge of technology, but I use the computer in preparing for my classes, for my teaching and learning, but not all the time."*

P-D, DH-A1, and DH-D1 said, respectively*, "I need help from someone to open Excel for me first, and then I can work on it. Every time, I need someone who will always start it for me when using Excel and PowerPoint. I rely on these newly appointed teachers just to teach us."*

P-D acknowledged, *"So my knowledge is a little compared to how advanced technology is nowadays. So, I am struggling but hoping to reach out and get more help so that I can be on par with the technological world."*

DP-D said, *"I can use Word, I can use Excel, I can type, I can email. Most of the things, even my colleagues, wherever I have a problem, are the people who are guiding me on how to do things. Most of the things it is self-taught. I just taught them by myself, and my colleagues are assisting me here and there, but I'm getting there. My typing is not that fast. I don't have university and college training."*

P-B confidently said, *"I can rate myself nine out of ten. I know Word, Excel, and PowerPoint, and I don't know what the other ones are, but I know all of them. I have general knowledge."*

Based on the SMTs' responses, most have basic computer knowledge and skills. This is accurately reflected in their statements, "*The little knowledge that*

I have is just the basics of computers," "I've got a problem when it comes to Excel." "I cannot even use Excel."

Furthermore, to confirm this finding, some of the SMTs shared that they rely on those who are computer literate.

> *Statements were made, "I need help from someone to open Excel for me first, and then I can work on it, and every time, I need someone who will always start it for me when using Excel and PowerPoint." "I rely on these newly appointed teachers just to teach us."*

Therefore, the case study reveals that most SMTs lacked the necessary computer knowledge and skills to perform simple administrative duties. The level of computer skills and usage among SMTs raises serious concerns about their overall expertise. It also shows why it is difficult for SMTs to integrate ICT in primary schools. However, some SMTs showed intermediate computer knowledge and skills, as presented below.

- **Intermediate computer knowledge and skills**

Based on responses from the SMTs, some indicated an intermediate level of digital literacy, particularly with the Microsoft Office Suite. An intermediate level means SMTs can perform ICT tasks and have the computer knowledge and skills needed to carry out their core practical and administrative duties without difficulty. The SMTs' responses show they can effectively use applications such as Word, Excel, and PowerPoint for everyday tasks, including creating memos, analysing data, and delivering presentations.

Unlike the previously mentioned group with basic computer skills, this group of participants are familiar with and possess the computer skills needed to use applications like Word and Excel for specific professional purposes. They reported using Word for writing and Excel for creating spreadsheets and analysing learners' data. Their responses extend beyond basic usage, showing the ability to perform more advanced tasks, such as creating spreadsheets, generating graphs, and designing PowerPoint presentations.

This group of SMTs further showed that they are comfortable using desktop software and skilled with online tools. They acknowledge that they can access any information they need from Google search at any time and manage various attachments sent via email. There is a general sense of confidence and competence, with phrases like *"I'm able to navigate through Microsoft"* and *"I am familiar with Excel, PowerPoint, and the rest,"* indicating they have a strong foundation in these tools.

Below is an example of what some SMT members said during the interviews:

> P-A said, "*I'm familiar with Word and Excel, and I can use Word and Excel for writing memos and analysing learner results. I'm able to do spreadsheets, any spreadsheet... I used Excel to make my graphs and PowerPoint for presentations. I'm also able to access whatever information I need from Google at any time... Anything that has been sent to me via the district emails?"*
>
> P-B said*, "Word, Excel, PowerPoint, and I don't know what the other one is, but I know all of them."*
>
> DP-D added*, "I am familiar with Excel, PowerPoint, and the rest. Yeah, most of them I am familiar with. This helps me to use SA-SAMS to do my reports, upload learners' marks and monitor absenteeism."*
>
> DP-A confidently mentioned*, I'm conversant with Word more than Excel, and I enjoy working with Word.*
>
> In addition, DH-E1 said*, "I would say I'm able to navigate through Microsoft. So basically, using Word, PowerPoint, and Excel."*

The responses from the SMTs indicate they possess the necessary computer knowledge and skills, enabling them to perform their administrative duties effectively. It further shows their confidence in computer knowledge; for example, DP-A said, *"I'm conversant with Word more than Excel, and I enjoy working with Word."* This shows DP-A's ability to perform any function using the Word application.

Similarly, DH-E1 confidently said, *"I would say I'm able to navigate through Microsoft. So basically, using Word, PowerPoint, and Excel."* This indicates that the SMT member is proficient in using computers to perform various tasks. P-A also showed

how they use their computer knowledge and skills to perform complex tasks. P-A said, *“I used Excel to make my graphs and PowerPoint for presentations.”*

These results reveal that although there is a group of SMTs who possess basic computer knowledge and skills, some of them have computer skills that enable them to perform their duties easily. Furthermore, the results indicate that possessing computer knowledge and skills enhances the SMTs’ ability to perform their duties efficiently and effectively.

The following responses relate to advanced computer knowledge and skills.

- **Advanced computer knowledge and software application skills**

Although the case study revealed that a group of SMTs can perform some duties using specific functions, they do so with their computer knowledge and skills. The case study further shows that some SMTs possessed advanced computer knowledge and skills, acquired through tertiary-level studies. This was shown by their use of complex software features, such as advanced spreadsheets to analyse learner results and perform other functions, and software like SA-SAMS for administrative tasks.

Below are the details of the SMTs’ responses concerning advanced computer knowledge and skills.

DP-A expressed familiarity with smartboard technology and its usage in teaching, highlighting the significance of work experience in enhancing their computer literacy skills.

> “*I'm from the high school. We were using smartboards to teach, and there is a lot I just learned when I was working.”*
>
> P-E said, *“I've got advanced computer skills and literacy, which includes troubleshooting simple issues like connecting to networks, managing power settings, or setting up peripherals.”*

P-C showed a growth mindset, self-assessing their technology skills and rating themselves as "level six" in Word, Excel, and PowerPoint, promoting a culture of continuous learning and professional development.

"*I'm learning, and even now, I'm busy learning how to use the computer. I've got an idea. If I were to say levels, I'm level six now in terms of Word, Excel and PowerPoint so far.*"

DH-C2 and DH-E1 emphasise possessing knowledge of many applications, including Excel, Google, and email.

"The knowledge, yes, I know about Excel, I know Google, emails, all those things which are related to computers."

DH-C2 and DH-E1 show proficiency in Microsoft Office, Google, and email, indicating strong foundational technology skills for administrative tasks and educational activities.

DH-E2 said, *"I have computer knowledge that is enough to help me to integrate ICT in the classroom."*

P-E: *"I can also use Google Workspace to perform daily tasks like creating lesson plans, managing documents and conducting research."*

Both DH-E2 and P-E show confidence in their ICT skills. DH-E2's ability to integrate technology in the classroom can enhance teaching and learning. P-E's proficiency in Google Workspace enables efficient task management, lesson planning, and research, showcasing their adaptability and tech-savviness in an educational setting.

DP-B highlighted their proficiency in computer technology by stating that they have received formal education and training in this field.

DP-B noted, *"I have N6 computer technology. I am familiar with Excel, PowerPoint, and the rest. Yeah, most of which I am familiar with."*

DP-A highlighted their computer literacy and familiarity with Microsoft applications, stating that they acquired these skills through formal education.

"I've got computer literacy... I think I did it when I was doing my BA degree."

Both DP-B and DP-A show a foundation in computer technology through formal education. DP-B's N6 qualification in computer technology showcases specialised

training, while DP-A's computer literacy acquired during their BA degree highlights integrating technology skills into their academic pursuits. This formal education background can support their effectiveness in using technology for administrative and educational tasks.

> DP-D stated, *"We come from a background where most of us technology finds us on our way. So, I can't say there's a proper workshop or training that I went through, but what I can say to you is that most of the things are self-taught."*
>
> DH-D2 further mentioned, *"When I was doing my advanced certificate in teaching Mathes scripts in the face, it came with computer training. I have a certificate that also reflects the computer."*

The case study revealed that some SMTs are proficient in Google Workspace, enabling efficient task management, lesson planning, and research, and showcasing their adaptability and tech-savviness in an educational setting. In summary, Sub-Theme 1 identified three main levels of computer knowledge among the SMTs: basic, intermediate, and advanced skills. Chapter 5 extensively discussed and analysed these.

The following section presents and interprets the themes in Sub-Theme 2 regarding the SMTs' understanding and perspectives on ICT integration and implementation in schools.

4.4.1.2 Sub-Theme 2: SMTs' Understanding and Perspectives on ICT Integration and Implementation in Schools

The SMTs' understanding and perceptions of ICT integration are vital because their attitudes influence ICT integration, the school's strategy, resource distribution, and overall digital culture. However, the effective use of ICT in schools goes beyond simply providing hardware and software. It demands a comprehensive strategy that emphasises pedagogical integration, professional development, and sustainable implementation. Moreover, ICT integration is not merely about introducing devices into the classroom; it involves transforming the teaching and learning process to develop 21st-century skills such as critical thinking, collaboration, and digital literacy. As a

result, SMTs as change agents support schools in managing the complexities of technological change, ensuring that ICT functions as a powerful tool to improve educational outcomes for all learners.

The data collected from the SMTs' responses indicate that SMTs have varying understandings and perspectives of ICT integration in education. While some define ICT integration as merely using technology in the classroom, others view it as a means to improve teaching and learning, foster communication and collaboration, and prepare learners for a digital world.

Emerging sub-themes from Sub-Theme 2 are shown in Table 0:6 below.

Table 0.6 Responses on the SMTS' understanding of ICT integration and implementation in schools.

SUB-THEME 2	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**
SMTs' understanding and perspectives on ICT integration and implementation in schools	• SMTs' perspectives on ICT integration in schools • Benefits of ICT integration in schools • SMTs using ICT tools to support teaching and learning during COVID-19

- **SMTs' perspectives on ICT integration in schools**

The following are responses from the SMTs regarding their understanding of ICT integration in schools.

> P-C defined ICT integration as a situation, *"Where our learners are taught how to use the gadgets in the computer lab."* While DH-D2 stated that ICT integration involves *"Teaching using a PC and moving away from paperwork."* P-A stated, *"Everything is presented via smartboards and smartphones."* P-E defined ICT integration as. "*Using all forms of ICT gadgets for teaching and learning in the school."*
>
> DH-D2, *"ICT integration is the use of ICT tools, moving away from paperwork and teaching using computers. We are trying to use ICT tools like computers. So far, our school is not part of the ICT schools in our district. But now we are*

trying to use ICT tools like computers. We have schools identified by the department for pioneering ICT in the district. Those were prioritised; they have Wi-Fi. They have all the equipment."

P-E showed an understanding of using ICT tools in teaching and learning,

"I can connect my laptop to the smartboard using the Internet. You see, using the HDMI. We've got smartboards, and learners do have laptops as well. We've got projectors where we project our lessons as well, and other PowerPoint presentations."

P-B, ICT, "*It's where learners are being taught how to integrate their learning with using computers because a lot can be done."* DH-C1, *"ICT is the use of technology for teaching and learning purposes."*

DP-D define their understanding of ICT integration as,

DP-D said, *"ICT integration in the school is where we are going to use technology. That's when we move away from the textbook to the new technology, where learners will be able to use computers and tablets, as we now live in a technological world where there's a lot of technology. Even in the last meeting I attended, they emphasised the need to introduce technology to learners, as schools like X and Y have largely transitioned away from textbooks, instead using information from ICT."*

P-D highlighted the importance of using ICT in the school to support modern learners:

P-D, *"My understanding of ICT integration is that we need to use technology in the classroom, at least for our learners to be advanced and like modern children."*

DH-C2 showed an understanding of ICT in teaching and learning,

DH-C2, *"Learners must learn through the use of technology. The department has introduced e-learning. They learn how to use a computer, how to get information using the Internet, and how to use the computer. There are certain skills that they are learning almost every day."*

DH-E1 believes: *“Both learners and teachers need to possess technology knowledge to a certain extent that would allow this integration during lessons. Incorporate videos into my classes somehow. Using Google Forms...learners should also be able to work through the Google Form.”*

On the other hand, P-A views ICT integration as a crucial element of school development and progress.

P-A revealed that*, “Using ICT or technology can enhance the development of our school. I want our school to be an ICT school, where teachers are preparing lessons and activities, using technology to work smarter and empowering teachers to effectively integrate ICT in their work.”*

P-A explicitly expressed the conviction that ICT serves as a formidable instrument for beneficial transformation. Furthermore, P-A perceives ICT not merely as a supplementary element but as a driver for substantial advancement in the school. This indicates an understanding of how technology can enhance educational activities and administrative functions.

P-B *highlighted, “I think learners do much better if you integrate technology with their learning, rather than showing them a textbook lately. If they can research for themselves, they have resources that they can use to visualise the things that we're talking about in class.”*

DH-D1 showed an understanding of ICT,

“ICT can be helpful to learners, especially this new generation of learners. It will be easy for us as teachers when we use computers to teach them in classes, looking at those pictures and everything. It will be much more interesting for them.”

P-D highlighted the potential benefits of ICT,

P-D said, *“We need to use technology in the classroom...to be advanced. The only thing that we do is open up and put some slides for learners. Our learners are even better than us...they can even come and help you.”*

The participant highlights the possibility that learners may be more familiar with technology than teachers. Additionally, it indicates that the participant recognises the potential for learners to become digital citizens and for teachers to learn from them.

Based on the SMTs, the responses reveal a diverse understanding of ICT integration in schools, ranging from basic tool use to a broader view of its role in pedagogy, communication, and whole-school transformation. Several participants initially defined ICT integration in terms of the hardware or the skill of using it. P-C and P-B see it as teaching learners how to use gadgets, such as computers, in the computer lab. At the same time, P-A and P-E focused on using all forms of ICT gadgets and presenting material via smartboards and smartphones. DH-C1 offers a straightforward, functional definition: *"the use of technology for teaching and learning purposes."*

Overall, the responses of the SMTS illustrate a variety of understandings. Some define ICT based on its physical presence and basic usage skills, such as gadgets and the computer lab. Others describe ICT as a means to replace outdated teaching methods, like paper-based materials and textbooks, to improve efficiency. Meanwhile, some see ICT as a tool to actively enhance teaching, learning, assessment, and communication, using videos and Google Forms for diagnosis. ICT is recognised as a catalyst for holistic school development and transformation.

- **SMTs enhancing teaching and learning through ICT integration**

SMTs also revealed that integrating ICT into teaching and learning enhanced teaching and learning. The following are the responses of SMTs gathered during the interview.

> DH-E2, *"ICT is facilitating communication through the mediums of technology, using technological advances and devices so that we can get the message across. It might be through instruction in the classroom. I integrate technology to enhance communication. I use Google Forms for reflection purposes to diagnose whether the learners understood the lesson or not."*

DH-E2's views on ICT integration are similar to those of P-E, who stated:

> P-E stated that, *"ICT promotes communication and collaboration among district officials, teachers and learners."* While DH-A2 mentioned that,

“Technology enables learners to research and visualise concepts, promoting independent learning.”

DH-D1stated*, “Using ICT helps to capture learners’ marks using SA-SAMS easily. We also use it for learner attendance and track their performance.”*

P-B believes that learners respond well to visual content and technology, and that integrating ICT into learning enhances engagement and outcomes, making it more effective than traditional textbook-based methods.

P-B, “*Our learners are learners who understand visual things. So, when you're using ICT in their learning, our learners are technically inclined again, so they love it. I think they do much better if you integrate it with their learning, rather than showing them a textbook lately.”*

The responses show the participant’s understanding of the potential benefits of ICT integration for learners, particularly regarding engagement and relevance. They also emphasise the importance of using technology to meet the needs and preferences of contemporary learners. Additionally, the participant highlights the school’s use of specific ICT tools, including SA-SAMS, for capturing and tracking data on teacher attendance, learner attendance, and learner performance. This shows the participant’s awareness of ICT’s role in supporting school administrative tasks and data management.

- Advantages of incorporating ICT in educational institutions

SMTs also mentioned the benefits of integrating ICT in teaching and learning. These are some of the benefits highlighted by the SMTs of integrating ICT in teaching and learning.

DH-E1 believed ICT improves teaching and learning,

DH-E1 mentioned, *“ICT integration is using ICT to improve teaching and learning in classrooms to support teaching and learning.”*

Principal P-B noted that technology integration,

P-B also said, *"ICT makes learning more fun and enjoyable, and learners love it."*

DP-A stated that technology integration lessens the load of teachers,

DP-A revealed that, *"ICT use lessens the load of teachers and makes things quicker."*

Principal P-B noted that, *"ICT motivates learners to do their work."* Similarly, DP-E stated, "*ICT enhances learners' engagement."*

Their responses suggest that technology integration can improve learner motivation and engagement.

DH-C1 also revealed that ICT improves teaching and learning,

DH-C1 said, *"Learning purposes, improving learner engagement, motivation, outcome, facilitating communication and collaboration among learners and teachers. It can help us in terms of curriculum implementation."*

The responses show the participant's understanding of the benefits of ICT integration, including increased learner engagement and motivation, improved communication and collaboration, and support for curriculum implementation.

Principal P-A observed that ICT "*…assists with attention. All learners will remember what they have learned in class."*

This implies that integrating ICT into lessons can help learners focus and retain information more effectively.

DP-E mentioned that *"ICT improves access to resources and information on the Internet. I would say ICT integration and implementation in schools have enhanced learners' engagement in learning and improved their access to resources and information on the Internet."*

This highlights the importance of ICT in providing learners with access to a wealth of educational resources.

DH-A2 mentioned that technology enables learners to *“research and visualise concepts, promoting independent learning.”*

This suggests that ICT integration can enhance learners’ research skills and promote autonomy. ICT integration has enhanced learners’ engagement in learning and improved their access to online resources and information.

Regarding increased flexibility and accessibility, DP-A mentioned that technology enables.

“virtual meetings, remote communication, and access to educational resources.”

This suggests that ICT integration can increase flexibility and accessibility.

The responses from the SMTs provide helpful information regarding the perceived benefits of ICT integration in schools. The participants' understanding of ICT integration centres on its capacity to improve teaching and learning, increase student engagement and motivation, and facilitate curriculum implementation.

Key benefits of ICT integration identified by the SMTs in their responses include improved learner engagement and motivation. The SMTs believe that ICT integration makes learning more fun and enjoyable, motivating learners to do their work and increasing their engagement. Furthermore, the participants mentioned that ICT integration enhanced teaching and learning. The SMTs highlighted that ICT integration is seen as a means to improve teaching and learning, facilitating communication and collaboration among learners and teachers, and supporting curriculum implementation.

They also perceived ICT integration as a tool that amplifies learners' access to resources and information. They strongly mentioned that ICT provides learners with access to a wealth of educational resources and information on the internet, fostering independent learning and research skills. SMTs also believe that ICT assists with flexibility and accessibility. ICT integration enables virtual meetings, remote communication, and access to educational resources, thereby increasing flexibility and accessibility.

The following section presents and interprets SMTs' responses regarding how ICT supported online teaching and learning during the COVID-19 pandemic.

- **SMTs using ICT tools to support teaching and learning during COVID-19**

The SMTs revealed in the current study how ICT tools supported teaching and learning during the COVID-19 pandemic outbreak. This was shown through the responses given during the semi-structured interviews. Below are some of their responses:

> P-E acknowledged using ICT during COVID-19, *"During COVID-19, we were able to use technology to teach...online teaching.* DH-B1 also acknowledged using ICT, *"During COVID-19, we used WhatsApp to communicate with each other at school."* Furthermore, DH-B1 explained how they communicated with each other using ICT*, "The district also just sent emails. We often communicated through emails and also used virtual means. We were using Teams."* On the other hand, DH-B2 outlined the importance of ICT, *"I think ICT at schools is needed, especially for our learners and even for us teachers, in our teaching. Like now, since we had COVID, most of the things were done using laptops, tablets and phones."*
>
> P-E highlighted the importance of using ICT for virtual meetings, *"We used technology to communicate with school members...virtual meetings...SMS, WhatsApp, emails, and even virtually all the meetings we conducted at that time. We used Microsoft Teams...as long as there is connectivity."* P-E further mentioned that they use ICT to collaborate with other schools using virtual platforms. *"Not only at the school level, but we are collaborating with the neighbouring schools. So, we use Teams."*

The study revealed that during the total shutdown caused by the COVID-19 pandemic, SMTs used ICT tools to teach online and communicate with each other, the district, and, in some cases, with parents' learners. P-E recognised using ICT during COVID-19, *"During COVID-19, we were able to use technology to teach...online teaching."*

On the other hand, DH-B1 relied on WhatsApp to communicate with other staff members at school; furthermore, DH-B1 and P-E used emails and Teams to reach the district officials: *"During COVID-19, we used WhatsApp to communicate with each*

other at school." Furthermore, DH-B1 and P-E explained how they communicated with each other using ICT*, "The district also just sent emails. We often communicated through emails and also used virtual means. We were using Teams."*

4.4.1.3 Sub-Theme 3: The training SMTs received to prepare them for integrating ICT in Schools

It is necessary to determine the types of training SMTs receive to prepare them to integrate ICT into schools. This ensures they have the required skills and knowledge to use technology effectively in schools. Moreover, understanding their proficiency level will help identify areas where further support or professional development may be needed. By assessing their training and proficiency levels, schools can tailor ongoing support and resources to enhance the integration of ICT in teaching practices. This will ultimately benefit both teachers and learners by maximising the potential of technology in education. The participants' responses in this area are presented below, and the emerging sub-themes are illustrated in Table 0.7.

Table 0.7 Responses to the training SMTS received to prepare them to integrate and implement ICT in schools.

SUB-THEME	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**
The Training SMTs Received to Prepare Them to Integrate ICT in Schools.	• Formal training and certification received by SMTs • SMTs received basic training and professional development in ICT • SMTs district and school-based professional development training • SMTs' self-directed learning and informal training in ICT • SMTs' lack of ICT training and professional development

- **Formal training and certification received by SMTs**

Some participants reported completing formal training and earning certificates for the courses they attended. Particularly, participant DH-C2 reported receiving formal training and certification in computer operation, stating,

> *“I received training on how to operate the computer. I got the certificate from the Department of Education from GDE, from NGOs.” “*The participant also highlighted the various sources of training, including: *“Different NGOs were coming here. They were inviting us.”*

This suggests that the DH-C2 had access to multiple training opportunities, which provided them with a foundation in computer operations and resulted in formal certification. This experience shows the value of collaborative efforts between government departments and NGOs in providing teachers with relevant training and certification. The other emerging sub-theme is self-directed learning and informal ICT training, presented and interpreted below.

Participant DH-E2 highlighted the various training opportunities they received for specific educational software and platforms, stating,

> *“We did receive training for IT software, Microsoft Teams, Microsoft PowerPoint, SDLR, and Teacher Connect.”*

The participant further emphasised the importance of targeted training*,*

> *“People use it as a chalkboard rather than an ICT medium," highlighting the need for training on effective use of IQ software.”*

The participant also mentioned the impact of COVID-19 on the need for training,

> *“Around COVID, we used it a lot, so they had to help teachers manoeuvre through it.”*

This highlights the importance of providing teachers with targeted training and support for specific educational software and platforms, particularly in response to changing educational landscapes and technological advancements. This is followed by early exposure to technology and ongoing support for professional development, presented below.

- **SMTs received basic training and professional development in ICT**

Most SMTs did not receive formal ICT training, but they received informal training that included,

P-E reflected on their experiences with informal training and self-directed learning in technology. Specifically, P-E stated,

> *“We were introduced to computers, but... we couldn’t get enough training. We were only taught how to open a computer and how to capture information. We couldn't get all the information thoroughly.”*

This highlights the importance of self-directed learning and informal technology training, particularly when formal training opportunities are limited. The participant's experience shows that, with motivation and opportunity, individuals can develop their technology skills and adapt to new situations.

DH-B2 reflected on their experiences with technology training, stating that they had limited training,

> *“Hmm, but in this school, I never used or received training. But while I was in my previous school... they did train us on the basic foundation for ICT laptops. They did teach us how to open a laptop, how to switch it off, and how to use it. Maybe you want to print something... where you have to go, where, and how to do it.”*

This highlights the limited scope of the participant's technology training, which focused on basic operational skills rather than advanced technology integration or pedagogical applications. The participant's experience suggests that more comprehensive training and support are needed to integrate technology effectively into educational practices.

DH-A1’s responses indicate that the experience with ICT training is confined to a school level:

> *“The kind of training I can say I got is not long-term or formal training. I only did professional development sessions at a school level, where we learned the basics of how to utilise this integral part of communication. I only received*

general training on how to use computers to capture school information and learners' marks."

These statements highlight the participant's experience with minimal formal ICT training and professional development sessions at the school level. They also acquired fundamental ICT skills, such as employing ICT for communication and using computers for administrative functions (recording school data and learner grades). This illustrates the participant's engagement with ICT training, predominantly via informal and brief professional development programs.

DH-B2 received basic ICT training at a previous school in 2008, covering basic computer operations (opening, switching on/off) and printing. However, the participant did not receive any training at the new school,

"No, I never received ICT training at the current school or at the university, not at the college level. I also did not receive professional development on ICT from the school. I relied on self-practice and experimentation to learn ICT skills."

This highlights the participant's resourcefulness in learning ICT skills independently, despite limited formal training opportunities.

DH-C1 did not have a formal university or college-level education,

"I never received training at a university or a college."

However, DH-C1 received some professional development training at school, covering simple technology skills,

"I had professional development training at school, but it was for simple technology skills. We do talk, but usually at the SMT level. During a staff meeting, we communicate. Like, especially now we do have new subjects. Robotics."

The school is now incorporating new subjects, such as robotics, which require technology and ICT implementation. This highlights the participant's experience with

basic ICT training and the school's efforts to integrate ICT into the curriculum, particularly through the introduction of robotics.

The DP-A participant reflected on their experiences with technology training and support. Specifically, focusing on the early years of technology exposure,

“Yes, while I was in high school, they trained us to use the smartboard... Yes, I can use a smartboard today. At the university level... I was only given the basics of ICT, computer literacy, and how to type and do some basic things.”

The participant further highlighted the importance of ongoing support for professional development, stating.

> *“I reckon we don’t have that here for professional development. But I know the district has that department where those people with ICT knowledge... come to school to service the computers... they continually develop admin staff.”*

This highlights the importance of early exposure to technology and ongoing support for professional development in maintaining and improving technological skills. The participant’s experience shows that continuous support and training opportunities enable teachers to integrate technology into their practice effectively.

- **SMTs district and school-based professional development training**

DP-D expressed the experience with ICT training and professional development at a district level,

> *"The courses that we started to attend...where they were educating us on how to make lesson plans and other things through technology. The district was showing us how to make a lesson plan and share information as teachers through technology."*

This shows the participant's experience with professional development training provided by the district, learning specific skills, such as creating lesson plans using technology, and sharing information with colleagues through technology. Moreover, the participant also highlights the department's expectations for teachers to integrate ICT into education. The potential benefits of ICT integration include reducing the

weight of textbooks for learners. The role of NGOS in promoting ICT adoption in schools. The challenges of unequal access to ICT resources and gadgets for learners.

> DP-D said, “*Yeah, but given that, the department now wants us to be more knowledgeable about this ICT issue and integrate it into education. Even near school, some NGOS used to come, requesting to see parents, and they sell software in connection with the textbooks and everything. So, if we were an advantaged school or advantaged community, most of our learners would now have those gadgets and know what to do.”*

This illustrates the participants' experiences with ICT training and professional development, as well as their comprehension of the opportunities and problems associated with ICT integration in their school and community.

DP-E statements show experience with ICT training and professional development at a district level,

> *"We have someone here who comes every Tuesday. He provides training with Microsoft Teams. We've got...a WhatsApp thing from the district where you can enrol for short courses, and then they will give you a certificate when you complete the course."*

This highlights the participant's engagement in routine training sessions using Microsoft Teams. District-sponsored professional development opportunities via brief courses on the WhatsApp platform, culminating in a certificate upon completion. The participant clarified that they did not receive ICT training at the university or college level; rather, their ICT training and professional development were obtained via external trainers (Microsoft Teams) and district-provided programs (WhatsApp short courses). This shows the participant's experience with various forms of ICT training and professional development, primarily through external support and district initiatives.

DH-C2 received ICT training through professional development programs,

"I received training on how to operate the computer. I got the certificate from the Department of Education, from GDE, and from NGOs. Different NGOS were coming here. They were inviting us. Then that's what I got."

The participant received ICT training on operating computers through professional development programs provided by the Department of Education (GDE) and NGOS. Upon completion of the training, they received a certificate. The training was not part of their formal university or college education but rather through external organisations and departmental initiatives.

DP-B said,

“I only did online courses. It was an introductory course on the use of computers in schools. It was designed by the Gauteng Department of Education.”

This reveals the DP-B’s experience with the Department-designed training programs aimed at supporting ICT integration in schools.

DH-D2 highlighted, “*As an SMT member, I received basic leadership training as the departmental head. So that we can escalate the use of technology in classrooms.”* According to DH-D2, leaders receive basic leadership training as SMT members. The training aimed to promote the use of technology in classrooms.

DP-C shows experience with ICT training at the school-based level,

“I have been trained a long time ago at the district level; it was only professional development at the school level. They were coming to train us; I can say all the basics.”

DP-C reports experience receiving ICT training in the past through a school-based professional development program, where they were taught only the basics of ICT. The participant also clarifies that their ICT training was not part of their formal education at a university or college, but rather through in-service professional development programs. This shows the participant's experience with ICT training and professional development, primarily through school-based initiatives.

- **SMTs self-directed learning and informal training in ICT**

Some SMTs did not receive university training, but they were able to teach themselves through informal training. The participant, P-B, highlighted their experiences with self-directed learning and ICT training.

Specifically, P-B stated,

> *"But the other things, we just learn as we go. Teams, I've learned as I go. For example, you learn how to drive as you drive."*

Participant P-B also mentioned that they acquired technology skills through their experience as ICT coordinators, stating,

> *"I just know that in one of the schools, I was an ICT coordinator. That's when I learned most of the things because I, myself, in that school, we had an ICT room... I interacted with the teacher so much because I was coordinating. Hence, I would know all this stuff."*

Additionally, the participant mentioned receiving some formal technology training, including,

> *"I once conducted a few classes in that room myself, and then I did professional development in ICT by the district. We just focused on, as I say, we were taught how to use smart boards when they were introduced and tablets."*

Similarly, P-E also noted the value of self-directed learning and personal training, stating,

> *"I did not receive training at a university level; that's personal training, yes, of course. Yes, actually, I was self-taught. I think I started using a computer in 1999 or 8 if I remember well."*

This highlights the importance of self-directed learning, informal technology training, and the need for formal training and professional development opportunities to support school leaders in developing their technology skills.

P-C highlighted their experiences with self-directed learning and ongoing professional development in the technology sector. Specifically,

> *“I did not get any training. I did this on my own. Mine is like...I did not do...I did not go to school for ICT. But what happened is that through the love of my work, I’ve learned continuously.”*

P-C emphasised their commitment to ongoing learning, stating, *“I’m learning, even now, I'm busy learning how to use the computer.”*

This highlights the importance of self-directed learning and continuous professional development in technology, particularly for school leaders who may not have received formal training in ICT. The participant's experience shows that, with motivation and dedication, individuals can develop their technology skills and stay updated with technological advancements.

P-D also mentioned limited formal training. Despite the limited formal training, P-D highlighted their self-directed learning efforts,

> “*While I was working in my school... I grabbed this and that that I could use on my computer, especially capturing. I can capture at a very fast rate, even though I don't have much basic support.”*

Another emerging sub-theme is targeted training and support for specific Educational Software and platforms presented and interpreted below.

DP-B shows experience with ICT training and professional development through online courses,

> *“I only did online courses. It was an introductory course for the use of computers in schools.”*

This shows the participant’s experience with online ICT training courses.

- **SMTs’ lack of ICT training and professional development**

DH-B1 said this about ICT training, “I have never received any ICT training. No. I didn’t do it at the university or college level. No. No, I have never received an ICT training.”

The participant, P-A, highlighted the lack of technology training and professional development provided by the Department of Education. Specifically, the participant stated,

> “I never received any training from the Department of Education, *to tell you the honest truth. The department never gave us any training. I did not do professional development programs.”*

DH-A2 mentioned not receiving formal ICT training,

> *"I have never been trained for ICT integration. I was never trained because I think by then, there were no smartphones. We only did it in class. We were using the overhead projectors."*

This shows the participant's experience, given their lack of formal ICT training, limited exposure to modern technology during their education, and reliance on older technologies, such as overhead projectors. The participant also expresses a desire for professional development in technology for teaching purposes, an interest in using smartboards, and a desire to receive training. This shows the participant's awareness of the importance of ICT training and their willingness to learn and improve their teaching practices.

DH-B1 clearly states,

> *“I have never received any ICT training, either at the university or college level, nor any school-based professional development programs on ICT.”*

This indicates that the participant has not received any formal or informal ICT training to prepare them for integrating technology into their teaching practices.

DH-D1 reveals,

"Our district needs to have someone whom they can bring to our school to teach us about the SA-SMS, because it serves a lot of things that we can use as leaders of the school to have all the information about what is happening around us. I can say some leaders do have training, but others we don't. And they do that for themselves on the other side, not being trained here at our school or at the district."

DH-D1 raises the desire to be trained in how to effectively use SA-SMS because they believe that the tool can enhance their leadership experience.

DH-C2 revealed,

"I was never trained at the university or college level."

The participant did not receive any computer training at the university or college level.

DH-D2 revealed that they did not receive any university training,

"No, I was not trained at the university level, even at the college level."

The participant did not receive any ICT training at the university or college level. Overall, the participant received some leadership training related to ICT integration as an SMT member, but lacked formal education in ICT at both the university and college levels.

4.4.2 Summary of Theme 1

Theme 1 focused on the SMTs' knowledge of ICT integration in teaching and learning. The theme comprised three sub-themes: The computer type and TK held by SMTs; SMTs' understanding of ICT integration and implementation in schools; and the training SMTs received to prepare them for integrating ICT in schools. The participants' responses to the sub-themes revealed a significant number of emerging sub-themes, which include:

- Basic computer knowledge and skills.
- Intermediate computer knowledge and skills.
- Advanced computer knowledge and software applications.

Whereas, the second sub-theme raised emerging sub-themes, including:

- SMTs' Perspectives of ICT Integration in Schools
- SMTs Enhancing Teaching and Learning Through ICT Integration
- SMTs' Benefits of ICT Integration in Schools
- SMTs Using ICT Tools to Support Teaching and Learning During COVID-19

The third sub-theme's responses revealed five emerging sub-themes:

- Formal Training and Certification Received by SMTs
- SMTs Received Basic Training and Professional Development in ICT
- SMTs District and School-Based Professional Development Training
- SMTs Self-Directed Learning and Informal Training in ICT
- SMTs' Lack of ICT Training and Professional Development

The emerging sub-themes are discussed and critically analysed in Chapter 5 to explore the experiences and challenges SMTs face when integrating ICT into schools to enhance teaching and learning. The next theme addressed the difficulties SMT faces in integrating and implementing ICT in schools. Responses from the SMTs are presented in the subsequent paragraphs.

4.4.3 Theme 2: Challenges experienced by SMTs in integrating and implementing ICT in schools

This case study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

Theme 2 was derived from the following research question:

- What challenges do SMTs face when integrating ICT in primary schools?
- The objective of this question was to explore the challenges SMTs face in integrating ICT in schools.

To achieve this, the participants had to answer questions based on two sub-themes:

- Challenges experienced by SMTs in Integrating and implementing ICT in schools.
- Challenges related to ICT infrastructure in schools.

In this theme, participants were interviewed about their experiences and the challenges they faced in integrating ICT into schools. The interviews provided valuable insights into the specific obstacles SMTs face in using ICT effectively, as well as the issues surrounding the availability and functionality of necessary technology within schools.

Overall, the discussions shed light on the multifaceted nature of challenges in integrating ICT in schools. Their responses led to emerging sub-themes expressed in Table 4:6 below, Sub-Theme 1.

4.4.3.1 Sub-Theme 1: Challenges experienced by SMTs in integrating and implementing ICT in schools

School management teams experience several challenges in integrating ICT in schools. Some common challenges SMTs face during interviews include limited resources for technology infrastructure, a lack of SMT training in ICT integration, and resistance to change. Additionally, navigating complex policies and regulations governing ICT use in education poses obstacles for SMTs. SMTs must develop comprehensive strategies to address these challenges and ensure the successful implementation of ICT in schools. Collaboration with stakeholders, seeking external support, and continuous professional development for SMTs can help overcome these obstacles. In this qualitative case study, 20 SMT members from 5 schools were interviewed, and their responses yielded emerging sub-themes, as shown in Table 0:8 below.

Table 0.8 Responses to the challenges experienced by SMTS in integrating and implementing ICT in schools.

SUB-THEME	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**

Challenges experienced by SMTs when integrating and implementing ICT in schools	• **Resistance to ICT adoption and reluctance to Learn** • **Insufficient funding for SMTs to support ICT integration and maintenance in schools** • **Inadequate SMTs training to support ICT integration in schools**

- **Resistance to ICT adoption and reluctance to learn**

The participant, P-A, expressed concerns about some SMTs and teachers' reluctance to adopt technology and learn new skills, stating,

> *"Neither SMTs nor teachers are willing to learn. I remember that three years ago we had organised training for them via our administrators... They didn't attend."*

The participant noted that even when training is provided,

> *"Even if they attend... There's no willingness, there's no... that hunger that I need to know more about this."*

Furthermore, the participant emphasised the importance of motivation and a desire to learn,

> *"I need this so that I can be able to apply it in my workspace."*

P-A highlights the challenges of promoting technology adoption among teachers who may resist change or lack the motivation to develop new skills. Addressing these challenges requires strategies that promote a culture of ongoing learning and professional development.

P-E confirmed,

> *"Yes, teachers who are still not cooperating still do not want to use technology."*

Participant P-E described how some teachers misuse technology,

“In other words, they have replaced the smartboard with a chalkboard instead of utilising it effectively. They just come and write like they are writing on a chalkboard.”

The participant attributed this to,

“We can say there are still those who are resisting change.”

This highlights the ongoing challenge of teacher resistance to technology adoption and effective use, emphasising the need for targeted support, professional development, and change management strategies to promote technology integration and enhance teaching and learning practices.

The participant, DP-A, highlighted,

“Another challenge is that old SMTs and old teachers do not want to learn about technology.”

The participant clarified,

“I’m saying, I think the older SMTs and older teachers who think they cannot learn.”

This mindset was distinguished from a lack of willingness,

“Not necessarily, they don’t want to. They think they cannot learn. I’ve got computer literacy... Like I told you, I was only given the basics of ICT, the computer literacy, how to type and do some basic things. I learnt it by myself.”

The participant noted the growth potential,

“They’re old enough to learn about technology.”

In contrast, newer teachers were seen as more open to technology integration,

“New teachers are key.”

This emphasises the need for targeted support and professional development opportunities to help experienced teachers build confidence and competence in using

technology, promoting a more cohesive and practical approach to technology integration across the school.

DH-C1 highlights that SMTS and teachers resist adopting ICT and prefer traditional methods,

> *“Usually, SMTs and teachers don't want to accept transformation. In terms of the use of ICT, they like using traditional methods. Yes, so they don't wish for ICT to come to their classrooms. Teachers don't want to be transformed into this.”*

The participant notes that teachers are hesitant to integrate ICT into their classrooms, indicating a cultural barrier to technology adoption. The participant experiences challenges in integrating ICT due to resistance to change and cultural barriers among SMTS and teachers, who prefer traditional methods and are hesitant to adopt new technologies.

- **Insufficient funding for SMTs to support ICT integration and maintenance in schools**

Participant P-E raised the issue of inadequate funding,

> *“There is also inadequate funding*.” The participant emphasised the need for funding to support: “*We need to purchase...and maintain, as well.”* The participant P-E reiterated*: “Yes, that needs funding as well.”*

This highlights the critical need for sufficient funding to support the purchase, maintenance, and overall sustainability of ICT infrastructure, ensuring that technology integration initiatives can be effectively implemented and maintained.

> *P-A said, “Lack of resources, that is, in terms of financial resources, so that we can buy those smartboards and then. Yeah, we can't because the money that is given to us is not enough”* and added, *“The other thing is that our SGBs don't have those skills of raising funds so that we can have these materials that we need in terms of buying smartboards and all those things so that we can integrate our teaching and learning. If I can get sponsors, people who can*

sponsor us with gadgets and then train us. Intense training. But the challenge that we have now when it comes to sponsorship, the parent component, they think maybe when you go out and seek support, you want money for yourself... So that's discouraging. You know, we're wasting a lot of money on exercise books if we can move away from that and do those workbooks... then we will be saving a lot of money."

DP-B, highlighted,

"The government also does not provide a budget for that. Buying in small packages takes a long time. And then the numbers are high. So, it becomes very difficult to cater for every learner in terms of ICT."

This emphasises the need for sufficient and dedicated government funding and efficient procurement processes to support schools in providing equitable access to ICT resources for all learners.

DP-D also mentioned,

"Another challenge, I think, is the finances. Everything that we receive as a school requires financing. We need money to buy smartboards for teaching and learning."

The participant identifies financial constraints as another challenge, highlighting the need for funding to purchase ICT resources such as smartboards.

- **Inadequate SMTs training to support ICT integration in schools**

Participant P-E highlighted the lack of training,

"Even training is a challenge. SMTs do not always come on board."

This emphasises the difficulty in engaging and training SMTs in technology integration, which can hinder the effective implementation and sustainability of school ICT initiatives.

DP-D highlighted the lack of training as the most significant challenge,

“The biggest challenge is that I think we need proper training. Currently, the training that we have lasts for less than two hours. From half past two to three. At half past three, we knock off. So, if we can have proper training... I think that will be much better. I think the department is not clear on how they are going to introduce technology... to us, I don't think that is clear.”

The participant believes that inadequate training is a significant challenge in integrating ICT, citing the short duration of current training sessions.

DH-B2 mentioned that there is insufficient training for SMTs and teachers, particularly older teachers who may require additional support to develop their technology skills.

“The other problem is a lack of training for SMTS and teachers. Young teachers can use laptops, but older teachers still have technology problems. The problem is they don't know how to use it.”

The participant DP-D notes that having ICT resources (e.g., smartboards) is insufficient without proper training,

“If we have smartboards, then we will choose the issue of textbooks. But as I've said, we can have those smartboards, but if you don't know how to use them, then they will be white elephants and they will be standing there.”

The participant emphasises that inadequate training and financial constraints are significant challenges in integrating ICT, and that these challenges are interconnected, requiring a comprehensive solution.

DH-A1 revealed,

“A lot of unskilled teachers on technology can be a challenge because we can have laptops and whiteboards, but if we don't know how to use them, they will remain a white elephant.”

As a result, the participant highlights that unskilled teachers are a significant challenge in integrating ICT. Therefore, ICT resources are insufficient without the necessary skills to use them effectively.

“Some of us struggle to use computers because we are not trained on how to use them. We can have, for instance, somebody to come and assist and make you type something, type a report without knowing you have a laptop, but you don't know how it operates.”

DH-E1 emphasises that SMT members face challenges in integrating ICT due to a lack of skills among teachers, which impedes the effective use of ICT resources. The participant also notes that possessing ICT resources is not sufficient without the skills to operate them, and some teachers find it challenging to use laptops and other devices.

DH-B1 highlights the absence of qualified teachers to introduce and teach using ICT tools.

“We don’t have qualified teachers to introduce or teach using ICT tools. There is a serious shortage of teachers who can use technology to teach. There is a serious shortage of teachers who can use technology to teach.”

The participant experienced challenges in integrating ICT due to a lack of qualified teachers and insufficient teacher training, resulting in a significant capacity gap among teachers to use technology effectively in teaching and learning.

DH-A2 identifies a lack of training as another significant challenge in integrating ICT, highlighting the need for practical training on using technology.

“I think another challenge is training. Training on how to use technology, maybe the way to project the work that you have prepared.”

DH-B1 notes that most teachers are not trained in using ICT in classrooms. DH-B2 also identifies a lack of training as a significant challenge for SMTS and teachers.

“Most teachers are not trained in using ICT in classrooms. The other problem is a lack of training for SMTS and teachers.”

DH-B2 notes that older teachers face greater challenges with technology due to a lack of training or experience.

“Young teachers can use laptops, but older teachers still have technology problems. The problem is they don't know how to use it.”

DH-B2 emphasises how technical issues disrupt teaching and learning activities.

“Mostly when you have to make some comprehension, you need to set some questions, type them, and then print them. If the internet is not working, you cannot even print out what you want. The printer is not working. Sometimes, we don't even have ink.”

Principal D (P-D) noted,

“We need to use technology in the classroom... but it is very limited due to our lack of knowledge and training.”

This suggests that P-D recognises the importance of ICT integration but feels constrained by a lack of training and support.

The following sub-theme presents and interprets challenges associated with ICT infrastructure in schools.

4.4.3.2 Sub-Theme 2: Challenges Related to ICT Infrastructure in Schools

SMTs encounter challenges with ICT infrastructure, including computers, networks, and the internet. These include outdated equipment, limited bandwidth, and security issues. Enhancing ICT infrastructure can increase the efficiency and effectiveness of ICT integration and operations. A reliable ICT setup also promotes better communication and collaboration among team members, leading to improved decision-making and problem-solving. Upgrading equipment and expanding bandwidth can help SMTs remain competitive in a rapidly evolving technological environment. Table 0:9 shows responses from the participants based on interview questions.

Table 0.9 Responses and emerging sub-themes on the challenges SMTS experienced in integrating ICT in schools associated with infrastructure (computers, networks and internet)

SUB-THEME	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**
Infrastructure challenges SMTs encounter when integrating ICT in schools	• Unavailability and functionality of ICT building infrastructure in schools. • Theft and vandalism of ICT gadgets in schools • Poor Internet connectivity and network coverage in schools. • Shortage of maintenance and technical support procedures for ICT infrastructure.

- **Unavailability and functionality of ICT building infrastructure in schools**

The SMTs indicated that some schools face challenges with the unavailability and functionality of the ICT infrastructure. By infrastructure, they refer to computer labs, gadgets such as computers and laptops, and internet connectivity. The SMTs encountered three issues related to infrastructure: computer labs or buildings, gadgets such as computers or laptops, and poor internet connectivity in their schools.

Firstly, the SMTs highlighted the issue of inadequate ICT computer labs in their schools. P-A noted that the computer lab was being used for storage, while DH-A2 mentioned that the school had closed its computer lab because it is not an ICT-focused school. P-B emphasised the need for more classrooms and ICT infrastructure to accommodate the large number of learners, as well as training for teachers. P-D described the school's computer lab as a "white elephant" due to its underuse. This is what emerged from the interviews.

> P-A said, *"We do have a lab; it has our books for the time being. We have them packaged, and then we lock them there."*
>
> DH-A2 added, *"We once had a lab, but since it's a primary school, it is not an ICT school, so we closed the lab and converted it into a class. So, we don't have anything now. I think we need infrastructure. The infrastructure I am*

talking about is both the building and the computers. Like, if we can go back to that classroom with computers. So, where learners can have access to go to Google and do their work."

P-B said*, "I need three to five classrooms that can accommodate them. Given the large number of learners, 1,600 learners. We also need to train most of our teachers... Not all of them are ICT literate."*

P-D added, *"No, I won't say anything is stopping us because we have a building now. We have a computer lab that the government built some years back. Unfortunately, the computer lab is like a white elephant."*

In contrast, P-C mentioned that their school's computer lab was working well thanks to the Click Foundation's support, which provided internet access. However, DP-D stated that their school's computer lab was not functioning, despite having been operational previously. Below is what they said during the interviews,

P-C said, "Yes, the school does have a computer lab. It is functional because the Click Foundation is helping us with the connection."

DP-D said, "Yes, and we have a computer lab that is not working. It was working before, but now it is no longer working."

The participants' views indicate that many schools lack sufficient ICT infrastructure and resources, which hampers the effective integration of ICT in teaching and learning. The causes of this include a shortage of resources, inadequate infrastructure, and limited support. The problem of underused or non-functional computer labs emphasises the need for schools to ensure that ICT resources are properly maintained and supported. This could involve providing training for teachers and staff, as well as forming partnerships with external organisations to offer technical support and resources. Consequently, schools can foster a more supportive learning environment that encourages the effective use of ICT resources.

Secondly, the SMTs highlighted significant challenges related to the availability and access to computers, laptops and Smartboards in their schools. DH-A2 mentioned that the laptops provided to the school were old, not user-friendly, and were subsequently

taken back. The lack of ICT resources, such as laptops and Smartboards, was a major concern. P-A noted that learners lacked access to laptops, while P-B emphasised the need for each teacher to have a laptop and for learners to access a computer room or tablets.

Below are SMTs' responses collected during the interviews regarding the shortage of computers and other essential resources, such as Smartboards and tablets, in schools.

> *DH-A2 said, "The company that provided the laptops, I understand, took them because they were not user-friendly. They were, how can I put it? They were old." DH-A2 added, "I think one of them is the lack of ICT resources. Things like laptops and other ICT resources."*
>
> *"So, like this year, we've just received one computer for each teacher, only for the SMTs. As I'm saying, I would love to have a Smartboard that we can use for Grade 7 classes. In previous years, we only had one computer for the entire phase, so it wasn't easy for us to work well, but now, since we have one computer per teacher, I think it would be wise for us to have the Smartboard so we can use our USBs."*
>
> While P-A said, *"The challenge is that we don't have laptops for our learners."* This was also highlighted by P-B, who said*, "Each and every educator must have a laptop... All learners need a computer room... At least if we can provide tablets for all of them."*

P-D mentioned that the government had previously supplied learners with devices, but these were later withdrawn. DP-D pointed out the inequality in ICT resource distribution, noting that while SMT members had laptops, not all teachers did, and learners had limited access to functional gadgets. DP-C stressed the necessity for Smartboards in classrooms to enhance learning, citing problems with the current boards.

> P-D had this to say, *"The government once gave learners 20 gadgets that they said they would only use within the school. And they came back again to take them to high school when they had shortages."*

DP-D said, *“We don’t have projectors and other gadgets. We don’t have gadgets for learners. We have gadgets for educators, even though we are limited. We have only a few laptops that are used by educators. Not all educators have laptops except the management. All the SMT members were given laptops, but educators were not. And learners no. We received tablets. But those tablets were not functional.”*

DP-C said, *“Smartboards should be available in classrooms to facilitate learning. Currently, the boards we use have issues; sometimes the chalk doesn’t write clearly, making it difficult for the students to see.”*

The SMTs’ views indicate that the lack of ICT resources, such as laptops, Smartboards, and projectors, is a significant barrier to effective teaching and learning. The unequal distribution of resources, with SMT members having more access to ICT tools than teachers and learners, exacerbates the problem. The participants’ suggestions for improving ICT resources, such as providing laptops for teachers and learners, Smartboards in classrooms, and functional devices, highlight the need for greater investment in ICT infrastructure to support teaching and learning.

Thirdly, SMTs highlighted considerable challenges related to internet connectivity in their schools. A primary concern was the lack of reliable internet access for teachers and learners, especially in classrooms. DP-C and DH-A1 noted that, although the admin block had internet access, teachers did not because of password control issues and limited Wi-Fi coverage. P-B agreed, mentioning that the Wi-Fi only covered the admin area and not the entire school, citing cost constraints as a barrier. This is what they said,

DP-C said*, “SMTs and teachers need computers and reliable connectivity, as many often find themselves at the far end of the school where they lack connection. They need to print out emails and ensure that tasks are completed. Thus, if they have connectivity and computers available, it would greatly help.”*

DP-C further added, *“We have access to the internet at the admin block, but teachers do not have access due to the password control. Actually, in our*

classroom, we don't have internet at all. Sometimes we've got more than seven keys or passwords to access the internet.".

P-B also added*, "Wi-Fi for the whole school... For now, the Wi-Fi that we have covers admin. It doesn't cover the entire school. It's costly. The department doesn't give us a budget for that."*

DH-A1 said, *"No, it's utilised in the office, the network that we have, the wifi and the likes, they are utilised by the office, only if maybe you ask for them to give the Wi-Fi.."*

Other SMTs expressed similar sentiments, with DP-B stating that their school lacked ICT equipment and faced internet scarcity. DP-A mentioned that load shedding and data constraints further worsen the problem. Meanwhile, P-D noted that although their school had Wi-Fi, its coverage was limited, forcing teachers to rely on their phones for internet access. This is how they responded to the interviews,

DP-B said, *"First, we don't have any ICT equipment at the moment. The scarcity of the internet is a problem."*

Also, DP-A mentioned*, "The problem of load shedding affects the data. When there is no data, everything comes to a standstill. We have internet access, especially around the office, and we used to have it around the schoolyard."*

In addition, P-D said, *"Yes, our school does have network coverage. We have Wi-Fi." However, it only covers a few radiuses. Those in the classrooms are unable to use it. Most of our teachers connect through their phones to integrate their learning in the classrooms."*

P-C highlighted the impact of limited internet connectivity on specific programs, such as coding and robotics, and mentioned that external initiatives like the Click Foundation were underused due to connectivity issues. Other participants, such as DH-B2, P-E, and DP-E, also emphasised internet connectivity as a significant challenge, citing problems with slow Wi-Fi, theft, and poor connectivity. This is what was said during the interviews,

P-C said, *“We have challenges with internet connectivity... The internet or the network is very limited. It could not even reach the other side... We are using the Internet for coding and robotics. Even the Click Foundation, we cannot use it the way we're supposed to because of the limited network or Internet. The internet cannot cover the other three blocks. It's only around the admin block.”*

DH-B2 said, *“Number one challenge, it's the internet. We've got an internet problem.”*

In addition, P-E said, *“So, regarding infrastructure, I cannot say we have enough. The main problems are theft and slow Wi-Fi sometimes...and internet connectivity.”*

While DP-E said*, “Connectivity is an issue because our Wi-Fi connection is bad, failing us in most cases.”*

Overall, the participants’ views indicate that inadequate ICT infrastructure and internet connectivity are significant barriers to effectively integrating ICT to improve teaching and learning in their schools. SMTs observed that network coverage only supports the administration block, limiting it to the administrative staff. Other issues include problems with passwords, radius coverage, internet costs, load shedding, and occasional poor connectivity. However, resolving these issues will require investment in infrastructure, enhanced Wi-Fi coverage, and more reliable internet access for SMTs, teachers, and learners. The SMTs also highlighted a challenge of theft and vandalism of ICT gadgets in schools.

The following section presents and interprets theft and vandalism of ICT gadgets in schools.

- **Theft and vandalism of ICT devices in schools**

The SMTs highlighted theft and vandalism as significant challenges to the effective use of ICT resources in their schools. P-A and P-D mentioned that their computer centres had been burgled, leading to the loss of valuable equipment. P-E and DP-A stressed that theft was a primary concern, with DP-A stating that the school had lost

gadgets and equipment due to break-ins. DP-B voiced frustration over the theft of ICT equipment, including computers, monitors, and speakers, which had hindered the school's capacity to support learners with ICT. Below are some of the examples of their responses during the interviews.

P-A said, "Our computer centre had computers there, but there was a burglary. Everything was stolen."

P-D said, "The reason for not using the computer lab is that the computers that were in there were vandalised."

In addition, P-E said, "So, regarding infrastructure, I cannot say we have enough. The main problems are theft and slow Wi-Fi sometimes...and internet connectivity."

DP-A highlighted, *"The Major problem is theft. I can say we had a lab, so the gadgets were stolen. I think that is the major problem that we are facing as schools. But the major problem that's coming to me is theft of gadgets, the looting of the gadgets, and then the stealing of the gadgets in the laboratories." They break in when you try to create one. Thieves come and break in and take all the gadgets. At the moment, we don't have gadgets, especially for the learners. Only teachers have gadgets."*

DP-A added, *"We do have the internet, especially around the office, and we used to have it around the schoolyard. Like I'm saying, the problem is theft; they came in and broke some cables and even the cameras. So, like I'm saying, it's a major problem. And the issue of stealing the ICT equipment."*

DP-B expressed unhappiness about the issue of ICT gadget theft at the school*. "They stole computers, monitors, control systems, speakers, and a lot more. Yes, it's a challenge. The problem is that equipment is always stolen, especially in the laboratories. Community members come in and do vandalism. So, it becomes a problem to have lessons where ICT supports learners because the equipment is stolen. If we deal with this challenge, we can be able to have our ICT operating in our school."*

DP-C also noted that burglaries during school holidays are common, targeting the computer lab and stealing valuable resources. The participants' opinions indicate that theft and vandalism are major obstacles to the effective use of ICT resources in their schools, and that addressing these issues is vital to ensuring learners have access to the ICT tools they need to succeed.

> *DP-C said, "Sometimes, we have issues with burglaries, especially during school holidays. The burglars are well aware that our school has valuable resources. Most of the time, there's a burglary in the computer lab where many resources, particularly computers, have been stolen."*

The section below presents and interprets the shortage of maintenance and technical support procedures for ICT infrastructure.

- **Poor internet connectivity and network coverage in schools**

As a school leader, Participant P-E acknowledged theft and slow internet connectivity as challenges hampering the integration of ICT in the school.

> *"So, regarding infrastructure, I cannot say we have enough. The main problems are theft and slow Wi-Fi sometimes...and internet connectivity."*

This emphasises schools' need to address these major infrastructure challenges to guarantee reliable and effective ICT integration, which supports teaching, learning, and overall educational outcomes.

The participant, a school leader, P-B, highlighted several infrastructure and resource challenges that hinder effective technology integration, including

> *"Wi-Fi for the whole school... For now, the Wi-Fi that we have covers admin. It doesn't cover the entire school. It's costly. The department doesn't give us a budget for that."*

Addressing infrastructure and resource challenges, such as Wi-Fi coverage and device availability, is crucial for seamless ICT integration in schools.

DH-B2 highlights internet connectivity and printer issues as significant challenges.

“Number one challenge, it’s the internet. We’ve got an internet problem.”

Participant P-C highlighted significant infrastructure challenges, particularly the impact of limited internet connectivity on educational programmes. Furthermore, the participant emphasised the geographical restrictions of the internet connection within the school grounds.

“We have challenges with internet connectivity... The internet or the network is very limited. It could not even reach the other side... We are using the Internet for coding and robotics. Even the Click Foundation, we cannot use it the way we're supposed to because of the limited network or Internet. The internet cannot cover the other three blocks. It's only around the admin block.”

This highlights the importance of better internet infrastructure and network coverage to enable effective ICT integration and educational programmes in schools.

P-D confirmed the challenge of network coverage by revealing that, to overcome this issue, teachers rely on their cell phones to perform some of their duties that require internet access.

“Yes, our school does have network coverage. We have Wi-Fi. However, it only covers a few radiuses. Those in the classrooms are unable to use it. Most of our teachers connect through their phones to integrate their learning in the classrooms.”

This emphasises the need for enhanced Wi-Fi infrastructure to support effective ICT integration, allowing teachers to leverage digital tools and resources seamlessly in the classroom.

The participant, DP-B, reaffirmed

“Yes, it's a challenge, and now the internet is not working. Yes, the school has internet, but it’s only in the admin space. However, it does not extend to special classrooms.”

DP-C mentioned the challenge of internet connectivity and the dependence on the internet from an NGO providing support at the school.

“Okay. Actually, in our classroom, we don’t have internet at all. We are relying on this project from the Click Foundation, which allows our kids to learn and explore. However, due to issues with the Wi-Fi connection, we were unable to do so. This means that every time learners need to access the computer lab, we rely on the connection via the Click Foundation. They have their own connection. Even though the school has a connection, they are using the one they currently have.”

Although the DP-C admit that they have access to the internet at the admin block, they also acknowledge that teachers do not have access because they are supposed to ask for the password, as all internet access is strictly controlled with a password.

“We have access to the internet at the admin block, but teachers do not have access due to the password control. Actually, in our classroom, we don't have internet at all. Sometimes we've got more than seven keys or passwords to access the internet.”

Due to limited internet access, passwords, and connectivity in schools, there are significant obstacles to effectively implementing and maintaining ICT initiatives.

DP-E highlighted poor Wi-Fi connectivity as a challenge in integrating ICT.

“Connectivity is an issue because our Wi-Fi connection is bad, failing us in most cases.”

DH-B2 notes that printer maintenance, e.g., ink availability, is also problematic.

“If the internet is not working, you cannot even print out what you want. The printer is not working. Sometimes, we don't even have ink.”

- **Shortage of maintenance and technical support procedures for ICT infrastructure**

The study identified significant challenges in the maintenance and technical support of ICT infrastructure and resources in schools. P-E mentioned that the process of logging a call with the GDE and waiting for the service provider to respond is lengthy,

resulting in delays and disruptions to teaching and learning. This is what P-E said during the interviews,

> P-E said, *"But the other problem is that there is still a problem with maintenance ...technical support when it comes to freezing of the smartboards and learners' tablets. We must log a call to GDE, and GDE must now refer the matter to the service provider. It's a long chain... You can do it today, and they will provide you with a reference number, which will be sent to the service provider. From there, they will send out their technicians, but after a long time. It's not immediate, there is no immediate response."*

DP-D highlighted the issue of abandoned ICT infrastructure due to a lack of maintenance. The ICT lab in their school had not operated for a long time due to broken equipment and a lack of repairs.

> DP-D said*, "There's a building here next to where you parked your car. It was our ICT lab. But it didn't function because of maintenance. If things get broken, the department doesn't fix them. I think that was before COVID, maybe five years ago. No, it should be ten years ago."*

4.4.4 Summary of Theme 2

Theme 2 focused on the challenges SMTs face in integrating and implementing ICT in schools. To achieve this, Theme 2 examined two sub-themes:

- Challenges experienced by SMTs when integrating and implementing ICT in schools.
- Infrastructure challenges SMTs encounter when integrating ICT in schools.

The emerging sub-themes related to challenges experienced by SMTs when integrating and implementing ICT in schools, as raised by the participants, include:

- Resistance to ICT Adoption and Reluctance to Learn.
- Insufficient Funding for SMTs to Support ICT Integration and Maintenance in Schools.
- Inadequate Training for SMTs to Support ICT Integration in Schools.

Emerging sub-theme related to challenges of infrastructure, as raised by participants, includes:

- Unavailability and Functionality of ICT Building Infrastructure in Schools.
- Theft and Vandalism of ICT Gadgets in Schools
- Poor Internet Connectivity and Network Coverage in Schools.
- Shortage of Maintenance and Technical Support Procedures for ICT infrastructure.

These emerging sub-themes were discussed and critically analysed in detail in Chapter 5. The following Theme concentrated on support structures and systems available to assist SMTS in integrating ICT in schools.

4.4.5 Theme 3: Support Structures and systems available to support SMTS in integrating ICT in schools

This case study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools.

Understanding support structures and systems available to assist SMTs in successfully integrating ICT in schools enhances their ability to do so. By being aware of the kinds of support, resources, and assistance available, SMTs can make informed decisions on how best to implement ICT in their schools for teaching and learning purposes. This knowledge can also help them navigate potential challenges during the integration process. Moreover, recognising the potential barriers and limitations to integrating ICT in schools can enable SMTs to address issues before they escalate into major obstacles proactively.

Theme 3 was derived from the following research question:

- What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?
- The objective of this question was to determine the existing support structures and systems that enable SMTs to integrate ICT in schools.

To achieve this, the participants had to answer questions based on one sub-theme:

- Types of ICT Support Received by SMTs from the District

By staying informed and prepared, SMTs can facilitate a smoother and more successful implementation of ICT in their schools. Theme 3 introduced a sub-theme, which is: Types of support or training provided by the district to assist SMTs in integrating ICT into schools.

The responses from the interviews regarding the types of support or training provided by the district to assist SMTs in integrating ICT into schools translated into emerging sub-themes presented in Table 4:8 below. These emerging sub-themes are discussed and analysed further in Chapter 5.

4.4.5.1 Sub-Theme 1: Types of ICT support received by SMTs from the district

For schools to effectively integrate ICT into their operations and curriculum, SMTs must receive comprehensive support and training from the district. The district is integral to this process by offering diverse support, including practical workshops, resources, and technical assistance. However, when asked about the district support, the SMTs expressed mixed views on the support they receive regarding ICT integration in their schools. This sub-theme presented various support methods received by the SMTs from the district to assist them in integrating ICT into teaching and learning. Table 0:10 below presents the sub-theme and emerging sub-themes.

Table 0.10 Responses and emerging sub-themes on types of support or training provided by the district to assist SMTs in integrating ICT into schools

SUB-THEME	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**
Types of ICT Support Received by SMTs from the District	• Supporting SMTs through district ICT workshops • Supporting SMTs through school-based district visits • Insufficient district ICT support for the SMTs

- **Supporting SMTs through district ICT workshops**

The SMTs expressed mixed views about the support they receive from the district regarding ICT integration in their schools. Some participants, like P-A and DP-A, acknowledged that the district offers training and support for ICT integration through online platforms, but noted that not all SMTs take advantage of these opportunities. P-A mentioned that SMTs tend to register for other workshops, such as assessment and quality paper setting, rather than ICT training. This is what some SMTs said during the interviews,

> *P-A said, "There are workshops where SMTs and teachers have to enrol on a program called District Support Advisors (DSAs) for ICT. But what I found out is that most of our SMTs and teachers do not register for ICT, but rather register for other workshops on the DSAs. DSAs is a portal where teachers register for any training organised by the teacher development office at the district, head office, or provincial level. Yeah, yeah. There's a lot of training, but teachers only take it for assessment and how to set quality papers. I've never seen one teacher here at school registering for ICT training. The district trains us so that we can integrate ICT. Yes, we bring our own laptops. Then they take us through, like when we do SA-SMS. Remember, SA-SMS is policy."*

> DP-A said, *"I know the district has a department where people who have problems with computers get support. They service them, they continually develop them. If they encounter some problems, they come and help them."*

Others, like DP-B and P-C, stated that they do not receive adequate support from the district, with DP-B noting that support is mainly provided to ICT pilot schools. P-B expressed interest in receiving ICT training and support, but noted that the district does not offer enough opportunities.

> DP-B had this to say, *"There are schools identified as ICT pilot schools. For now, no. There's no support. Yeah, maybe the ICT schools have been supported, but we, we are not."*

> P-C said, *"No. I don't get district support to integrate ICT in my school. There's no training, there's nothing. There's no training, there's nothing. They can only*

come when you've got, maybe you've accessed some resources through donations."

However, P-B expressed enthusiasm for the school's ambition to become an ICT school and highlighted their own experience with district ICT training. P-B mentioned that they attended training as a DP, which empowered them to prepare ICT lessons and activities for teachers and learners. Nevertheless, he expressed concern that other teachers do not register for ICT workshops or training, which hinders their ability to integrate ICT into their work effectively.

P-B said, *"I definitely want my school to be an ICT school. I went for district ICT training, and I was trained even before I became a principal. I was the deputy principal. My principal wasn't interested in undergoing that training. Yeah, I went there with someone. The other administrator, who was here before, trained on how to register teachers in that system, must ensure that all the teachers are there. That training empowers teachers on how to prepare ICT lessons. Prepare extra lessons, extra activities. Activities for learners in one package, so that everyone can use technology. So, my worry is that they don't register for those ICT workshops or training so that they can do their work smart."*

Some SMTs, like DH-C1 and DH-C2, mentioned that the district provides occasional workshops and training, but these are not frequent enough to meet their needs. DH-D2 and DP-B stated that the district does not provide support to their schools, with DP-B noting that support is only offered to schools that are pioneering ICT programs. In contrast, DP-E mentioned that the district provides short courses and training on Microsoft Teams via a WhatsApp platform, and that technical support is provided by the vendors supplying the tablets and Smartboards.

DH-C1 said, *"The district just comes when they want to do workshops. I remember they did visit us once, and they usually use workshops to support us. However, we do attend workshops sometimes."*

DH-C2 said, *“Sometimes the district sends people who give us a workshop on how to use a computer. But it's not often. As I've said before, we need more, more time. They usually come quarterly, but sometimes they don't. Yes.”*

DH-D2 said, *“No, the district doesn’t give us support in ICT. The support only goes to those schools that are pioneering the ICT program.”*

DP-E said, *“We've got, I don't remember the name, but it's our WhatsApp thing from the district where you can enrol for short courses, and then they give you a certificate when you complete the course. Mostly it's training on Microsoft Teams. We've got the people who come here once a year again. The ones who provide us with the tablet and the smartboard. They come here and train us on how to use their devices.”*

DP-B had this to say about the support from the district, *“Most of the district or support meetings are held at schools that are designed for ICT, where they can easily go through using the smart board and other things. There are schools identified as ICT pilot schools. For now, no. There's no support. Yeah, maybe the ICT schools have been supported, but we, we are not.”*

Overall, the current study revealed that the district’s support for ICT integration, while available, is not always practical or equitable, with some schools receiving more support than others. The study further highlights the need for the district to review its support structures and ensure that all schools have access to the resources and training they need to integrate ICT effectively. The following section presents School-Based support for ICT integration.

- **Supporting SMTs through school-based district visits**

The current qualitative case study revealed varying perceptions among SMTs regarding the support they receive from the district for ICT integration in their schools. Some participants, such as DP-C and DH-E1, reported receiving support from the district, including facilitators who visit their schools to monitor the ICT programme and offer technical assistance where needed. Additionally, DH-E1 mentioned that the district’s technician visits their school every Tuesday to provide support and training on various ICT tools.

DP-C said, *“Yes, we receive support because we have facilitators from the ICT district who come to check the program we're running. It's functional and taking place. There’s an improvement in program attendance. They check as well, and they come to visit and support the other participants in programs like the Click Foundation.”*

DH-E1 said, *“There is a technician from the district who visits us every Tuesday to assist. So, she would just be taking us through, for example, a PowerPoint presentation, creating Google Forms. And now recently we've moved to a video conference, and so we are working on that currently, as to how we do this?”*

In contrast, other participants, such as DP-B, DP-D, DH-A1, DH-A2, and DH-B1, reported limited or no support from the district. DP-B stated that most district support meetings are held at schools that are already well-equipped with ICT resources, while DP-D mentioned that they have not received any formal training or workshops on ICT integration.

DP-B had this to say about the support from the district, *“Most of the district or support meetings are held at schools that are designed for ICT, where they can easily go through using the Smartboard and other things.*

DP-D said, *“So, I can’t say there’s a proper workshop or training that I went through, but what I can say to you is that most of the things are self-taught. I just taught them by myself, and my colleagues are assisting me here and there, but I'm getting there. So, all the training is more of professional development. The professional development training is given by the district. Hence, I said there was a training that I attended at School X, whereby the time frame was too small.”*

DH-A1 said, *“No, the district never comes and talks about ICT or technology in the school.”*

DH-A2 said, *“No. We haven’t received any support in ICT integration from the district.”*

DH-B1 said*, "The district trains us in the basic skills of technology within the school site. It's for teacher development or for teacher training. Yes. So that would help as well."*

Some participants, such as DH-E2, acknowledged receiving support from the district but suggested that the district needs to conduct research to determine the level of ICT proficiency among teachers and tailor their support accordingly. DH-B1 mentioned that the district provides training in basic ICT skills, but it would be helpful to have more support.

DH-E2 said, *"We do get support from the district; there is a lady who comes on Tuesdays who is from the district. In that sense, we do receive support. But I also feel like the district probably needs to do a bit of research, for example, just to check what level we are on. One time, we attended a workshop, and it was extremely basic."*

DH-B1 said, *"The district trains us in the basic skills of technology within the school site. It's for teacher development or for teacher training. Yes. So that would help as well."*

The qualitative case study discovered that the district's support for ICT integration is inconsistent and may not be meeting the needs of all schools. Some schools receive regular support and training, while others are left to rely on self-directed learning and peer support. This highlights the need for the district to review its support structures and ensure that all schools have access to the resources and training they need to integrate ICT into teaching and learning effectively.

- **Insufficient ICT district support for the SMTs**

Most SMTs agreed they received support from the district through workshops and school visits. However, they also claimed that the district didn't provide them with adequate ICT support to integrate ICT into teaching and learning. They felt that support is mainly given to the SMART schools.

DH-A1 had this to say,

"No, the district never comes and talks about ICT or technology in the school. There is no day I remember the district coming to help with how to implement or integrate ICT or technology in the school."

These statements indicate that the SMT member believes the district has not sufficiently supported ICT integration at the school and that the district should provide guidance on implementation.

DH-A2 said, *"No, we haven't received any support in ICT integration from the district."*

This indicates an apparent lack of support for ICT integration from the district.

DP-B state, *"For now, no support from the district. There's no support, yeah, maybe the ICT schools have been supported, but us, we are not. No kind of support."*

The above statements indicate that the SMT feels they are not receiving support from the district for ICT integration, and that other schools may be receiving preferential treatment.

DH-B1 said, *"The district trains us in the basic skills of technology within the school site. It's for teacher development or for teacher training."*

This statement suggests that the district provides some support for ICT integration, specifically on-site training for teachers in basic technology skills.

DH-B2 said, *"No, there is no district support on ICT at all. They support schools that are ICT-only. So I haven't found any training about any sense or anything and everything now. Only the principal and admin were assisted with SASMS."*

The statements suggest that the SMT member has not received support or training from the district, except for the principal and admin, who were trained on the SA-SAMS.

DH-C1 stated, *“The district just comes when they want to do workshops. I remember they did visit us once, and they usually use workshops to support us. However, we do attend workshops sometimes.”*

The SMT member mentions that the district provides support through workshops, but it seems to be limited to those specific events. They also noted that the district only visits when they want to conduct workshops, implying that the support is not ongoing or consistent.

P-C explicitly states that they do not receive district support to integrate ICT in their school:

“No. I don’t get district support to integrate ICT in my school. There’s no training, there’s nothing. They don’t give us support in terms of that.”

This indicates a clear lack of support from the district for ICT integration in the school.

DH-C2 mentioned that the district does provide some support, but it's limited and infrequent:

“Sometimes the district sends people who give us a workshop on how to use a computer. It’s not often. They usually come quarterly, but sometimes they don’t.”

This suggests that while there is some effort from the district, it’s not consistent or sufficient to meet the school’s needs.

DP-D describes the district’s support as “*minimal*.”

They mention attending a training session that was too short, 2 hours to be effective.

The SMT member feels that the district’s support is insufficient, implying that more comprehensive training is needed.

DH-D2 said, *“No. the district doesn’t give us support in ICT. The support only goes to those schools that are pioneering the ICT program.”*

That is a clear statement indicating the district does not provide ICT support to this school. It sounds like the support is prioritised for schools already ahead in the ICT program, leaving others behind.

4.4.6 Summary of Theme 3

Theme 3 presented SMTs' responses based on types of support or training facilitated by the district to assist SMTs in integrating ICT into schools. The emerging sub-themes include:

- Supporting SMTs through district ICT workshops
- Supporting SMTs through school-based district visits
- Insufficient district ICT support for the SMTs

The following theme presented SMTs' responses on ICT policies.

4.4.7 Theme 4: ICT policies supporting SMTs to integrate ICT in schools

This study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools. The National ICT Policy serves as a foundational blueprint for integrating information and communication technologies into a country's socio-economic fabric. In an educational context, it's a strategic document that outlines a national vision for a digitally-empowered society and a knowledge-based economy. This policy aims to leverage technology to enhance the quality of education, bridge the digital divide, and prepare learners for the demands of the 21st-century workforce.

It often focuses on broad objectives such as infrastructure development, ensuring widespread access to affordable and reliable ICT infrastructure, including internet connectivity and computer hardware. Digital Literacy promotes digital skills and competencies among all citizens, particularly in the education sector. Content and Services encouraging the development and use of relevant digital educational content and e-learning platforms. The policy framework, therefore, acts as a top-down directive, setting the stage for what is to be achieved through ICT in education.

While the National ICT Policy provides the overarching vision, a school-based ICT policy is the critical mechanism for its on-the-ground implementation. This policy is developed at the school level and is tailored to the unique context, resources, and needs of a specific institution. It translates the national goals into actionable strategies and daily practices. A robust school-based policy typically addresses: Curriculum Integration, how ICT will be used to support and enhance teaching and learning across various subjects.

Infrastructure Management includes the specific procedures for maintaining, acquiring, and allocating ICT assets, such as computer labs and mobile devices. Teacher Professional Development: The provision of continuous training and support to empower teachers with the pedagogical and technical skills required for effective ICT integration. Guidelines and protocols for the ethical and safe use of technology by learners and staff, including cybersecurity and data protection.

The SMT is the linchpin connecting these two policy levels. As instructional leaders, SMTs are responsible for ensuring that the national vision for ICT in education is not only understood but also effectively implemented within their schools. Their role is multifaceted and includes: Strategic Leadership, developing and championing the school's ICT policy, aligning it with national directives and the school's specific goals.

Resource Management oversees the acquisition, maintenance, and distribution of ICT resources to support both teaching and administrative functions. Capacity building, fostering a culture of digital literacy by providing continuous professional development opportunities for teachers, thereby empowering them to integrate technology meaningfully into their lessons. Monitoring and evaluation, assessing the impact of ICT initiatives on teaching and learning and making data-driven decisions to improve outcomes.

In essence, the SMT acts as the bridge between national policy and classroom practice. Their effective leadership is crucial for transforming policy aspirations into a thriving digital learning environment, ultimately preparing learners to be successful participants in the modern world.

Theme 4 was derived from the following research question:

- How do the National ICT Policy and the School-Based Policy support SMTs in effectively integrating ICT in primary schools?
- The objective of this question was to review and analyse the National ICT Policy and the School-Based Policy to evaluate their effectiveness in guiding SMTs to integrate ICT in schools.

To achieve this, the participants had to answer questions based on two sub-themes:

- SMTs' knowledge of the National ICT Policy guidelines

Theme 4 presented and interpreted the findings of ICT policies that assist SMTs in successfully integrating technology into schools. The primary sub-themes presented and interpreted include:

- The National ICT Policy
- The school-based ICT policy

The emerging sub-themes presented and interpreted in this section include:

- The National ICT Policy guidelines in schools
- The existence of the school-based ICT policy in schools
- SMTs' key performance areas in the school-based ICT policy
- Monitoring of ICT school-based policy by SMTs

4.4.7.1 Sub-Theme 1: SMTs' knowledge of the National ICT policy guidelines

The National ICT Policy serves as a framework and regulates schools and institutions to ensure successful ICT integration. The South African DBE formulated a policy outlining the framework for executing a strategy to enhance the use of ICTs and elevate the quality of teaching and learning, thereby equipping South Africa to compete in the global economy. This sub-theme outlines feedback from the SMTs on the guidelines of the National ICT Policy and their understanding of its details.

Table 0.11 Responses and emerging sub-themes on the guidelines provided by the National ICT Policy in supporting SMTS in integrating ICT in schools

SUB-THEME	EMERGING SUB-THEMES FROM INTERVIEW RESPONSES
SMTs' knowledge of the National ICT Policy guidelines	• SMTs' knowledge of the National ICT policy guidelines in schools

- **SMTs' knowledge of the National ICT policy guidelines in schools**

To successfully implement digital migration in schools, SMTs must not only be aware of the National ICT policy guidelines but also understand how to translate these frameworks into practice. However, data gathered from participants reveal a deeply fractured landscape of policy literacy. Rather than a uniform understanding, SMT members' responses expose a stark divide between theoretical awareness and operational reality, compounded by a pervasive sense of institutional paralysis. SMTs expressed mixed views on their knowledge of the National ICT policy guidelines. This is what some SMTs said during the interviews,

> P-A,DHc1, DH-C2, DH-D2, and DH-E2 said, *"Yes! The National ICT Policy definitely provides guidance on integrating ICT. But we are doing nothing about that as a school. Okay, we can have the information and the knowledge, but we need to put it into practice. But you can't do it because we don't have the resources."*
>
> *P-A added, "Yeah, the resources. We're not there yet. We see in the schools that are fully ICT schools, remember, there were schools that were called SMART schools. You can see that those learners are far, far. We are far behind. They're moving. The schools that are not ICT schools disadvantage the learners."*
>
> P-B echoed*, "At some stage, I read the national policy on ICT because I was an ICT coordinator. Okay, it gives clear guidelines on how to implement ICT in school. But since I came to this school, I have never read it again, and I can't remember anything now."*

P-D added, "*Honestly, no government policy will exist without national guidelines. Every policy that is in operation within schools has a guide. Hence, we have the National Education Policy Act. Obviously, even though now we don't use it, but then I think it is still there because it is a document that cannot go anywhere."*

DP-B and DP-B supported P-D when they said, *"Yeah, the main policy, the national policy, does provide guidance, but it is not clear, especially on how to integrate ICT schools for the purposes of teaching and learning."*

While some SMTs acknowledge the importance of the National ICT policy guidelines, others, like DP-D, said*,*

"No, I've never seen that policy. No, I don't know anything about that policy. I never read the national ICT policy."

DH-A1 also added*, "I have no idea. I have never read through...No."*

DH-A2 and DH-B1 also said*, No, no, no. I've never read that. I blame myself for not reading the National Policy on ICT integration. No. I've never seen it and never read it."*

DH-B2, DH-D1, and DH-E1 added*, "No, I just know that ICT must have a policy. No, I have never seen it. I feel bad because we're lagging behind in so many things. Yes, because if we all have that knowledge, we can take our school to another level."*

Based on the provided transcripts, the School Management Team (SMT) members display a complex, fractured relationship with the national ICT policy guidelines. Their responses reveal a sharp divide between theoretical awareness and practical implementation, hampered by resource constraints and a pronounced lack of policy dissemination.

There is a clear group of SMT members (P-A, DH-C1, DH-C2, DH-D2, DH-E2, P-B, P-D) who actively acknowledge that a national policy exists and that it contains guidelines for ICT integration. However, this knowledge is entirely passive. As P-A and the department heads point out, knowledge does not equate to practice. They are

acutely aware of the guidelines but feel completely paralysed by a lack of infrastructure. “We need to put it into practice... but you can't do it because we don't have the resources.” P-B’s comment highlights that without continuous engagement and a supportive environment, policy literacy fades. Even a former ICT coordinator forgot the guidelines after moving to a school where the policy isn't actively practised.

The data reveals deep-seated frustration with systemic inequality. P-A explicitly compares their school to “SMART schools”, fully equipped ICT schools, noting that their learners are being left “far, far behind.” The SMT recognises that policy without equitable resource distribution creates a multi-tier education system in which non-ICT schools actively disadvantage their learners.

Even among the SMTs who know the policy, there is criticism of its clarity. DP-B notes that while the national policy provides a macro-level framework, it fails to offer actionable, micro-level guidance on integrating ICT into pedagogy, and it is unclear, especially regarding how to integrate ICT into schools for teaching and learning. This suggests a disconnect between high-level ministerial vision and classroom reality.

A significant portion of the SMT (DP-D, DH-A1, DH-A2, DH-B1, DH-B2, DH-D1, DH-E1) is entirely disconnected from the National ICT policy, ranging from never having seen it to knowing nothing about it. Interestingly, several department heads internalise this systemic breakdown as a personal failure: “I blame myself”, “I feel bad because we’re lagging behind”. They view the lack of policy knowledge not only as an administrative gap but also as a missed opportunity to elevate their school “If we all have that knowledge, we can take our school to another level.”

4.4.7.2 Sub-Theme 2: SMTs’ Knowledge of the School-Based ICT Policy Guidelines

The school-based ICT policy provides the school with essential information for ICT integration. The National ICT Policy is its source of strength and inspiration. This ensures that the school’s ICT initiatives are aligned with national standards and goals. By following the National ICT Policy, the school can contribute to broader efforts to advance technology education and literacy. This alignment also helps the school stay current with best practices and innovations in the field of ICT. Additionally, it allows for

collaboration and networking opportunities with other institutions and organisations working towards similar goals. The following sub-theme focuses on the responses based on how the school-based ICT policy provided support for ICT integration in schools.

Table 0.12 Responses and emerging sub-themes on the support offered by the school-based policy document, enhancing ICT integration in schools

SUB-THEME	**EMERGING SUB-THEMES FROM INTERVIEW RESPONSES**
Support from the School-Based Policy Document for ICT Integration	• The existence of the school-based ICT policy in schools • Key performance areas in the school-based ICT policy • Monitoring and evaluation of school-based ICT policy

- **The Existence of the school-based ICT policy in schools**

The qualitative case study findings revealed SMTs' mixed views about the existence and awareness of a school-based ICT policy in their schools. Some participants, such as DP-C, DP-D, DH-C2, and DH-E1, reported that their schools have a school-based ICT policy, with some mentioning that it is kept in the principal's office or master file.

> DP-C said, *"Yes, we do have the school-based ICT policy. The policy is in the master file, I believe it's in the principal's office, where all the policies are kept in a master file."*
>
> DP-D said, *"Yes, but we have a computer lab that is not working. It was working before, but now it is no longer working...but we do have the school-based policy."*
>
> DH-C2 said, "*Yes, we do have one as a school." The school does have a school-based ICT policy.*
>
> DH-E1 claimed to have a school-based ICT policy, *"Yeah, it's there, but I've never seen it. Yes"*

However, many participants shared a common theme of not having a school-based ICT policy or being unaware of its existence. Several SMTs, including DH-A2, P-D, P-B, DP-A, DH-A1, DH-B1, DH-D1, DP-E, DH-C1, and DH-B2, stated that their schools either lack a school-based ICT policy or have abandoned it for various reasons, such as insufficient ICT infrastructure, vandalism, or not being an ICT school. Moreover, some participants, like DH-A2, mentioned that they simply ignore or "scratch off" the ICT policy document provided by the district, indicating a lack of relevance or priority. While others, like P-B, acknowledged that not having an ICT policy affects their school's performance in self-evaluations.

> DH-A2 said*, "No. We don't have a school-based ICT policy at all. We are not an ICT school. When it comes to the school-based ICT Policy document that the district wants, regarding ICT policy, we simply scratch it off, and then we say we are not an ICT school. We just scrap it out and move. The only policy that is there is for gadgets. They tell us how to handle and look after gadgets."*
>
> P-D said, *"No, we don't have a school-based ICT policy. But after it was vandalised and no longer in operation, we don't even look at the policy anymore... So, we also do away with the ICT policy because we are no longer using the laptops or any gadgets."*
>
> P-B said, *"Our school does not have an ICT policy. No, because we don't even have those classes. So, every time we do our school self-evaluation, we score ourselves zero."*
>
> DP-A said, *"The school does not have a school-based ICT policy. ICT policy, no, because we don't have ICT. Well, if there is, I'm not aware of it. Maybe it's because I ignore it. After all, there is no ICT at the school; we don't have a laboratory."*
>
> DH-A1 said, *"No. We don't have a school-based ICT policy. It might be there somewhere, but I don't know it. That is why I say a big no."*
>
> DH-B1 said, *"Currently, I'm not sure...since we are not using the computer lab...we used to have the school-based ICT policy. Now that it's not functional, I'm not sure whether it is there..."*

DH-D1 said, *“No. We don’t have any school-based ICT policy. We can’t have the performance areas when we don’t have a school-based ICT policy. I have never seen one”*

DH-B2 said, *“When I came to the school, I saw it... But because we need to change each and every year, or after three years, we need to change. Some did change. I never saw it. I don't want to lie. No, we never discussed the school-based ICT policy.*

DP-E said, “*I don’t know if the school has a school-based ICT policy. I have never seen it.”*

DH-C1 said, “*I don’t know if the school has a school-based ICT policy. I haven’t seen one yet. I have never seen it, and I don't even know about it, and I don't know what's in it, even if it's there.”*

DH-A2 said*, “No. We don't have a school-based ICT policy at all. We are not an ICT school. When it comes to the school-based ICT Policy document that the district wants, regarding ICT policy, we simply scratch it off, and then we say we are not an ICT school. We just scrap it out and move.”*

A few participants, particularly P-E, acknowledged that their school has a school-based ICT policy, but noted that it’s not effective. The policy was drafted based on a template provided by the GDE, which was then supposed to be edited to suit the school’s needs. Moreover, the SMT member suggests that the ICT must also discuss the budget, ICT infrastructure, and resources, as well as focus on teacher development and the use of ICT in the curriculum. However, P-E also highlighted that not everyone is aware of this policy. As a result, it’s not being implemented properly, suggesting that while the school may have a policy on paper, it’s not being used effectively to guide ICT integration.

P-E acknowledged, *“Well, we do have a school-based policy, although it’s not effective, to be honest. This was drafted. Remember, the Gauteng Department of Education will send out a draft, and we now have to edit it to suit our school. Not everybody is aware of this. That’s why I say some of the things are well, on paper, we do have, but they are not being implemented.”*

P-E further suggests, *"Yes, the school-based ICT policy must change because we are an ICT school. In ICT, we must also discuss the budget, ICT infrastructure, and resources in the policy. We need to focus on teacher development and then use ICT in the curriculum as well."*

The qualitative case study discovered that most SMTs lacked awareness and inconsistent implementation of school-based ICT policies, highlighting the need for greater support and guidance from the Department of Education. The study also believes that by developing and implementing effective ICT policies, schools can better integrate ICT into teaching and learning, ultimately improving learner performance.

- **Key performance areas in the school-based ICT policy**

When responding to this sub-theme, DP-A said,

DP-A said, *"No, there's nothing. We don't have any key performance areas because we don't have a school-based ICT policy. The only policy that is there is for gadgets. It tells us how to handle and look after gadgets."*

The response indicates that the school does not have a comprehensive school-based ICT policy. Consequently, there is no overarching school ICT policy or performance areas to direct ICT use and implementation. The only existing policy pertains to managing and caring for gadgets, which represents a narrow aspect of ICT management. This underscores the limited scope of school-based ICT guidance and policy.

DH-D1 confirmed the absence of a school-based ICT policy,

DH-D1 said, *"No. We don't have anything like that. We can't have the performance areas when we don't have a school-based ICT policy. I have never seen one"*

The response indicates that the DH-D1 confirms the absence of a policy and explicitly states that the school does not have a school-based ICT policy. Additionally, DH-D1 recognises a lack of familiarity and confirms never having seen a policy.

Based on the key performance areas in the school-based ICT policy,

> DP-C said*, "The policy talks about both the management, teachers and learners. The school-based ICT policy talks about exploring and planning for the classes. At the end, even the kids need to be part of the computer literacy...In the end, there must be an improvement in the lessons that they are doing."*

This indicates that the school-based ICT policy focuses on ICT integration and literacy for both teachers and learners. The policy covers management as well as teaching aspects. It also considers planning for ICT-supported lessons. The policy emphasises the importance of planning and applying ICT in classrooms. The goal is to improve lessons through ICT: the ultimate aim is to enhance teaching and learning via ICT integration. Learners are expected to become familiar with computer programmes and to work independently with guidance. This highlights the participant's vision for ICT integration, stressing both the development of teachers and learners, as well as the importance of planning and implementation.

Concerning the key performance areas of the school-based ICT policy,

> P-D said, "*One thing that I can say I still remember is that we had some pupils who were learners attending computer lessons. Additionally, we had one person who was responsible for the ICT lab. Also, it wasn't supposed to be used by everyone, but it also allowed the community, especially the youth, to come and utilise it on weekends."*

These statements indicate that the principal's school previously had ICT infrastructure. The school operated a functional ICT lab and offered computer lessons to learners. Someone was responsible for managing the ICT lab. The ICT lab was accessible to the community, especially youth, on weekends, showing an effort to extend ICT access beyond the school itself. This highlights the principal's recollection of past experiences with ICT infrastructure and community involvement, which may influence their current views on ICT integration.

DH-A1 revealed the absence of a school-based ICT policy and key performance areas,

“Since I said no, we don’t have any key performance areas...which means there is no key performance area.”

These responses indicate that DH-A1 affirms the school's lack of an ICT policy and highlights that no key performance areas are established. Without a policy, there are no specified key performance areas for ICT. This emerging theme emphasises DH-A1’s clear assertion about the absence of a school-based ICT policy and its related key performance areas.

DH-A2 also acknowledged the absence of a school-based ICT policy and key performance areas,

DH-A2 said, “*We do not have key performance areas...since we are not an ICT school.”*

DH-A2 confirms the absence of key performance areas by clearly stating that the school lacks defined key performance areas for ICT. According to the DH-A2, this is attributed to the school type, implying that the school's non-ICT focus is the reason for not having key performance areas.

DH-B1 revealed that the school had a defined key performance area for ICT policy

DH-B1 said, “*The key performance areas were to monitor the use of the computer lab...the computers and how teachers and learners used the lab during their visiting times or class contact times.”*

The response indicates that the DH-B1 identifies specific monitoring areas by highlighting the use of lab facilities, computer usage, and teacher/learner behaviour. Furthermore, the DH-B1 emphasises the importance of ensuring proper use of ICT resources.

- **Monitoring and evaluation of school-based ICT policy**

The qualitative case study revealed various approaches SMTs used to monitor and manage ICT resources in their schools. Some participants, like P-D, mentioned that they had a coordinator in charge of the computer lab, and measures were in place to monitor its use, including cameras and remote monitoring from the head office.

P-D said, *“We had a coordinator who was in charge of the computer lab. He was the one who had the code to open it because our computer lab was also monitored from the head office in Johannesburg. There were cameras that were installed in that computer lab, which were monitored from the head office...Our SMT members, before they open the computer lab, will dial that code to the head office so that the alarm doesn't go on.”*

Whereas others, like DP-B, highlighted the importance of monitoring and control, with the district playing a role in overseeing school-based ICT policies. DP-C emphasised the need for discipline and time management in the computer lab, ensuring that learners are guided and monitored while using ICT resources.

DP-B said, *“The main thing was getting learners to use computers in their learning. The district monitored the school-based policy. The school level, yes. We would manage in terms of the measures that are available. It required monitoring, and we had a system for control and so on.”*

DP-C said, “*We monitor, and we do have the timetable. Time management is needed. There must be discipline because sometimes we experience a problem. A teacher, a facilitator, or an assistant needs to make sure that each and every learner being monitored and guided knows what to do.”*

However, some SMTs, such as DH-B2 and DH-A1, noted that monitoring ICT resources was challenging or not possible due to the lack of resources, infrastructure, or assigned personnel. DH-B1 mentioned that their school received support from external personnel who occasionally visited the computer lab, and a lab coordinator would liaise with them.

DH-B2 said, “*No, there was no one who was assigned to monitor it. It was only the principal, deputy principal and the admin. It was not easy to monitor it because you cannot monitor without a laptop to check that this person can use a laptop.”*

DH-B1 said, *“Yes, because we had somebody who would come in once or twice for the computer lab. And we had a computer lab coordinator at the time*

who was liaising with that person. As we come in and come out with learners, they would just monitor using the register."

DH-A1 said, "*Like I said, there's nothing to monitor...because we don't have a policy. My answer is no."*

4.4.8 Summary of Theme 4

Theme 4 presented and interpreted the findings of ICT policies that assisted SMTs in successfully integrating ICT into schools. The primary sub-themes presented and interpreted:

- SMTs' knowledge of the National ICT policy guidelines
- SMTs' knowledge of the school-based ICT policy guidelines

The emerging sub-themes presented and interpreted in this section include:

- SMTs' knowledge of the National ICT policy guidelines in schools
- The existence of the school-based ICT policy in schools
- SMTs' key performance areas in the school-based ICT policy
- Monitoring and evaluation of school-based ICT policy

The following section presents documents analysed in the study.

4.4.9 Document Analysis

The documents analysed in this case study include the National Policy on Whole-School Evaluation, the Draft White Paper on e-Education (Transformation Learning and Teaching through ICT), the National ICT School, the GDE ICT Policy, the School-Based ICT Policy, Annual Teacher Preparation (ATP), and lesson plans.

- **National policy on whole-school evaluation**

The National Policy on Whole-school Evaluation was created to ensure that school evaluation is conducted in accordance with an agreed national model (Department of Basic Education, 2002). It outlines the legal framework for school evaluation, its aims, what aspects are to be evaluated, and who is authorised to carry out evaluations. It also offers guidance on how the evaluation should be performed. Additionally, it details

how the evaluation process should be managed and funded. The Policy describes ways to recognise outstanding schools and support under-performing ones. It clearly establishes the connections between those at national and provincial levels responsible for the quality of education, and the supervisors, schools, and local support services involved (Department of Basic Education, 2002).

- **Areas for evaluation in the National Policy on whole-school evaluation**

The following are the key areas of evaluation:

- Basic functionality of the school.
- Leadership, management and communication.
- Governance and relationships.
- Quality of teaching and learning, and educator development.
- Curriculum provision and resources.
- Learner achievement.
- School safety, security and discipline.
- School infrastructure.
- Parents and community (Department of Basic Education, 2002)

The areas of focus are analysed in relation to SMTs' ICT integration in schools.

- **Basic functionality of the school**

Basic functionality ensures that the school has appropriate policies and procedures to run smoothly. The policies include language policy, admission policy, code of conduct for learners, finance policy, school safety policy, maintenance policy and asset policy.

- **Leadership, management and communication**

The SMT provides clear guidance for the school's Vision Statement, customised to the school using the GDE mission and basis. Furthermore, SMTs provide direction on workload distribution in accordance with the PAM and the school improvement plan (SIP) for the current year.

- **Governance and relationships**

The SGB is duly established and functions effectively with an elected executive. As required, the SGB provides the schools with clear strategic direction together with the SMTs. Moreover, the SGB ensures that Audited Financial Statements are prepared and, together with Budgets and Resolutions, are presented to parents at the annual AGM.

- **Quality of teaching and learning, and educator development**

The SMTs ensure that effective time management of teaching and learning is adhered to by every teaching staff. Furthermore, SMTs ensure that teachers have a positive learning environment by managing learner discipline and classroom diversity. They also assist teachers in understanding the curriculum, using skills and setting goals to work towards attainment. They oversee lesson planning, presentation, learner assessment and achievement. SMTs ensure the school conducts appropriate assessments of learner competencies, assessments are of a good standard and correctly recorded.

- **Curriculum provision and resources**

SMTs ensure the curriculum offered complies with CAPS, and the school provides curriculum resources to support teaching and learning. The SMTs also manage the procurement, distribution and retrieval of Learning and Teaching Support Material (LTSM). SMTs also establish and maintain a relevant curriculum information management system database, which ensures that teachers use SA-SAMS or the Education Management Information System (EMIS).

- **Learner achievement**

SMTs manage learner assessment and achievement and provide evidence of internal assessments and of participation in the Annual Provincial Assessment (APA) for languages and literacy. Furthermore, SMTs provide evidence of participation in the Annual Provincial Assessment in Mathematics.

- **School safety, security and discipline**

SMTs implement a health, safe and security policy to support, care for and protect the learners, staff and others in the school through internally managed programmes, communicable diseases, medical emergencies, HIV management, and poverty alleviation. In addition, the SMTs implement security regulations to ensure the safety of learners, staff, and visitors on the premises through access control, supervision, and systems to record and monitor early departures. They also implement regulations in compliance with legislation to keep the school violence and drug-free and conduct regular search and confiscation operations in conjunction with the South African Police Service (SAPS). Importantly, SMTs ensure learner discipline policy and procedures are in place (Department of Basic Education, 2002).

The schools that participated in the study include one school that is part of the GDE ICT SMART schools, where the ICT programme is being pioneered. The other four schools are non-ICT schools. A non-ICT school is a school that is not part of the GDE ICT pioneering schools. In the department's language, it is not a SMART School.

The schools have a National Policy in place, which is kept in a master file in the principal's office.

4.4.9.1 The GDE ICT policy

Important terms used in the GDE ICT policy document include:

- ICT in the document refers to the term 'Information and Communication Technology.
- Cyber safety refers to the safe and responsible use of the internet and ICT equipment/devices, including mobile phones.
- School ICT refers to the school's computer network, internet access facilities, computers, and other school ICT equipment/devices as outlined below.
- ICT equipment/devices used in this document include, but are not limited to, computers (such as desktops, laptops, tablets and LED Boards), and any other similar technologies as they come into use.
- Learner devices refer to tablets issued to learners for the duration of the year.
- Users mean Teachers, Learners, and all other School staff members.
- Class teacher means the teacher responsible for a particular class for the administration related to the distribution and retrieval of learner devices.

This policy serves to manage the use of ICT within the school. It is envisioned that the resources entrusted to the school by the GDE will be used to enhance the provision of education to the learners of this school.

- **Distribution of learner devices at the beginning of the academic year**

The class teacher will oversee the distribution of the devices to the learners at the beginning of the academic year. The class teacher will also be expected to collect, maintain, and capture all the necessary records and submit them to the ICT coordinator.

And these records include and are not limited to:

- The name and surname of the learner to whom the device has been issued.
- The asset tags of the learner device.
- The device makes and serial number.
- Condition of devices.
- Loss or theft of the devices.

- **The retrieval of the learner devices at the end of the academic year**

Class teachers will retrieve the devices from learners at the end of the year using a checklist provided by the ICT coordinator. The class teachers will submit the checklist referred to in number 3 to the ICT Coordinator for quality assurance and other purposes.

The learner devices will then be submitted to Bongani Rainmaker Logistics (BRL) for:

- Safekeeping.
- Quality assurance.
- Updating of the device software.
- Loading of learner information.
- Loading of new e-textbooks for the following academic year.

- **Theft and damage**

Each learner is responsible for their own device and must use it responsibly and appropriately. The school takes no responsibility for stolen, lost or damaged devices, including lost or corrupted data on those devices.

- ✓ It is the responsibility of the learner and their parents/guardians to report stolen devices.
- ✓ The learner will verbally report the stolen device to the class teacher and/or the ICT Coordinator or delegated member of the ICT Committee.
- ✓ The school will issue a GDE 73E form, which the learner and their parent/guardian will fill in and use to report the stolen device at the police station.
- ✓ The completed form that bears a police case number or reference number shall be returned to the school for record-keeping purposes.
- ✓ If the learner's device is damaged, it is the responsibility of the learner to report the damage to the school by informing the class teacher and/or the ICT coordinator or delegated member of the ICT Committee.
- ✓ The ICT Coordinator will report the device to the BRL for repairs

- **Management of teachers' laptops**

- ✓ Once the teacher has been profiled and the devices have been delivered to the school's ICT Coordinator, the teacher will be expected to fill in a Consent Form, which must be accompanied by two certified copies of the said teacher's identity document. The teacher will not receive the laptop without the Consent Form being correctly filled out and filed.
- ✓ The laptop is for educational purposes only; therefore, it must not be used by anyone except the registered teacher. Furthermore, the laptop must not be used to access any obscene material/unauthorised website/content/applications.
- ✓ Any software or hardware issues must be reported to the ICT Coordinator.
- ✓ Lost laptop must be reported to the police within 24 hours, and a GDE 73E must be used to report the lost laptop.

- ✓ Physical damage (Screen crack, water damage, etc.) are deemed to be the teacher's responsibility and as such will not be attended to.
- ✓ If the teacher intends to leave the school permanently, the laptop must be reported to the school with all the accessories that were issued with the laptop.

- **Management of smartboards and KAPP boards**

- ✓ LED Boards should always be plugged in.
- ✓ The Boards should always be kept clean.
- ✓ Stolen OPS devices/hard drives/ LED Boards must be reported within 24 hours, the GDE 73E form must be filled in and sent to GDE and BRL.
- ✓ The serial numbers for each classroom must be known via the maintenance of the Asset Register and Quarterly Audits.

4.4.9.2 ICT committee

- **Composition of the ICT committee**

The ICT Committee members voluntarily join the committee at the beginning of each year; the Committee should comprise the following members of staff:

- ✓ The Principal of the school.
- ✓ ICT Coordinator.
- ✓ Member of the SMT.
- ✓ Teacher
- ✓ The Administrator
- ✓ e-Cadres or PYIE (Optional)

- **Roles and responsibilities**

The 'Guidelines on the Management and usage of ICTs in Public Schools in Gauteng' (2011:29) presents the following roles and responsibilities for the School-Based ICT Committees:

- ✓ ICT Planning for the school.
- ✓ Working with the SMT to develop and implement an ICT policy for the school.
- ✓ Scheduling and monitoring training.

- ✓ Identification, evaluation and selection of educational software.
- ✓ Representing the school in all e-Learning activities at the District or cluster level.
- ✓ Representing the school at District or ICT forums and sharing information from these meetings with the school.
- ✓ Promoting ICT integration in teaching and learning.
- ✓ Monitoring and evaluating the effectiveness of ICT use in the school.
- ✓ Design and implementation of the monitoring and review process

Additionally, the day-to-day responsibilities of the ICT Committee are listed below:

- ✓ The ICT Committee is responsible for updating the school's ICT Asset register.
- ✓ The number of LED Boards.
- ✓ Make sure that the LED Boards that are not functional are reported and fixed.
- ✓ Collect information on dysfunctional learner tablets.
- ✓ Liaise with BRL technicians about dysfunctional tablets and LED Boards.

- **ICT committee coordinator's role**

Pages 29–31 of the Guidelines on the Management and Usage of ICTs in Public Schools in Gauteng (2011) describe the attributes of an ICT Committee coordinator. These include digital literacy and the ability to integrate ICTs pedagogically, enabling them to drive and champion the process competently. Some of the school ICT Coordinator's responsibilities are:

- ✓ Staff Development.
- ✓ Management and leadership of the ICT innovation in the school.
- ✓ Curriculum planning.
- ✓ Resource and inventory management.
- ✓ Monitoring the teaching and learning using ICT.

- **The principal: role and responsibilities**

The principal is the accounting officer who provides oversight of the ICT committee's activities and the management of the school's ICT resources. The principal will therefore undertake to do the following:

- ✓ Review and approve the ICT policy and provide strategic directives on the use of ICTs for teaching and learning.
- ✓ Appoint an ICT committee.
- ✓ Ensure implementation and compliance with the ICT policy.
- ✓ Periodically coordinate the review and amendment of this policy.
- ✓ Plan and develop an ICT strategy to safeguard the school's systems in particular.
- ✓ Be the custodian of all ICT resources of the school.

- **Monitoring and evaluation**

- ✓ The ICT Committee will, at the end of each term, conduct an audit of the ICT resources.
- ✓ The physical stock count will be compared to the asset register.
- ✓ Any difference should be investigated, and if they cannot be reconciled, must be reported at the police station using the GDE 73E form.
- ✓ At the end of the term, the ICT Committee must meet to monitor and evaluate the achievements of the committee and suggest improvements to the systems and processes used by the school.

- **School-Based ICT policies**

The SMART school in the study has a school-based ICT policy designed to ensure the effective, safe and responsible use of technology in all aspects of school life. Furthermore, the policy outlines standards and guidelines for using ICT resources, supports the integration of technology in education, and ensures a secure digital environment for all learners, teachers, and staff. Its objectives include enhancing learning by leveraging ICT to improve teaching and learning, supporting teachers by providing necessary ICT tools and training, and promoting digital literacy by equipping learners with essential digital skills for the future. In addition, the policy ensures security to protect the school's digital infrastructure and data from threats. It also focuses on how to maintain responsible use of technology by encouraging ethical and responsible use of ICT resources by all users.

The policy applies to all learners, teachers, and staff members, as well as all ICT resources, including computers, internet access, tablets, and software provided by the school. It also applies to all personal devices used on school premises for educational purposes. It also applies to SMTs' roles and responsibilities as overseers of the implementation and periodic review of the ICT policy. Whereas the ICT coordinators manage the school's ICT resources, provide technical support, and ensure adherence to the policy. Teachers integrate ICT into their teaching and learning practices and supervise learners' use of ICTresources. In turn learners use ICT resources responsibly and in accordiance with the school guidelines. Parents or guardians support the school's ICT policy and guide responsible use of technology at home.

The schools that are not part of the SMART schools have school-based ICT policies, but they focus on the inventory and safekeeping of the gadgets received from the district and from the school. Most of these policies need urgent updates to align with the National and GDE ICT policies.

- **Annual Teacher Preparation (ATP) and lesson plans**

The SMART schools have included ICT in their annual planning, whereas the non-SMART schools lack ICT planning. No ICT lesson plans were provided during the data collection and research period. This shows that the schools were not implementing ICT during the research period.

4.4.10 Summary of the Document Analysis

The summary shows that most schools have the National ICT Policy in place, but its implementation depends on whether the school is part of the ICT pioneering programme. The GDE ICT Policy is also a very detailed document that clearly outlines the responsibilities of all staff members and SMTs. In terms of annual preparations and daily lesson plans, it also depends on whether the school is part of the ICT pioneering programme, after a thorough analysis of the policies and procedures. The study concluded that schools have the National ICT Policy and the GDE ICT Policy, which provide detailed information on SMTs' duties. Still, neither policy presents clear, detailed guidelines on ICT integration and implementation. It looks like the National ICT policy gives SMTs the option to choose their own approach to integrating ICT in

their schools. When it comes to school-based policies, most schools, especially those not part of the SMART schools, lack ICT policies.

In addition to document analysis, the researcher also took pictures of school labs. These are presented in APENDIX E. Photos revealed that most computer labs were used as storage rooms. Computer labs were no longer used for educational purposes. SMTs need to come together to plan how to rebuild computer labs to support ICT integration in schools.

4.5 SUMMARY OF CHAPTER 4

The chapter began by presenting the school and participants' biographical data. This was followed by themes, sub-themes, and emerging themes from the subsequent primary research question:

- What are the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools?

The chapter also presented and interpreted the findings based on the four sub-questions, which are as follows:

- What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?
- What challenges do SMTs face when integrating ICT in primary schools?
- What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?
- How do the National ICT policy and the school-based policy support SMTs in effectively integrating ICT in primary schools?

The summary of all emerging sub-themes is shown in Table 0:13 below.

Table 0.13 Summary of Emerging Sub-Themes of the Findings

THEME 1: THE SMTS' KNOWLEDGE OF ICT INTEGRATION IN TEACHING AND LEARNING	THEME 2: CHALLENGES EXPERIENCED BY SMTS IN

	INTEGRATING AND IMPLEMENTING ICT IN SCHOOLS
• Lack of computer knowledge and skills • Intermediate computer knowledge and skills • Advanced computer knowledge and software applications • SMTs' perspectives on ICT integration in schools • Benefits of ICT integration in schools • SMTs using ICT tools to support teaching and learning during COVID-19 • Formal training and certification received by SMTs • Insufficient ICT district support for the SMTs	• Resistance to ICT adoption and reluctance to learn. • Insufficient funding for SMTs to support ICT integration and maintenance in schools. • Inadequate SMTs training to support ICT integration in schools. • Unavailability and non-functionality of ICT building infrastructure in schools. • Theft and vandalism of ICT gadgets in schools • Poor internet connectivity and network coverage in schools. • Shortage of maintenance and technical support for ICT infrastructure.
THEME 3: SUPPORT STRUCTURES AND SYSTEMS AVAILABLE TO SUPPORT SMTS IN INTEGRATING ICT IN SCHOOLS	**THEME 4: ICT POLICIES SUPPORTING SMTs TO INTEGRATE ICT IN SCHOOLS**
• Insufficient ICT district support for the SMTs	• SMTs' knowledge of the National ICT Policy guidelines in schools • The existence of the school-based ICT Policy in schools • Key performance areas of school-based ICT policy • Monitoring and evaluation of school-based ICT policy

CHAPTER 5

DISCUSSION AND ANALYSIS OF FINDINGS

5.1 INTRODUCTION

The case study was designed to investigate and describe the experiences and challenges faced by SMTs (principals, DPs, and DHs) in integrating and implementing ICT into teaching and learning in South African primary schools. In Chapter 4, the case study presented and interpreted themes and subthemes emerging from the study's research questions and objectives. It further explained and interpreted the emerging subthemes derived from semi-structured interviews with the SMTs. In essence, Chapter 4 presented and interpreted the findings in a thematic format, based on the primary research questions, which include:

What are the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools?

The chapter also presented and interpreted the data based on the four subquestions, which are as follows:

- What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?
- What challenges do SMTs face when integrating ICT in primary schools?
- What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?
- How do the National ICT and the School-Based ICT policies support SMTs in effectively integrating ICT in primary schools?

Chapter 5 discussed and analysed the findings by using the subthemes that emerged from the SMTs' responses identified in Chapter 4 to answer the primary research question.

Below are the key subthemes identified after presenting and analysing the SMTs' reactions to the research questions in Chapter 4.

5.2 KEY SUB-THEMES EMERGED IN CHAPTER 4

The key sub-themes that emerged after data presentation and interpretation in Chapter 4 are summarised in Table 5.1, organised according to the order of the sub-research questions and objectives. We compared the discussion and analysis of the key findings with previous research to understand their relevance to the existing literature. In addition, the discussion and analysis of the findings assessed whether they confirmed, contradicted, or expanded previous research. It also discussed how the current case study contributes to understanding the topic. The sections below, Table 0.14, discuss the findings (sub-themes identified).

Table 0.14 Summary of the findings: Emerging sub-themes from the research questions

THEME 1: THE SMTS' KNOWLEDGE OF ICT INTEGRATION IN TEACHING AND LEARNING	THEME 2: CHALLENGES EXPERIENCED BY SMTS IN INTEGRATING AND IMPLEMENTING ICT IN SCHOOLS
• Lack of computer knowledge and skills • Intermediate computer knowledge and skills • Advanced computer knowledge and software applications skills • SMTs' perspectives on ICT integration in schools • Benefits of integrating ICT in teaching and learning • SMTs using ICT tools to support teaching and learning during COVID-19 • Formal training and Certification received by SMTs	• Resistance to ICT adoption and reluctance to learn. • Insufficient funding to support ICT integration and maintenance in schools. • Inadequate SMTs training to support ICT integration in schools. • Unavailability and non-functionality of ICT building infrastructure in schools. • Theft and vandalism of ICT gadgets in schools. • Poor Internet connectivity and network coverage in schools. • Shortage of maintenance and technical support for ICT infrastructure.

THEME 3: SUPPORT STRUCTURES AND SYSTEMS AVAILABLE TO SUPPORT SMTS IN INTEGRATING ICT IN SCHOOLS	THEME 4: ICT POLICIES SUPPORTING SMTs TO INTEGRATE ICT IN SCHOOLS
• Insufficient ICT district support for the SMTs.	• SMTs' knowledge of the National ICT Policy guidelines in schools. • The existence of the school-based ICT policy in schools • Key performance areas in the school-based ICT policy • Monitoring and evaluation of school-based ICT policy

5.3 DISCUSSION AND ANALYSIS OF KEY SUB-THEMES EMERGING IN CHAPTER 4

The discussion and analysis of key sub-theme findings from Chapter 4 were carried out using the RST and the SETI framework. For triangulation, the discussion and analysis drew on document analysis, observations, and photographs of school buildings taken during the interviews. This also involved comparing the emerging sub-themes with existing literature to link the findings to the broader body of knowledge. It helped determine whether the findings confirm, contradict, or expand upon previous studies. Additionally, the analysis aimed to determine whether the qualitative case study's results enhance current understanding of the topic by highlighting the experiences and challenges SMT members face in integrating ICT into South African primary schools. The following section discusses and analyses the findings in relation to the primary research question.

5.3.1 Lack of computer knowledge and skills

The study found that many SMTs lacked computer knowledge and skills and struggled to integrate ICT into schools to enhance teaching and learning. This study further found that SMTs struggled with simple computer-based applications, such as Word documents, Excel spreadsheets, and PowerPoint. This was a significant concern regarding the implementation of ICT in schools. Teachers' limited technological-

pedagogical knowledge and limited experience integrating computers into the classroom have affected ICT uptake (Dlamini, 2022).

This is important because research says that the challenge of integrating ICT stems from a lack of knowledge and skills for doing so in schools (Abdul Razzak, 2015). This further supported Wilson and Boateng (2014) in Ghana, who mentioned that despite significant investment in ICT infrastructure and tools, ICT use and literacy levels among teachers remained low due to a lack of basic computer skills. A lack of computer knowledge and skill is a real challenge for SMTs as change agents. SMTs are expected to spearhead all school-improvement initiatives, including ICT integration. They, therefore, execute this duty in their capacities as technological leaders (Mwawasi, 2014).

SMTs are supposed to take the lead in implementing ICT in schools. However, if the SMTs struggle with basic computer skills, it will be challenging to introduce ICT in their schools. Ogenyi *et al*. (2023) also revealed that teachers lacked computer literacy. As a result, there is a need for SMTs to be well-equipped with ICT teaching methodologies and ICT practical skills (Bakari & Ali, 2023). Similarly, the current study's results further confirmed the findings of Mohd, Zulkifli, Hamzah and Tamuri (2024) in Malaysia, which indicated that teachers' ICT skills and usage remained limited due to a lack of skills that hinder effective use of ICT resources. Furthermore, researchers from Northern Vietnam also found similar results, suggesting that teachers' ICT skills have the strongest positive correlation with the extent of ICT use in schools (Pham The, Nguyen Ngoc, Dao Thi & Duong Thi, 2025). But if the SMTs lacked ICT knowledge and skills, this would affect ICT implementation in schools.

In a similar vein, empirical evidence from the literature indicates that the uptake of technology in South African schools remains low because teachers lack skills (Padayachee, 2017). Empirical literature also shows that many teachers, including newly qualified teachers, often lack TPCK, which involves the specific skills and knowledge needed to incorporate ICT into classroom teaching and learning practices effectively (Chigona & Chigona, 2013).

Grounded on the RST, SMTs are responsible for creating conditions, learning environments and structures to support effective learning and teaching (Shava &

Heystek, 2019). Given this recent discovery about SMTs possessing basic computer knowledge and skills, it is challenging to determine how they will support the integration of ICT in schools, as they themselves struggle with basic computer skills. Therefore, the current study concluded that SMTs' levels of computer knowledge and skills significantly affected the integration of ICT in primary schools. This further suggests that, despite their knowledge and skills in computers, SMTs may struggle to perform their duties using ICT tools. As a result, the study found that a lack of computer knowledge and skills impeded the integration of ICT in schools.

Although the study revealed that a substantial number of SMTs lacked ICT knowledge and skills, it also showed that a few had intermediate levels, enabling them to use ICT tools to enhance administrative duties and teaching and learning. The following section discusses findings on intermediate computer knowledge and skills.

5.3.2 Intermediate computer knowledge and skills

The study revealed that some SMTs possess intermediate computer knowledge and digital literacy, particularly with Microsoft Office applications. SMTs can effectively perform essential ICT tasks, such as creating memos and analysing data, using tools like Word, Excel, and PowerPoint. They know how to create spreadsheets, generate graphs, and design presentations. The findings support Alvarado, Aragón and Bretones (2020), who believed that the introduction of ICT in schools is instrumental, as it improves teaching and learning processes and encourages learners' development in technological environments.

The study further found that many SMTs are familiar with desktop software and online tools, enabling them to access information and manage emails efficiently. Masango, Van Ryneveld and Graham (2020) revealed that teachers found digital resources easy to use and accessible to navigate. The current study further found that SMTs could use their skills to perform administrative duties. However, the study could not establish whether this knowledge translated into the implementation of ICT in classrooms to augment teaching and learning. The study found that some schools lacked operational computer labs, except for a few that relied on NGO-sponsored labs and one school that is part of the district's ICT schools. The study also found that the ATP and lesson plans did not show how ICT was being implemented to support teaching and learning

since most computer labs were used as storerooms or “white elephants”, as some SMTs mentioned.

Research indicates that teachers perceive digital resources as user-friendly and that ICT has improved operational efficiency by automating routine tasks such as learner data management and attendance tracking (Masango, Van Ryneveld & Graham, 2020). Furthermore, literature shows that the implementation of these solutions has yielded significant benefits, including time savings and improvements in the accuracy and organisation of administrative processes (Orhani *et al*., 2024). The benefits of SMTs having the skills to use computers efficiently can easily help them implement ICT tools for teaching and learning.

To further leverage these benefits, SMTs must invest in ongoing staff training, ensure stable and up-to-date infrastructure, and develop clear policies governing technology use (Orhani *et al*., 2024).

In this case, the study acknowledged that some SMTs possessed the necessary skills to easily support ICT integration in schools. However, the study revealed that school leaders did not leverage their skills to begin supporting ICT implementation in schools. Based on the current findings, one can assume that schools will capitalise on those who can use or incorporate ICT into teaching and learning to influence the entire school in implementing ICT. Nevertheless, this approach must not prevent measures such as adequate training and monitoring when integrating ICT into classrooms. These results indicate that possessing computer knowledge and skills enhances the SMTs’ ability to perform their duties efficiently and effectively.

The study also found that some SMTs possessed advanced computer knowledge and software application skills, discussed and analysed in the following section.

5.3.3 Advanced computer knowledge and software application skills.

The study revealed that some SMTs had advanced computer knowledge and software application skills acquired through formal education and online learning platforms. Furthermore, the study shows that SMTs showed knowledge of using ICT tools and apps in their school duties. One example was the use of SA-SAMS to do administrative duties. The South African School Administration and Management System (SA-

SAMS) is crucial for streamlining administrative tasks and improving data management in South African schools (Ajani & Dlomo, 2025). In this case study, advanced computer knowledge and software application skills refer to SMTs who can leverage these skills to perform more complex duties using ICT tools for teaching and learning. The literature reveals that school leaders significantly and favourably impact teachers' positive attitudes towards digital technology, their technical proficiency, and their ability to educate with digital technologies (Schmitz, Antonietti, Consoli, Cattaneo, Gonon & Petko, 2023).

The study also revealed that SMTs used smart interactive boards for teaching and PowerPoint for their presentations. Overall, the study showed that SMTs possessed a range of ICT skills, from basic to advanced, and highlighted the ability to use various tools to support administrative and educational tasks. However, in this case study, ICT integration does not necessarily mean using ICT tools solely for administrative responsibilities. It means using ICT tools to enhance teaching and learning in the classroom. This involves the use of smartboards and the full use of ICT tools in the curriculum in schools. As a result, teachers must have prerequisite skills to integrate ICT into teaching and learning, and SMTs have a role in enabling the effective use of ICTs (Mwawasi, 2014).

Research shows that integrating ICT in schools has the potential to help teachers meet the global requirement to replace traditional teaching methods with technology-based tools and facilities (Ghavifekr & Rosdy, 2015). It further affirms the potential of Microsoft products in improving teaching and learning processes (Muhammed, Mukaddas & Mohammed, 2022). These days, some apps are suitable for enhancing teaching and learning. SMTs can purchase these apps to support teachers and learners, and SMTs can leverage their computer skills to support teachers.

The integration of ICT into the education sector is a complex exercise (Rabah, 2015), which is why the SETI framework was developed to address the need for considering various social and cultural aspects of technology integration (Engen & Engen, 2019). Therefore, SMTs, particularly principals, must ensure that all relevant stakeholders are involved throughout the ICT implementation process. This involvement should

encourage suggestions for changes and improvements, promoting the application of alternative strategies to enhance ICT integration (Shava & Heystek, 2019).

The study's findings paint a picture of a diverse group of SMTs with varying technological strengths and needs, underscoring the need for targeted support and tailored professional development to enable successful technology integration.

The study also focused on SMTs' perspectives on ICT integration in schools. This is discussed and analysed in detail below.

5.3.4 SMTs' perspectives on ICT integration in schools

The study revealed that SMTs have diverse interpretations of ICT integration, ranging from its use in teaching and learning to its role in enhancing communication. It emphasised the necessity for both teachers and learners to acquire ICT skills for successful integration. The findings suggest that ICT can make educational processes more engaging and practical, with examples such as Google Forms, smartboards, and projectors illustrating SMTs' recognition of ICT's potential in education.

Empirical evidence shows that most SMTs clearly understand that ICT in educational settings involves the use of digital tools and resources to enhance teaching methods and learning outcomes. (Halili *et al*., 2017). It was also revealed that personal computers, scanners, and digital cameras enhance ICT integration in schools (Msiza *et al*., 2020; Malatji *et al*., 2022). SMTs acknowledged that they used some of these tools to enhance teaching and learning in schools.

Ghory and Ghafory (2021) believed that using ICT effectively in schools enhances learner motivation and interest in learning, as well as improves critical thinking and problem-solving skills. Conversely, the current study argues that participants' understanding of ICT in schools does not clarify whether their knowledge influences ICT integration. Knowing what ICT is and which devices and tools can be used in ICT does not necessarily lead to its implementation in schools. The empirical literature shows that most SMTs lack an ICT background but are capable of using technology in their daily lives and for essential record-keeping tasks (Nath, 2019).

Ghavifekr and Wong (2022) believed that SMTs play a vital role in the successful integration of ICT in all educational setups. As a result, the view that SMTs significantly influence the success of ICT implementation at the school level, making decisions on strategic plans, budgeting, organisational structures, curriculum, programme evaluation, external relations, and ethical issues (Sun & Gao, 2019), is fundamental. Hence, to integrate ICT effectively into schools, SMTs, as leaders, must provide appropriate ICT structures and ensure that all agents, including teachers and other school staff, are appropriately trained. Furthermore, the structure plays a significant role in the implementation of ICT.

The role of SMTs drives and influences change by providing practical organisational functions. SMT members, especially principals, develop the school vision, motivate teachers to remain dedicated and stay inspired in their responsibilities, and create opportunities that improve job satisfaction (Adillo & Netshitangani, 2019; Khumalo, 2019). Nonetheless, fostering an inclusive digital learning environment necessitates considering teachers' perspectives on digital resources, addressing issues, and leveraging opportunities to enhance teaching practices and deliver engaging learner experiences (Yin Yin & Mohamad, 2023).

Overall, the case study's findings emphasise the importance of ICT integration in schools, highlighting its potential to enhance teaching and learning, improve communication, and support the needs of modern learners. The following section discusses and analyses how SMTs benefit from integrating ICT in teaching and learning.

5.3.5 Benefits of ICT integration in schools

The case study highlights several benefits of integrating ICT into education, including enhanced learner engagement, more enjoyable interactive learning experiences, and increased participation. It also emphasises improved teaching quality through better learning outcomes, as well as greater accessibility and flexibility, allowing for virtual meetings, remote communication, and broader access to educational resources.

Research shows that using ICT in the classroom was enjoyable, increased motivation, activity, enthusiasm, and critical thinking skills and improved learners' learning quality

(Ibanez *et al*., 2019; Jannah *et al*., 2020). Moreover, research shows that ICT integration supports learner-centred approaches, which require greater autonomy and teamwork (Apostolou, 2020). Literature further states that digital technologies provide interactive and compelling information that grabs learners' attention and encourages active engagement (Yin Yin & Mohamad, 2023).

The study also found that ICT integration in schools enhances personalised learning by enabling learners to research and visualise concepts and to engage in independent learning. It prepares learners for a technology-driven digital age, reduces teacher workload, and accelerates processes. Additionally, the case study found that ICT integration improves access to resources, enabling learners to find extensive educational materials online. Still, research shows that ICT integration empowers teachers to precisely track learners' progress and provide prompt feedback, facilitating prompt intervention and personalised support (Galindo-Dominguez, 2021; Cho *et al*., 2020). Besides, the potential benefits of using digital tools include the ability to deliver dynamic, engaging content, personalised learning experiences, collaboration opportunities, and access to a wide range of resources (Yin Yin & Mohamad, 2023).

ICT provides benefits such as encouraging creativity, enhancing academic results, boosting motivation and responsibility, and supporting teamwork (Ogenyi *et al*., 2023). Furthermore, empirical evidence shows that the integration of ICT in teaching and learning classrooms enhances self-directed learning, optimises specific objectives, stimulates learners, and improves their progress (Azmi, 2017). This is also evident in the study by Mwendwa (2017) in Kenya, which found that ICT is seen as a crucial tool for improving performance, collaboration, and learning outcomes in primary schools.

Previous research states that using ICT enhances children's digital literacy, including the use of multiple platforms to enrich educational content and improve teaching outcomes. (Yeung & Ma, 2024). Additionally, literature expounds that ICT integration in schools can enhance early learning and development when teachers use ICT to boost learners' mental development (Yeung & Ma, 2024).

The SETI framework perceives the school as a complex ecosystem with many interconnected parts that all influence the use of technology (Crompton, Chigona & Burke, 2023; Crompton, Burke, Nickel & Chigona, 2024). Bush and Glover (2016)

state that the principal's role includes ensuring the best possible resource achievement, allocation and evaluation, and the sites' and properties' security. This highlights that, without the necessary support, the principal's role alone can also hinder the successful integration of ICT in schools.

This is why it is advised that the principal must involve all stakeholders in the school to suggest changes and improvements, encouraging them to apply alternative strategies that would enhance operations (Shava & Heystek, 2019). It is, therefore, crucial for SMTs to have access to ongoing professional development and resources to implement ICT initiatives effectively. Collaboration with teachers, staff, and other stakeholders is essential for creating a culture of innovation and continuous improvement in the use of ICT in education, especially in primary schools (Shava & Heystek, 2019). It is also crucial for school SMT members to provide resources, training, and encouragement to teachers to effectively implement ICT in the classroom.

Drawing on RST, Archer (1995) defines school culture as the everyday behaviours and actions of people within the school community (Archer, 1995). Therefore, a positive school culture that values innovation and collaboration fosters successful ICT integration initiatives. Furthermore, a healthy school culture provides a secure, nurturing, motivating, inclusive, and demanding atmosphere for learners and staff, hence facilitating the development of learners' academic achievements (Adillo & Netshitangani, 2019). On the other hand, a school culture that is resistant to change or lacks support for professional development in ICT may hinder efforts to integrate ICT effectively into teaching and learning.

Overall, the current study findings suggest that ICT integration can have a transformative impact on teaching and learning, improving learner engagement, accessibility, and outcomes. The study's findings, based on SMT responses, revealed that ICT integration in schools offers benefits to the entire institution when implemented correctly. The following section discusses and analyses how ICT supports online teaching and learning with reference to the COVID-19 pandemic.

5.3.6 SMTs using ICT tools to support teaching and learning during COVID-19

The key finding of the case study is that ICT tools enabled continuity of teaching and learning during COVID-19. The study revealed that SMTs used ICT tools to teach and communicate during the pandemic. Various ICT tools were used to access education and learning during the COVID-19 period. The study further showed that SMTs used multiple ICT tools, including WhatsApp, emails, Microsoft Teams, laptops, tablets, and phones, to facilitate communication and teaching.

The case study also found that virtual meetings and collaboration among school members, with neighbouring schools, and with district officials were used. The study also revealed the importance of ICT in education, highlighting its potential to enhance teaching and learning. The case study also found that ICT tools facilitated communication among teachers, school members, and district officials, ensuring continuity of education during the pandemic.

The current findings highlight the critical role ICT played in supporting education during the COVID-19 pandemic and the potential for ICT to enhance teaching and learning in the future. During the pandemic, the case study revealed that school principals played a crucial role in responding to COVID-19 and strengthening education systems (Leithwood, Harris & Hopkins, 2020). The findings of the case study support the idea that, through the use of ICT, learners can not only access a vast amount of information but also participate in collaborative projects and activities with learners from different cultures and backgrounds (Al-Ansi *et al*., 2021).

This means that, during the pandemic, learners have integrated new technological tools into their learning (Manco-Chavez, Uribe-Hernandez, Buendia-Aparcana, Vertiz-Osores, Alcoser & Rengifo-Lozano, 2020). Empirical evidence shows that ICT enables easy access to books and articles online (Ojo & Adu, 2018). In this regard, the results shown are contrary to those presented by Machuca Llanos and Véliz Espinoza (2019), who mentioned that there is no significant relationship between integrating digital skills and improving learning. What also stood out during the pandemic is that principals' roles changed dramatically, requiring them to assume additional responsibilities (Yorke, Rose, Woldehanna & Hailu, 2021). The duties involved implementing government strategies at the local level, supporting and encouraging teachers to

deliver remote learning, and ensuring a safe and healthy learning environment (Yorke *et al*., 2021).

Although the literature indicates that ICT-supported teaching and learning occurred during COVID-19, further analysis is needed. The study by Tigere and Netshitangani (2022) highlighted several challenges faced by schools, including a significant shortage of computers relative to learner enrolment numbers, unreliable Internet connectivity, and disruptions caused by electrical power cuts due to load shedding and blackouts. According to Yorke *et al*. (2021), school principals in rural areas receive less support from local government than their urban counterparts, thus highlighting the need for greater efforts to ensure that rural school principals are supported in responding to the pandemic. These challenges impacted teaching and learning during the COVID-19 pandemic. Not all learners gained full benefit throughout the COVID-19 period.

The study highlights the significance of ICT in education, especially during crises. It also underscores the need for schools to build robust ICT infrastructure and to train teachers to incorporate technology effectively into their teaching. Overall, the study showcases ICT's potential to improve teaching and learning, and its findings can guide education policy and practice in similar settings. The following section discusses and analyses the formal training and certification SMTs received.

5.3.7 Formal training and certification received by SMTs

The study's findings on SMTs' experiences with ICT training reveal varied experiences. The case study showed that SMTs' experiences with ICT training differ, ranging from formal certification programmes to self-directed learning. The study further revealed that SMTs depended on self-directed learning to develop their ICT skills. In addition, the case study showed that SMTs developed their ICT skills through on-the-job experience and training. However, the study revealed that some SMTs received training from various sources, including the Department of Education, NGOs, and online courses.

According to Dlamini and Mbatha (2018), SMTs and teachers must receive proper training on how to incorporate technology into their teaching practices effectively.

Furthermore, research consistently shows that teacher professional development is a critical factor in successful technology integration (Abdul Rauf, Swanto & Salam, 2021). A well-designed professional development programme and workshops can help SMTs and teachers acquire ICT competency and increase their confidence in integrating ICT into their teaching (Seng, Choi & Shin, 2014).

Literature also indicates that SMTs and teachers who receive adequate training and support in using ICT are more likely to integrate it effectively into their teaching practices (Ajani & Govender, 2023). As a result, professional development programmes should be tailored to address the specific needs of SMTs and teachers, considering their varying levels of digital literacy and teaching experience (Hennessy *et al.*, 2021). However, Ntsobi *et al*. (2025) articulate that ICT integration is multi-dimensional, which is why the GDE has partnered with the Matthew Goniwe School of Leadership and Governance (MGSLG) to provide the necessary comprehensive training.

At this stage, the GDE should be credited for partnering with MGSLG to help integrate ICT into schools. Ntsobi *et al*. (2025) further highlighted that the training approach adopted a whole-school, multi-stakeholder approach at the outset of the training programme design and the online assessment to identify teachers' ICT training needs, which was done initially by the MGSLG. This is a step in the right direction. The GDE must increase this initiative and must also ensure that the training continues to get funding for sustainability.

In essence, SMTs must offer adequate and ongoing professional development training to ensure that SMTs and teachers are equipped with the necessary skills and knowledge to integrate ICT into teaching practices.

Change Management was approached according to the GDE ICT Policy Strategy of Teacher Development, which was centred mainly on giving ICT training and support by a delegation of ICT facilitators to various schools, using the tech-enabled approach (Ntsobi *et al*., 2025). The challenge of initiatives like this is affected by SMTs' absenteeism or failure to attend the development training programme. SMTs should be encouraged to participate in the programmes.

Empirical literature shows that even teachers in a well-developed country like Canada face challenges in integrating ICT into their teaching practices due to gaps in knowledge, lack of training, inadequate support, and inability to translate training into pedagogical practice and curriculum design (Saxena, 2017).

The case study findings highlight the importance of targeted ICT integration training programmes to help SMTs develop the skills and confidence needed to incorporate ICT into teaching and learning effectively. It also highlights the importance of ongoing professional development opportunities, which can help SMTs stay up to date with the latest technologies and best practices in ICT integration. Furthermore, the findings emphasise the importance of addressing resource limitations, such as restricted access to technology and Internet connectivity, to ensure that SMTs have the necessary tools and resources to incorporate ICT into teaching and learning effectively.

The findings also promote self-directed learning and offer opportunities for SMTs to share their experiences and expertise, which can help foster a culture of innovation and collaboration. It further suggests that tailoring training programmes to the specific needs of SMTs can ensure they receive relevant and effective support. Enhancing SMTs' capacity to integrate ICT into teaching and learning can positively influence learner outcomes and overall school improvement.

Addressing these implications, educational institutions can provide SMTs with the essential support and resources needed to effectively incorporate ICT into teaching and learning, thereby enhancing learner outcomes. The following subsection discusses and analyses the SMTs' resistance to ICT adoption and reluctance to adopt new teaching methods.

5.3.8 Insufficient ICT district support for the SMTs

The study revealed that the district supported SMTs through district workshops and school-based visits. However, the study revealed that the support was insufficient. Furthermore, the study showed a significant disconnect between the availability of the district workshops to support ICT integration in schools. While a portal such as the Education Management Information System (EMIS) existed for SMTs and teachers to

register for various workshops, there was an apparent and concerning lack of engagement with ICT-related courses. As a result, principals and teachers believe district officials lack the competence to support the integration of ICT into teaching practices (Vandeyar, 2015). Improving ICT skills among teachers requires a systematic approach to enhance their enthusiasm for digital pedagogies, which are essential in 21st-century classrooms (Dlamini, 2022).

The most critical finding from the study is the low uptake of ICT training, despite its availability. This was also revealed by Masango, Van Ryneveld and Graham (2020), who mentioned that teachers desire additional training to utilise ICT effectively, but lack sufficient time to prepare teaching materials and learning activities. The case study also revealed that most SMTs and teachers deliberately choose other workshops, such as those on assessment and setting quality papers, over those focused on ICT.

The study by Ajibade and Bertram (2020) noted that teachers seldom used computers or science laboratory resources; however, teachers used the centres mainly for professional development activities such as workshops and meetings. It is a trend in the education system that SMTs and teachers attend the district physical workshops but not online training. It seems like they want more concrete encouragement, support, and opportunities to be developed to increase teachers' motivation to improve the level and quality of ICT use in classrooms (Uluyol & Şahin, 2016). At times, SMTs and teachers lack interest in the district's support due to its nature; for instance, the district offered professional development activities that are aimed at the implementation of the curriculum and assessment policies (Ajibade & Bertram, 2020) rather than ICT-based training. Ajibade and Bertram (2020) also argued that training centres were constrained by a shortage of trained personnel.

Seng, Choi and Shin (2014) identified the barrier to ICT integration as inadequate teacher training programmes. In another study, literature revealed that although teachers were willing to use computers in their classrooms, challenges such as insufficient support, limited resources, and insufficient training prevented broader adoption (Rolle-Greenidge & Walcott, 2020). Furthermore, research shows that inadequate training and a lack of knowledge and skills among teachers contributed to

the failure to integrate ICT into teaching and learning (Mpu & Adu, 2021). At times, a school can have a culture of laziness among teachers (Malatji, Soundy, Kafidze & Chiloane, 2022). This was revealed in the study whereby some SMTs were not willing to register for ICT training sessions, rather choosing to register for other programmes.

Regarding district support Moorosi and Bantwini (2016) argued that the district granted autonomy to principals to lead their schools, while the district's role was to monitor and evaluate the implementation of the district's instructional programme. Still, the study revealed that most SMTs complained of a lack of support from the district. This means principals may not be aware of their fiduciary rights to request or source school-based support for both SMTs and teachers for ICT integration. Although the study by Moorosi and Bantwini (2016) further outlines that the district, through subject advisors, undertakes intensive school visits and classroom observations in accordance with a clear strategic plan. The current study still revealed that the SMTs are not adequately supported by the district. As a result, the district must assume responsibility for the training and development of SMTs and teachers on ICT integration.

While SMTs have a duty to ensure the district is aware of each school's training needs, including ICT training and support. The study by Crompton, Chigona and Burke (2023) revealed that teachers in South Africa reported less support and resources and greater challenges since the current study showed that most SMTs are not getting adequate ICT support from the district. The matrix is always different from rural schools and SMTs. In Ajani and Dlomo (2025), rural schools often struggled to adopt technological innovations because of a lack of training and support, poor ICT infrastructure and limited access to technology for SMTs, teachers and administrators. The narrative suggests that, province by province, district officials must ensure that instructional tools are equally accessible to address challenges faced by under-supported schools, especially regarding ICT integration. As a result, the use of SA-SAMS in rural areas may be hindered by factors such as poor Internet access and electricity outages, which negatively affect administrative efficiency and data management improvement (Ajani & Dlomo, 2025).

Another key finding from the study regarding district support was an inconsistency in how ICT is integrated. The study also revealed that, in some schools, the district

provided training to help SMTs and teachers integrate technology. This seems to happen only for specific, policy-driven tasks, such as using the SA-SMS system. This mandatory, top-down approach to ICT training for a single purpose doesn't appear to translate into a broader interest or willingness to engage with other, more general ICT training opportunities. As is the case in many African countries, a large proportion of teachers in Kenya enter the profession inadequately prepared, while those already in the field receive insufficient support in their professional lives (Bett, 2016).

In short, there is a substantial gap between the opportunities provided and the choices teachers make, which likely hinders broader digital literacy and ICT integration in schools. To mitigate this challenge, the DBE (2017) encourages schools to follow the Professional Development Framework for Digital Learning (PDRDL) (2017) to train SMTs and teachers in ICT integration. The framework offers an action plan for developing teachers for online teaching (DBE, 2017). Moreover, the case study supports the findings made by Ajibade and Bertram (2020), who found that DTDCs create an ideal opportunity for teachers' professional learning, given the presence of computers, science laboratories, and libraries.

Skhepehe and Matashu (2021) advised that the DBE should establish relationships with local universities so that the universities' specialists can assist teachers in implementing e-learning in practice. This is excellent advice and opinion. If universities can assume responsibility for training SMTs and teachers in ICT integration and begin issuing certificates, it could encourage many SMTs and teachers to enrol in ICT programmes. However, if SMTs and teachers are only trained at the district level without receiving recognised certification, resistance and non-attendance will persist.

This development can prevent the issue raised by Whitworth (2015), which claimed that SMTs, teachers, and researchers have lambasted the scattered, shallow, fragmented array of activity that so often makes up the professional development landscape, reserving special criticism for activities that seem remote from teachers' priorities and problems of practice (Whitworth, 2015). However, Vandeyar (2015) argued that the uptake of ICT in schools continued regardless of the lack of policy and district support.

Overall, the current case study revealed that the district's support for ICT integration, while available, is not always practical or equitable, with some schools receiving more assistance than others. Therefore, this study further emphasises the need for the district to review its support structures and ensure that all schools have access to the necessary resources and training to effectively integrate ICT. To achieve this, schools must adhere to the PDRDL (2017) to train SMTs and teachers in ICT integration.

The following section discussed and analysed the SMTs' resistance to ICT adoption and reluctance to learn new things.

5.3.9 Resistance to ICT adoption and reluctance to learn

The study revealed that a significant number of long-serving elderly SMTs tend to resist change and prefer to continue teaching using traditional methods rather than taking advantage of ICT tools. According to Abdul Razzak (2015), resistance to ICT integration stems from the presence of older, traditional teachers who refuse to work with technology. Similarly, resistance among principals and teachers stems from an inherent, unknown fear of change (Van Wyk & Van Der Westhuizen, 2015). Chisango and Marongwe (2021) articulated that teachers may feel uneasy with new technology or believe they lack the skills to incorporate it effectively into their lessons, which can lead to resistance to change.

This study found that a significant number of SMTs lacked ICT competencies and, as a result, struggled to implement ICT in their schools. This could result from resistance to implementing ICT, perhaps due to fear of the unknown, as many researchers have noted. However, further research shows that teachers' positive attitudes can create opportunities to introduce ICT subjects in primary schools (Bakari & Ali, 2023). Campado etal. (2023) assume that resistance can be further attributed to a lack of confidence, technical skills, or a preference for traditional teaching methods.

The findings of the case study also support Naicker and Mkhabele (2020), who assume that resistance to school change stems from inadequate consultation with stakeholders. This is why both international and national standards emphasise that integrating ICT into the curriculum necessitates careful consideration and effective use of ICT to support transformative learning, and that this requires strong leadership that

fosters a shared vision among all community members (Thomas, 2016). A healthy school culture provides a secure, nurturing, motivating, inclusive, and demanding atmosphere for school staff and learners (Adillo & Netshitangani, 2019).

Lack of confidence, technical skill, and failure to consult relevant stakeholders always lead to low self-esteem, which can result in resistance. Acceptance and self-esteem originate from engaging in activities deemed socially constructive (Zhou & Brown, 2015). Self-esteem is essential among SMT members in schools, but most SMTs who lack self-esteem struggle to implement ICT in their schools.

The other challenge identified in the study is insufficient funding to support integration and maintenance in schools.

5.3.10 Insufficient funding for SMTs to support ICT integration and maintenance in schools

The study found that SMTs lacked the financial resources needed to integrate and maintain ICT in schools. Abdul Razzak (2015) discovered that ICT integration was affected by insufficient budgeting allocated for ICT resources. Furthermore, empirical evidence in research has identified that ICT integration is affected by inadequate funding and the high costs of ICT gadgets (Seng *et al*., 2014; Ojo & Adu, 2018; Kayembe & Nel, 2019; Uleanya, 2023). Additionally, the study by Abdul Razzak (2015) showed that ICT implementation in schools is greatly affected by other factors, including frequent technical problems with the computer networks and the insufficiency of technical support specialists available to fix them.

Kayembe and Nel (2019) had a view that the integration of the Fourth Industrial Revolution is impeded by insufficient funding, inadequate infrastructure, and a lack of the skills needed to prepare graduates for participation in the 4IR. Similarly, the study by Tigere and Netshitangani (2022) discovered that township and rural secondary schools lack the financial resources needed to purchase computer equipment due to insufficient state funding.

Inadequate financial support is the biggest challenge affecting ICT integration in primary schools. All five schools in the study reported that several challenges, including limited district financial support, constrained the implementation of ICT.

Financial support in schools plays a critical role, as the implementation of ICT in schools relies on purchasing these resources.

According to a study conducted in Fiji's schools, barriers such as limited access to computers, insufficient funding, sporadic electricity cuts, and the lack of ICT-related policies and training often limit the successful integration of ICT into the curriculum (Nath, 2019). The challenges faced by many SMTs in integrating ICT in schools, highlighted in their study, are like those identified by Rabah (2015), who concluded that insufficient support, inconsistent investments in ICT, and inflexible funding issues affected the implementation of ICT in schools.

However, a report from the House of Lords (2015) suggests that skills funding is not currently targeted effectively to enhance the UK workforce's capacity and promote economic growth. As a result, a study conducted by Ojo and Adu (2018) recommended that governments actively promote the effective use of ICTs by funding their implementation in schools, providing teacher training and retraining, and raising stakeholders' awareness of the importance of ICT pedagogy for teaching and learning.

Since most of the schools in the study are quintile 3, no-fee schools, they rely on government funding. If these schools don't get enough funding, they cannot afford the ICT equipment needed for integration. Literature argues that at times, the challenge is not a lack of funding, but rather, schools are not calling for extra funding in all areas; instead, they are advocating for the more innovative use of existing money (LORDS, 2015). This seems to be a problem with many developing countries, including South Africa.

Another challenge identified by the current study was inadequate SMT training to support ICT integration in schools.

5.3.11 Inadequate SMT training to support ICT integration in schools

The study revealed inadequate training for SMTs to support ICT integration in schools. SMTs as agents of change in schools must be adequately trained and supported on ICT integrations. Teachers also play a significant role in integrating ICT in schools, and motivated teachers reflect higher levels of ICT use in their classrooms (Uluyol & Şahin, 2016). So SMTs must develop clear strategies that support and inspire

teachers to integrate ICT in primary schools. Therefore, training SMTs and teachers in ICT is essential for its effective integration into classroom settings, as research indicates a clear link between teacher training and the successful adoption of ICT (Saxena, 2017).

The findings are consistent with previous studies that have found that the challenge of not integrating ICT in schools stems from a lack of training, experience and technical support (Muslem, Yusuf, & Juliana, 2018; Nath, 2019; Tigere & Netshitangani, 2022; Yin Yin & Mohamad, 2023). The lack of training and experience was strongly emphasised by many SMTs during interviews, with some even suggesting the need to go through ICT training workshops offered by the district. However, many SMTs reported that district officials prioritised schools in ICT programmes and offered less support to schools not in the programme.

The study by Nath (2019) raised another challenge where school heads also restricted the use of ICT gadgets in classrooms. This was a new phenomenon; principals are known as agents of change, but if they restricted the use of ICT devices in classrooms, it would become an obstacle for teachers and for ICT integration in schools. A similar challenge was raised by SMTs in some schools during interviews, who claimed that principals constantly changed the passwords for Internet access. As a result, the SMTs claimed they could not get access to the Internet for ICT integration in classrooms. However, the principals who were doing that defended their actions by highlighting that, at times, some SMTs and teachers misuse the Internet through personal use. The challenges associated with ICT integration include distractions, excessive use, exposure to misinformation, data theft, reduced human contact, and cyberbullying (Ogenyi *et al*., 2023).

To mitigate some of these challenges, Ajani and Govender (2023) suggested regular capacity building for teachers through ICT training, along with the provision of ICT gadgets and resources. This view was also supported by Ogenyi *et al*. (2023), who emphasised the need for a holistic approach to ICT integration, addressing teacher training, curriculum development, and organisational support to realise the full potential of ICT in education, especially at the primary school level.

Researchers agree that providing ICT training or workshops to teachers is an effective way to introduce ICT into teaching and learning (Li *et al*., 2019; Schildkamp *et al*., 2020). Teachers are the drivers of the curriculum. Moreover, other researchers emphasised the significance of comprehensive ICT training for pre-service teachers to effectively use ICT in their classrooms, enhancing their knowledge and skills in content delivery and teaching methods (Ajani, 2020; Niemczyk *et al*., 2021; de Beer, 2023).

Similarly, Ajani and Govender (2023) validated the importance of ICT-based professional development for SMTs or teachers, focusing on integrating it into teaching and learning and developing a positive attitude towards its practical use based on subject learning objectives. In doing so, the SMT trainers need to introduce them to the components of the TPACK framework, which discuss CK and pedagogy knowledge (Chigona & Chigona, 2013). The SMTs, on the other hand, should be familiar with RST and the SETI Framework, which prescribe steps for integrating ICT in schools. The steps include how infrastructure can be used effectively and the role of the school vision for all relevant agents.

Based on current findings and empirical evidence in the literature, it is beyond doubt that many SMTs and teachers in South African primary schools and worldwide require a dedicated department for ICT management. As suggested by McLaren (2015) to drive the achievement of key management goals and educational objectives. Furthermore, the literature shows that teachers in Canadian schools also faced challenges in integrating ICT into teaching and learning practices due to gaps in knowledge, lack of training, inadequate support, and inability to translate training into pedagogical practice and curriculum design (Saxena, 2017).

In KwaZulu-Natal, South Africa, it was found that District Teacher Development Centres have considerable potential to facilitate teachers' professional development (Ajibade & Bertram, 2020). Their study further found that teachers underused these resources, instead primarily leveraging the centres for professional development activities, including workshops and meetings (Ajibade & Bertram, 2020). Their claims are reflected in research that consistently shows that teacher professional development is a vital element in successful ICT integration (Abdul Rauf *et al*., 2021).

This assertion was further supported by Christensen *et al*. (2018), who found that SMTs play a crucial role in integrating ICT in schools, but they often lack professional development.

In the interim, literature further established that well-designed professional development programmes and workshops can help teachers acquire ICT competency and increase their confidence in integrating ICT into their teaching (Seng *et al*., 2014). The literature also indicates that teachers who receive adequate training and support in using ICT are more likely to integrate it effectively into their teaching practices (Ajani & Govender, 2023). As a result, professional development programmes must be tailored to address the specific needs of teachers, taking into account their varying levels of digital literacy and teaching experience (Hennessy *et al.*, 2021).

By adopting a proactive approach to teacher professional development, SMTs can harness the potential of ICT to enhance the educational experience and equip learners for the challenges of the 21st century (Abdul Rauf *et al*., 2021). This can help empower SMTs and teachers, especially those in rural areas, to effectively integrate ICT in their classrooms and overcome the challenges of adapting to the rapidly changing technological landscape (Raman & Thannimalai, 2019).

The empirical evidence in the literature and the current study findings indicate that from 2014 to 2025, the government of the Republic of South Africa and many other countries worldwide have been struggling to establish mechanisms for adequately training SMTs and in-service teachers on strategies for integrating ICT in schools. As a result, empirical evidence from 2014 to 2025 consistently shows that SMTs or teachers lacked adequate professional development in ICT integration. Therefore, the GDE and the Ekurhuleni North District must continue to provide suitable and continuous professional development to ensure that SMTs and teachers are equipped with the necessary skills and knowledge to integrate ICT effectively into their teaching practices.

Perhaps this calls for the DBE and the GDE to revisit professional development programmes and arrive at a lasting solution. However, this does not mean that efforts are not being made; instead, the finding indicates that relevant authorities and stakeholders must focus more on professional development programmes to equip

SMTs and teachers with the necessary skills to integrate ICT in schools. There is also a need for the GDE and the Ekurhuleni North District to seek external support from NGOs and involve parents.

The other critical challenge identified in the study was the unavailability and non-functionality of ICT building infrastructure in schools.

5.3.12 Unavailability and functionality of ICT building infrastructure in schools

The study revealed that schools are not integrating ICT due to the unavailability and non-functionality of the ICT building infrastructure. During interviews and observations, all five schools involved in the case study have computer buildings or buildings designated for computer labs. Some of them still have the remains of outdated computers and other accessories left behind after theft and burglary. Some buildings were turned into storerooms because they had been unused for a long time. SMTs called them “White Elephants” because of their conditions.

Infrastructure resources are one of the most common sources of challenges towards the use of ICT among teachers (Alvarado *et al*., 2020). Previous research results show that challenges of ICT integration stemmed from insufficient ICT facilities, teachers’ knowledge, and technological support in most primary schools (Bakari & Ali, 2023). As SMTs mentioned during the study, most computer labs are empty, with no computers, no Internet, and no support. The ones with tablets are sponsored by NGOs, and their use was restricted to a few grades. However, there was one school which is fully equipped for ICT integration. The school is part of the district’s ICT schools. The study also revealed that several schools in the cluster are ICT schools. However, only one ICT school participated in the study.

To resolve ICT integration challenges in schools, the government must focus on bridging the infrastructure gap, which is essential for addressing related issues (Bakari & Ali, 2023). Additionally, providing adequate training and support for SMTs and teachers to use ICT tools in the classroom effectively is crucial. This comprehensive approach will ensure that learners have access to quality education that prepares them for the digital age. However, purchasing, maintaining and supporting computers are SMTs’ most significant constraints. (Naicker, 2016). This shows that there is a need

for educational institutions and governments to make investments in providing sufficient resources, infrastructure, and training (Yin Yin & Mohamad, 2023) to ensure that SMTs can effectively use ICT for educational purposes.

Challenges faced by SMTs when integrating ICT further included a shortage of computers, limited time for learners in computer labs, and poor Internet connection for online access (Tigere, 2020). Overcoming these challenges requires investment in infrastructure, professional development for SMTs and teachers, and collaboration with stakeholders to ensure the successful integration of ICT. Nonetheless, during interviews, most schools reported that SMTs and a few teachers do have personal laptops offered by the schools. The only challenge raised in this regard was that most teachers do not have access to laptops and Internet connectivity; hence, at times, teachers bring their personal laptops and buy their own data bundles to support teaching and learning.

Barriers to successful ICT integration in schools include limited access to computers, insufficient funding, sporadic electricity, and the absence of ICT-related policies and training (Nath, 2019). Additionally, many SMTs lack an ICT background, though they are proficient in using technology for daily activities and record-keeping. For instance, SMTs acknowledged that they could use the SA-SAMS application to record learners' marks and perform other administrative functions independently. Nevertheless, some admitted they struggled to use the laptops independently, emphasising the need for peer support.

The case study also revealed a challenge of theft and vandalism of ICT gadgets in schools.

5.3.13 Theft and vandalism of ICT gadgets in schools

The study revealed that SMTs faced a critical challenge of theft and vandalism of ICT gadgets in schools. The study showed that these significant challenges are a result of burglary and theft, leading to the loss of valuable ICT equipment in schools. The study further found that most of these challenges, burglaries and theft, are predominant during school holidays. Theft and vandalism are considered the main issues faced by SMTs in primary schools. The study revealed that most SMTs believed that theft and

vandalism are among the challenges that hinder the integration of ICT in schools. However, school leaders, particularly SMTs, should ensure the availability, accessibility, reliability, compatibility, and security of ICT tools in schools (Msambwa, Daniel & Lianyu, 2024). Masango, Van Ryneveld and Graham (2020) believes that the GDE should have placed greater emphasis on encouraging community members and parents to protect school property.

Malatji and Mavuso (2018) found that device theft is a common problem in schools, significantly impacting the implementation of e-learning and posing the most difficult challenge schools face. The issue of school vandalism and theft is not new; a study by Mncube (2009) highlighted that schools lack financial resources to repair vandalised buildings. The problem of theft and vandalism in schools is a significant setback for ICT integration. It appears that community members are unwilling to protect schools in their areas. Every time there is a new development at the school, especially involving electronic gadgets, thieves will come and steal everything. It is like they have inside information about the latest gadgets delivered at the school.

Burglary, theft, and vandalism are significant challenges identified by research as the biggest obstacles to ICT integration (Xaba, 2011). Sosibo and Allie (2017) believe that some of the challenges of burglary and vandalism emanate from gangsterism and drug abuse. This could be true since in South Africa we have a high rate of drug abuse and gangsterism. Similarly, a study that was conducted by Nhlapo (2020) reflected that previously advantaged schools tended to pay particular attention to the maintenance of school facilities, whereas in the previously disadvantaged schools, vandalism and graffiti were rife. This is a serious problem that requires the GDE and the Ekurhuleni North District law enforcement agents to collaborate in eradicating this kind of behaviour in schools.

The findings of this case study further reinforce the assertion made by Amnesty International (2020), which emphasises that there is a serious issue of burglary and vandalism of infrastructure and resources in South African schools. This represents a significant challenge for SMTs in schools. Sometimes, one wonders why community members behave in such ways, especially when they destroy infrastructure that benefits their own children. At times, schools cannot function effectively due to the

theft and vandalism of electricity components by learners themselves (Skhephe, Caga & Boadzo, 2020).

Most of the school vandalism and theft happened during the lockdown period (Monareng, Ramraj & Mashau, 2020). Therefore, the DBE, the GDE, and relevant law enforcement agencies must work together to address theft and vandalism in schools, enabling schools to create a safer, more supportive learning environment that promotes the effective use of ICT resources. Msiza *et al*. (2020) said that the DBE's poor planning made it hard to implement e-learning because devices were stolen, the Internet didn't work, and e-books went missing.

Another challenge identified in the study relates to poor Internet connectivity and network coverage in schools.

5.3.14 Poor Internet connectivity and network coverage in schools

The case study found that most schools suffer from poor Internet connectivity and network coverage. Furthermore, the study uncovered that the network coverage in most schools is limited to the administrative block and does not extend to the entire school. As a result, the study revealed that both SMTs and teachers resort to using their personal data bundles to access the network connectivity. The study found poor Internet connectivity to be one of the most significant challenges to ICT implementation in most schools.

Evidence in the literature shows that Internet access is one of the main problems that schools face, particularly those in rural areas (Tigere & Netshitangani, 2022). Abdul Razzak (2015) revealed that ICT implementation in schools was affected by very poor Internet connection speed, the unavailability of high-quality teaching software and outdated technological resources. This significant challenge was also identified by Tigere (2020), who found that poor Internet connectivity and electrical power interruptions due to load shedding and blackouts affected SMTs in ICT integration in schools. Furthermore, a previous study found that most challenges to ICT integration in schools are caused by poor Internet speed and coverage, power cuts, and a lack of technological skills in some areas (Al-Ansi *et al*., 2021). Yusuf and Fashiku (2016) once argued that schools struggled with limited equipment and poor Internet

connections, leading teachers to share resources and waste time waiting for their turn to use ICT.

The challenge of poor Internet connectivity affects not only SMTs and teachers in primary and secondary schools but also learners. Moreover, research revealed that poor Internet connectivity also affects lectures and students in universities, where Internet speed, coverage, power cuts, and a lack of technological skills are common (Al-Ansi *et al*., 2021). This challenge also affects the aspirations of the South Africa Connect national broadband policy of 2013, which aimed to ensure that the country achieves universal Internet access by 2030, thereby fostering digital skills development (Mwapwele *et al*., 2019).

The empirical literature also shows that poor Internet connectivity affects developed countries like Ukraine. The literature revealed that the Ukrainian education system faces serious challenges, partly due to inadequate Internet access, especially in rural areas, and the lack of teachers' online instruction skills (Lokshyna & Topuzov, 2021). The challenge of poor Internet connectivity was starkly evident during the COVID-19 outbreak, with limited Internet quotas, network disruptions, device access issues, and difficulties maintaining learners' attention (Suci, Candra, Murtono, Suryani & Budi, 2021). Hence, the study by Ghahifekr, Kunjappan and Ramasamy (2016) argued that the slow uptake of ICT in schools is driven by limited access to the network connections. Moreover, ineffective computer security in schools led to thefts and sometimes non-functional passwords, preventing learners from accessing the computers (Mdlongwa, 2012).

At times, SMTs and teachers faced challenges accessing ICT due to web filtering and school firewalls, which restrict access to free Internet resources and block certain websites (Abdullah *et al*., 2016). Equally, bad Internet connectivity was identified as one of the barriers affecting ICT implementation (Msiza *et al*., 2020). Moreover, empirical findings showed that a lack of sufficient ICT equipment and Internet access is one of the main problems that schools, particularly those in rural areas, face (Tigere & Netshitangani, 2022).

The study found that SMTs in Ekurhuleni North District struggled to successfully implement ICT in teaching and learning due to poor Internet access in schools.

Overall, the participants' views suggest that inadequate ICT infrastructure and Internet connectivity are significant barriers to effectively integrating ICT to enhance teaching and learning in their schools. SMTs reported that network coverage was limited to the administration block, meaning it was only accessible to administrative staff. Other challenges included password issues, Wi-Fi coverage, Internet costs, load shedding, and occasional poor connectivity. However, addressing these challenges will require investment in infrastructure, improved Wi-Fi coverage, and more reliable Internet access for both SMTs, teachers, and learners.

Another challenge affecting the integration of ICT in schools for teaching and learning purposes is the shortage of maintenance and technical support for ICT infrastructure.

5.3.15 Shortage of maintenance and technical support procedures for ICT infrastructure

The study identified significant challenges related to maintaining and providing technical support for ICT infrastructure and resources in schools. The study revealed that the process of logging a call with the GDE and waiting for the service provider to respond was time-consuming, resulting in delays and disruptions to teaching and learning. Ghavifekr *et al*. (2016) found that the slow uptake of ICT in schools is driven by limited technical support and a lack of practical training. This assertion was backed by Mirzajani *et al*., (2016), who attributed the delay of ICT integration in schools and the slow functioning of school infrastructure to the insufficient technical support, which discouraged teachers from using ICT in teaching, while arguing that increasing adequate equipment and technical support in schools encouraged teachers to use ICT.

In Adytiansyah and Wibowo (2019), the study revealed that several decision-making methods were made to minimise technical disturbances in ICT devices through selecting the right vendors to carry out the ICT maintenance. Usually, ICT maintenance involves change management, a process responsible for controlling the entire life cycle of each change that occurs (Adytiansyah & Wibowo, 2019).

The current study findings further support the conclusions by Rowston, Bower and Woodcock (2022), which emphasised that positive change in ICT use was linked to

technical support, teachers' attitudes and teaching methods, along with the availability of technological resources. This shows that technical support improves the use of ICT in schools. Therefore, GDE, the Ekurhuleni North District and SMTs must ensure that issues related to ICT technical support and maintenance are adequately addressed with relevant stakeholders in the district. This collaboration will help ensure that schools have the necessary resources and expertise to use ICT effectively for teaching and learning. By prioritising technical support, schools can maximise the benefits of ICT in education and enhance learner outcomes.

The study also revealed insufficient ICT support from the district for the SMTs.

5.3.16 SMTs' knowledge of the National ICT policy guidelines in schools

The qualitative case study revealed diverse opinions regarding the National Policy on ICT and its directives for integrating ICT in schools. Furthermore, the study showed that some SMTs recognised that the National ICT Policy guides ICT integration, noting that it provides clear instructions for implementing ICT in schools. However, the study raised significant concerns about the large number of SMTs who claimed they had never seen or read the National ICT Policy Guidelines. Another pertinent issue that surfaced in Vandeyar's study was the lack of policy coherence (Vandeyar, 2015).

The purpose of the South African Educational Policy is to enhance educational opportunities across various academic disciplines by developing technical skills and using ICT (Department of Education Government Gazette, 2004). Furthermore, it provides a clear framework for all stakeholders, including school leaders, teachers, and learners, on how to use technology effectively and responsibly to support teaching, learning, and administrative tasks (Department of Education Government Gazette, 2004). However, if the SMTs have never seen or read the policy, this suggests that integrating ICT in schools remains a significant challenge. Therefore, ensuring that all members of the school community are familiar with the policy is crucial for successful implementation. Regular training sessions and updates can help address this issue and promote a culture of technology integration in schools.

In Swaziland, for instance, a study examined the dynamics of the ICT policymaking network. The study's findings indicated that the government primarily recruited

conformist actors into the policy network to meet deadlines. That policymaking was dominated by political agendas and significant foreign intervention, while marginalising key local policy actors (Metfula & Chigona, 2013). Such actions usually led to limited local participation and input in decision-making, ultimately affecting the effectiveness and relevance of ICT policies. ICT policy initiatives in education must rely on access to relevant infrastructure, hardware devices, and applications (Zagami, Bocconi, Starkey, Wilson, Gibson, Downie, *et al.*, 2018). Therefore, there is a need for more inclusive, transparent policymaking processes to ensure diverse perspectives are considered.

As a result, the qualitative case study's findings indicate a need for increased awareness and broader dissemination of the National Policy on ICT among SMTs and teachers. This may include providing training and support to help SMTs and teachers understand the policy and its implications for teaching and learning. Additionally, creating clear guidelines and implementation resources can help ensure the policy is effectively integrated into school practices. Furthermore, ongoing monitoring and evaluation can help track progress and identify areas for improvement in policy implementation.

The study also addressed questions about the existence of a school-based ICT policy.

5.3.17 The Existence of the School-Based ICT policy in schools

The study findings revealed SMTs' mixed views about the existence and awareness of a school-based ICT policy in their schools. The case study found that some participants reported that their schools have a school-based ICT policy, with some noting that it was kept in the principal's office or the master file. The findings support the study by Naicker (2016), which revealed that the majority of principals involved in the study had an ICT policy stored in their respective offices. However, the current study further found that some schools lacked a record of a school-based ICT policy, and most SMT were unaware of its content. As a result, schools and teachers remain isolated from systemic structures and operate without a guiding policy (Vandeyar, 2015).

However, this was contrary to Naicker's (2016) findings, which stated that the majority of principals were aware of the ICT policy and actively implemented it in their schools. This discrepancy in awareness and implementation of the ICT policy among principals highlights the need for further research to understand the factors influencing their engagement with such policies. Additionally, exploring the impact of varying levels of ICT policy implementation on learner outcomes could yield valuable insights to improve educational practices.

The study also established that schools that had a school-based ICT policy were drafted using a template provided by the GDE, which was then supposed to be edited to suit the school's needs. Moreover, the study found that SMTs suggested that school-based ICT must also address budget, ICT infrastructure, and resources, as well as focus on teacher development and the use of ICT in the curriculum. However, the main challenge identified by the study was that not everyone was aware of the policy. As a result, it was not being appropriately implemented, suggesting that while the school may have a policy on paper, it's not being used effectively to guide ICT integration.

The qualitative case study further found that most SMTs lacked awareness of, and inconsistently implemented, school-based ICT policies, highlighting the need for greater support and guidance from the Department of Education. The study also believes that by developing and implementing effective ICT policies, schools can better integrate ICT into teaching and learning, ultimately improving learner performance.

Rahim, Sahar, Jabeen, Ali and Shah (2017) argued that the schools are unaware of how to develop their own school-based ICT policy plans and build ICT policy capacity. This challenge stems from SMTs' lack of awareness of the National ICT Policy and its implications for ICT integration. On the other hand, Vandeyar (2021) maintains that if teachers' values and beliefs are inherently expressed in school-based policy, it is more likely that policy will influence their practice.

The study further argued that the absence of systemic policy support led to increased teacher frustration but also served as a catalyst for developing a school-based policy. (Vandeyar, 2021). The research findings highlighted the importance of establishing

clear guidelines and resources to help SMTs and teachers effectively navigate challenges in the absence of systemic support. Additionally, it emphasised the need for schools to empower teachers to take initiative in creating policies that address their specific needs and concerns.

The school-based approach is supposed to address school readiness, the importance of the school community to develop a proper ICT policy plan and the proper integration of ICT (Rahim *et al*., 2017). In addition, the school-based policy must outline the nature of ICT-based activities (Wastiau, Blamire, Kearney, Quittre, Van de Gaer & Monseur, 2013). Teachers play an instrumental role in compiling ICT schemes of work, ICT curriculum, and ICT policy, which are influenced by their practice and teaching context (Vandeyar, 2021). At the same time, the SMTs and the principals ensure policy implementation (Vandeyar, 2015). They must work together to monitor progress, provide support, and address any challenges that may arise. This collaborative effort helps to ensure that policies are effectively carried out and achieve their intended outcomes.

It is therefore essential for SMTs and teachers in schools to develop their own school-based ICT policies aligned with the National ICT Policy to support ICT integration. This will ensure that ICT is effectively used in the classroom to enhance learners' teaching and learning experiences. Additionally, SMTs and teachers should be provided with regular training and professional development opportunities to improve their ICT skills and knowledge.

The study also found that most schools did not include key performance areas in their school-based ICT policies, as few schools had such policies.

5.3.18 Key performance areas of school-based ICT policy

The qualitative case study found that most schools lacked a school-based ICT policy. As a result, schools lacked key performance indicators for ICT implementation. Therefore, the study revealed that most schools lacked key ICT performance areas, often citing the absence of a school-based ICT policy or a non-ICT focus. Even those with school-based ICT policies focused only on the management of ICT equipment and security.

The study has already shown that ICT policies play a fundamental role in the success of ICT integration in schools. Schools without school-based ICT policies are not ready to implement ICT for teaching and learning. Key performance areas help SMTs monitor and evaluate the progress of ICT implementation in schools. Therefore, without a school-based policy and key performance indicators, SMTs won't be able to measure progress in ICT implementation in their schools.

Every school needs an ICT plan to achieve its vision (Van Greunen, Kativu, Veldsman & Botha, 2021). A contributing factor to the formulation and implementation of a school-based policy must include teachers' experiences and the demands of the corporate world (Vandeyar, 2021). As a result, school leaders must be familiar with global expectations and teachers' knowledge of ICT to support ICT integration to help teachers plan ICT lessons. According to the literature, the success or failure of educational development depends on the nature and quality of educational policies, strategies, and sound implementation practices (Rahim *et al*., 2017). It is therefore crucial for SMTs to carefully consider the specific needs and challenges of the school system to design effective policies and strategies. Moreover, ongoing monitoring and evaluation are essential to ensure these initiatives are implemented successfully and produce the desired outcomes.

The literature suggests that a school's success in implementing ICT depends, in part, on the quality and maturity of its ICT plan (Van Greunen *et al*., 2021). Therefore, SMTs must design school-based ICT policies that support ICT integration for both teachers and learners. The school-based policy must include the performance areas and how SMTs will monitor and support them. Furthermore, a supportive policy environment and vibrant technological innovations are required to translate into meaningful access to and use of ICTs in all South African schools (Van Greunen *et al*., 2021). Interestingly, when the researcher analysed ATP documents from schools, most did not include ICT lesson plans. One school, specifically, had a few copies of ICT lesson plans or performance areas. This is a significant concern for the study because, without appropriate planning and a clear school-based ICT policy and performance focus areas, it is difficult for SMTs to implement ICT in schools.

The qualitative case study evidence shows that most schools lacked a school-based ICT policy, implementation guidelines, and clear performance indicators. As a result, the study suggests that schools must prioritise the design of school-based ICT policies and the need for increased support and guidance from the Department of Education.

Another challenge raised by the study regarding the school-based ICT policy was its monitoring by SMTs.

5.3.19 Monitor and evaluate the school-based ICT policy

Although the study found that schools lacked school-based ICT policies with all relevant guidelines and performance areas, it also identified various approaches SMTs used to monitor and manage ICT resources in their schools. These include laptops and photocopying machines used by both SMTs and teachers, which are termly monitored by completing asset registers. In some instances, the study found that schools had a district coordinator in charge of the computer lab, and measures were in place to monitor its use, including cameras and remote monitoring from the head office.

This monitoring of ICT devices or tools aligns with the GDE ICT policy guidelines, which the researcher analysed during the document analysis. The GDE ICT Policy includes sections on the management of teachers' laptops, smartboards, and KAPP boards. In some cases, schools have technicians who provide technical support and resolve ICT-related issues and ensure the continued operation of ICT equipment in schools (Hussain, Wang & Rahim, 2013). Although Hussain *et al*. (2013) mentioned that some schools have technicians who provided support in this study, most SMTs complained that the technicians are not always readily available. As a result, many SMTs expressed frustration with delays in resolving technical issues, leading to disruptions in teaching and learning. It is crucial for schools to prioritise efficient technical support to ensure smooth operations and minimise interruptions in the educational environment. In summary, providing timely technical support is essential for maintaining a successful ICT environment in schools.

5.4 SUMMARY OF CHAPTER 5

The study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools. Chapter 5 discussed and analysed the findings of the current qualitative case study. The discussions and data analysis were conducted in line with the study's primary research questions and objectives. The researcher also used document analysis and observations, which assisted in the discussion and analysis of data. All the findings mentioned above were discussed, compared, confirmed and analysed through relevant literature. Therefore, the discussion and analysis yielded different results, which are presented in Chapter 6. Among other challenges discovered in the discussions and analysis were SMTs' lack of computer knowledge and skills, resistance to ICT adoption and reluctance to learn, insufficient funding, inadequate training, unavailability and non-functionality of ICT buildings, theft and vandalism of ICT gadgets, poor internet connectivity, shortage of maintenance and technical support, and lack of knowledge of the National ICT policy and school-based policy. Furthermore, it was discovered that there was insufficient support from the district, that school-based ICT policies did not exist in some schools, and that there were no key performance areas or monitoring and evaluation processes to guide SMTs in integrating ICT in schools.

The next chapter presents a summary of the study's findings, conclusions, recommendations, and contributions to new knowledge.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The previous chapter discussed and analysed the study's findings. This chapter offers an overview of the qualitative case study, summarising the main findings and explaining how the objectives were met. It also presents conclusions, recommendations, and the study's contribution to new knowledge. Additionally, it suggests directions for future research.

6.1.1 Review of Research Problem

The qualitative case study was conducted based on the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in Tembisa, Ekurhuleni North District, Gauteng Province. SMTs faced difficulties in integrating and implementing ICT in schools to improve teaching and learning. These difficulties not only impact the SMTs, teachers, and learners but also continue to hinder the integration of ICT into primary school education.

Elements such as theft and vandalism, poor internet connections, a shortage of maintenance and technical support, schools lacking the National ICT Policy and the School-Based ICT Policy, misunderstanding of these policies, a lack of professional development for SMTs on ICT integration, ICT infrastructure, and SMTs' computer skills, and a lack of financial support pose a threat to the effective integration of ICT in South African primary schools. Although the DBE has implemented measures to integrate ICT into all schools in South Africa, it seems to be struggling to fulfil its obligation to transform education through ICT integration, especially in previously disadvantaged schools.

Various studies by scholars have examined ICT integration in primary schools. However, these studies tend to focus more on teachers' implementation of ICT and on teachers' and learners' perspectives on ICT use within schools. Consequently, only a few studies specifically examined the experiences and challenges SMTs face when integrating ICT in the Ekurhuleni North District of Gauteng province. The integration of

ICT in primary schools has been done. Still, it is poorly managed, particularly regarding ICT infrastructure, SMTs' professional development, and the provision of clear guidelines for the ICT policy for school integration.

The South African educational policy aims to enhance educational opportunities across various academic disciplines by developing technical skills and using ICT (Department of Education Government Gazette, 2004). Furthermore, the South Africa Connect policy, published in 2013 by the then DoC and now led by the newly established 2019 DCDT, advocates for a digital society characterised by widespread ICT knowledge and use among individuals, communities, organisations, and society (DoC, 2013). Besides, it provides a clear framework for all stakeholders, including school leaders, teachers, and learners, on how to use technology effectively and responsibly to support teaching, learning, and administrative tasks (Department of Education Government Gazette, 2004). The policy ensures that ICT integration aligns with the school's overall educational vision and objectives.

Although the ICT policy appears clear on paper, SMTs in Ekurhuleni North District primary schools still encounter challenges in integrating ICT. This is the main reason why the current qualitative case study was designed. The study aimed to examine in greater detail the experiences and challenges SMTs faced in successfully integrating ICT in primary schools. The case study was conducted in Ekurhuleni North District, Gauteng province, to recommend intervention strategies and ICT models for effective ICT implementation in primary schools. The models of ICT integration in education should stimulate SMTs to be well aligned with the National ICT Policy and School-Based Policy in successfully integrating ICT in primary schools.

6.2 SUMMARY OF KEY IDEAS AS PER CHAPTER BY CHAPTER

Chapter One

Chapter one outlined the introduction and background of the study, followed by the study's rationale, problem statement, research questions, research aims, and objectives.

Chapter Two

This chapter reviewed the literature related to the study. It compared existing published works on the experiences and challenges SMTs faced when integrating and implementing ICT in primary schools. It further described the theoretical framework used in the qualitative case study.

Chapter Three

This chapter outlined the research methodology, including the research approach, research design, research paradigm, population and sampling procedures, data collection instruments, data analysis, trustworthiness, ethical considerations, limitations and delimitations of the study.

Chapter Four

This chapter discussed and interpreted the case study results. The verbatim findings were presented and organised into sub-themes, which were then discussed in detail in Chapter 5. In addition, the study used document analysis in this section to examine relevant documents, including ICT policies, annual teacher preparation materials, and lesson plans. Also, photographs of schools were used.

Chapter Five

This chapter discussed and analysed the results of the case study. The discussion was supported by relevant literature. It examined what the findings imply in relation to the current research questions of the case study.

Chapter Six

This chapter provided a summary of the findings of the case study, a conclusion, and a contribution of new knowledge. This chapter also provided recommendations for future studies.

6.3 SUMMARY OF KEY FINDINGS PERTAINING TO RESEARCH QUESTIONS

The main findings of the case study are summarised according to research sub-questions 1, 2, 3 and 4. The conclusions were drawn from how each of the research sub-questions was answered during the semi-structured interviews.

6.3.1 Research Sub-Question 1: What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?

This sub-question involved investigating the level of computer knowledge held by SMTs, their perspectives on ICT integration and implementation in schools, and the kind of training they received to prepare them for ICT integration in primary schools. This was done to fulfil research objectives to assess SMTs' understanding of ICT integration in teaching and learning.

The study results revealed that some SMTs had limited to no computer knowledge, which hampered their ability to integrate ICT into teaching and learning. The study results also found that some SMTs possessed intermediate computer knowledge and skills, whereas others possessed advanced computer knowledge and software application skills, enabling them to perform their daily and administrative duties. Furthermore, the study found that most SMTs understood ICT integration in schools, its benefits, and how it supported teaching and learning during the COVID-19 pandemic. The study also found that some SMTs received formal training while others completed online short courses.

Additionally, the case study highlighted a strong need for external intervention from district authorities and NGOs through professional development programmes focused on ICT implementation. However, the findings showed that while some SMTs are trying to implement ICT in their teaching and learning, they are discouraged by those struggling to implement it in their classrooms.

6.3.2 Research Sub-Question 2: What challenges do SMTs face when integrating ICT in primary schools?

This sub-question investigated the challenges SMTs faced when integrating and implementing ICT in schools, as well as the infrastructure challenges they encountered

during this process. This was done to fulfil research objectives to explore the obstacles SMTs faced in integrating ICT in schools. Based on the study findings, SMTs faced serious challenges due to resistance to ICT adoption and reluctance to learn. Additionally, the case study revealed that SMTs faced critical insufficient funding to support IC integration and maintenance in schools.

The study also found that SMTs were not adequately trained to support ICT implementation in primary schools. They also faced the challenge of the unavailability and non-functionality of the ICT building infrastructure in schools. The case study also identified a troubling trend of theft and vandalism of ICT devices across all schools, hindering SMTs from effectively integrating ICT into primary schools. Furthermore, the study found that poor Internet connectivity and network coverage in schools affected ICT integration, alongside a lack of maintenance and technical support.

Owing to these findings, the study recommends that the GDE, particularly the Ekurhuleni North District, implement strict measures to address issues related to ICT infrastructure, including theft, burglary, and funding. The study recognises the efforts made by GDE, especially in the Ekurhuleni North District, in providing ICT infrastructure to all ICT primary schools. However, the case study encourages the district to expand its pioneering ICT programmes to all schools to prevent a digital divide.

6.3.3 Research Sub-Question 3: What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?

This sub-question involved investigating the types of support or training the district facilitated to assist SMTs in integrating ICT into schools. This was done to fulfil research objectives to determine the existing support structures and systems that enabled SMTs to integrate ICT in schools. The case study revealed that the district offered support through workshops, including school-based workshops. However, most SMTs felt that the support did not focus on ICT and was very limited to schools that are not part of the full ICT schools. Overall, the current case study revealed that the district's support for ICT integration, while available, is not always practical or equitable, with some schools receiving more assistance than others. The study further emphasises the need for the district to review its support structures and ensure that

all schools have access to the necessary resources and training to effectively integrate ICT.

6.3.4 Research Sub-Question 4: How do the National ICT policy and the school-based policy support SMTs in effectively integrating ICT in primary schools?

This sub-question examined how the National Policy guidelines support SMTs in implementing ICT. This was done to review and analyse the National ICT Policy and the School-Based Policy to evaluate their effectiveness in guiding SMTs to integrate ICT in schools. The findings are somewhat alarming; most SMTs have never taken the time to read the National ICT policy guidelines on ICT integration. Furthermore, the results revealed that some SMTs are unaware of whether there is a national ICT policy in their schools.

This situation is similar regarding school-based ICT policies; some SMTs were so reluctant and appeared indifferent towards these policies because they claimed that their schools are not ICT schools. Most SMTs were unaware of the existence of the school-based policy, its key performance areas, and the monitoring and evaluation of these policies. Therefore, the case study shows that the SMTs are unaware of the National ICT policy and lack a school-based ICT policy and monitoring tools.

These results indicate that it will take many years for these schools to implement ICT effectively, and learners will continue to suffer or face the digital divide. The qualitative case study's findings further highlighted a significant need for greater awareness and broader dissemination of the National Policy on ICT among school SMTs. This could include the district providing training and support to help SMTs understand the policy and its implications for ICT integration in schools, thereby improving teaching and learning.

6.4 CONCLUSIONS

The study concluded that most SMTs lacked the necessary computer knowledge and skills to integrate ICT effectively in primary schools. The study further concluded that SMTs faced challenges, including resistance to ICT adoption, reluctance to learn, insufficient funding to support ICT integration and maintenance in schools, and inadequate SMT training to support ICT integration. Furthermore, the study found that

the unavailability and non-functionality of ICT building infrastructure, theft and vandalism of ICT gadgets and poor Internet connectivity and network coverage hindered ICT implementation in schools. Moreover, the study found a shortage of maintenance and technical support for ICT infrastructure, which affected ICT integration. Additionally, the study found that SMTs lacked understanding of the National ICT policy guidelines, and the absence of a school-based ICT policy contributed to limited ICT implementation. The study further revealed that SMTs were receiving inadequate support in schools that are not ICT-enabled.

6.5 CONTRIBUTION TO NEW KNOWLEDGE

The study was conducted in primary schools within the Ekurhuleni North District in the Gauteng province. The study thoroughly discussed and analysed the challenges faced by the SMTs in integrating and implementing ICT in schools. The case study identified essential conditions that can help the SMTs successfully integrate and implement ICT in schools and improve teaching and learning.

The study's findings, along with a critical analysis of the policies, ATP, and lesson plans, formed the basis of the study. The researcher acknowledges the work of prior researchers and the efforts already made by the DBE and the GDE, in particular, the Ekurhuleni North District. The GDE, through the Ekurhuleni North District, has worked very diligently to integrate ICT in primary schools. There are schools that are fully ICT-supported, but the district still struggles to meet its goal of transforming all schools into ICT or SMART schools. To this end, this study proposes a model that enables SMTs to easily incorporate and implement ICT in primary schools across South Africa. The model can easily be implemented in schools. It comprises six simple stages that SMTs can follow to successfully integrate ICT in primary schools in South Africa. The proposed model is called the SMT DIGITAL TRANSFORMATION MODEL (SMT-DTM).

The stages of the model include:

- **Stage 1:** SMT Knowledge of National ICT Educational Policy
- **Stage 2:** School-Based ICT Policy and Digital Culture
- **Stage 3:** SMT Digital Leadership Competences

- **Stage 4:** ICT Financial Resources
- **Stage 5:** ICT Infrastructure and Buildings
- **Stage 6:** ICT Implementation, Monitoring and Evaluation

The model is illustrated in Figure 0.6 below.

THE SMT DIGITAL TRANSFORMATION MODEL (SMT-DTM)

Figure 0.1 Recommended SMT Digital Transformation Model (SMT-DTM) for effective ICT Integration in teaching and learning.

THE SMT DIGITAL TRANSFORMATION MODEL (SMT-DTM)'s six stages are explained in detail below.

THE SMT DIGITAL TRANSFORMATION MODEL (SMT-DTM)

6.5.1 Stage 1: SMT knowledge of National ICT educational policy

The National ICT Educational Policy for integrating ICT in schools is a strategic document that outlines the aims, principles, and guidelines for the use of ICT in schools and educational institutions. The policy ensures that ICT integration aligns with the school's overall educational vision and objectives. Therefore, SMTs' understanding of the policy is a fundamental step for every SMT member who wishes to see ICT integrated into schools.

In stage 1 of the model, SMTs must be thoroughly trained and supported by the district in implementing the policy in schools. The policy's implementation steps must be straightforward so that every SMT member can easily follow each step. If SMTs are aware of or understand the ICT implementation policy, they will, in turn, be able to train teachers. SMTs must be guided through a step-by-step implementation of the ICT policy. The policy must address the following:

- How SMTs will be trained and how often they should be trained, termly.
- Focus on specific ICT areas, e.g., sections of the policy that address ICT implementation.
- ICT devices and software apps that support ICT implementation in schools.

6.5.2 Stage 2: School-Based ICT Policy and Culture

Stage 2 must follow after a thorough training on the National ICT Educational Policy. SMTs should be restricted from moving to Stage 2 without a comprehensive understanding of Stage 1. No SMT member should be allowed to progress to Stage 2 without evidence that they are adequately trained on the National ICT policy. SMTs must be aware of all the components that guide ICT implementation.

In stage 2, SMTs should undertake thorough, vigorous training on developing their school-based ICT policy. The policy must align with the goals and aspirations of the National ICT policy. The school policy must include the following:

- Digital Culture. Digital Culture must outline the steps to be followed in computer labs or classes. It must have clear rules and guidelines governing the use of ICT infrastructure and the Internet to prevent misuse.
- The focus should be on digital curriculum and lesson plans.
- At this stage, the district must ensure that the training involves teachers.
- The school-based policy must be clear about the steps to be taken by both SMTs and teachers when integrating ICT in the classroom. If the school-based ICT policy is not clear, SMTs and teachers will struggle to follow it. Therefore, it must be very clear and user-friendly to both SMTs and teachers.
- SMTs and teachers must be equipped with proper implementation strategies.
- The school-based policy must include clear key performance areas and monitoring tools and align with the National ICT Educational Policy.

Culture refers to the way of life of a specific group of people, including behaviour, beliefs, values, customs, relationships, and special symbols (Shava & Heystek, 2019). In this case, digital culture refers to how SMTs manage ICT infrastructure use in their schools. SMTs must draft a clear policy on how teachers and learners should use the infrastructure. The policy should clearly state how teachers and learners use the Internet and the penalties for misuse. The third stage of the model is SMT Digital Leadership Competences.

6.5.3 Stage 3: SMTs' Digital Leadership Competencies

There is a strong link between SMTs' roles and the process of instigating change in schools. SMTs act as change agents, serving either as catalysts or as obstacles. The model strongly assumes that if SMTs are well-trained in integrating ICT into schools, most schools can easily implement ICT to enhance teaching and learning.

In stage 3, the model suggests targeted or customised SMT school-based workshops and professional development programmes to enhance ICT implementation in schools. The SMTs' training should be conducted vigorously, with a straightforward,

step-by-step approach, to ensure that all SMTs are fully equipped with ICT frameworks such as TPACK. The TPACK framework is vital for SMTs because it shows how traditional teaching methods can be easily inspired by modern teaching and learning methods. SMTs must be familiar with the ICT tools needed to support ICT implementation in their schools. The fourth stage of the model involves ICT financial resources.

6.5.4 Stage 4: ICT Financial Resources

Stage 4 of the model is crucial because it serves as the backbone of all the other stages. It is also the lifeline of all stages, as without financial support and resources, the integration of ICT in schools won't happen. Financial support is needed to purchase ICT equipment and gadgets, educational software apps, and to build computer labs to facilitate their integration. This financial support is different from buying a few computers or laptops for SMTs for administrative purposes. This type of financial support targets ICT devices and educational apps needed by teachers and learners in classrooms, such as smartboards, projectors, teachers' computers, and USB drives. SMTs must liaise with the district for this kind of support. It must be agreed how the financial support will be rolled out in "ALL" schools, not "SOME" schools. Financial support must be shared equally across all primary schools to avoid issues of the digital divide. After securing financial backing and resources, the SMTs can focus on the fifth crucial stage: infrastructure and buildings.

6.5.5 Stage 5: ICT Infrastructure and Buildings

Infrastructure and buildings play a pivotal role in implementing ICT in schools. Without adequate ICT infrastructure, integrating ICT in schools remains a significant challenge. In this stage of the model, SMTs must ensure that infrastructure, such as computer labs or ICT classrooms, is adequately and appropriately prepared. SMTs must ensure that the classroom environment is conducive to ICT integration. SMTs, with the district's support, must ensure that Internet connectivity is available throughout the school premises. They must check whether the broadband is sufficient for everyone to use for ICT integration, teaching, and learning.

The SMTs must clearly communicate how the Internet should be used to prevent misuse by SMTs, teachers, and learners, as mentioned in the digital culture policy. At this stage, SMTs must develop a clear maintenance plan detailing how the infrastructure will be maintained and cared for to prolong its lifespan in schools. Teachers and learners must be taught how to handle infrastructure to prevent unnecessary damage. SMTs must also address the challenges posed by theft and burglary of ICT infrastructure, including computers, laptops, and other devices. The policy must include clear steps for securing the infrastructure.

This can involve implementing stricter security measures such as access control systems, surveillance cameras, and regular security audits. Additionally, educating staff, school governing bodies, the community, and learners about the importance of safeguarding ICT equipment can help prevent theft and burglary. The community must be involved in securing the school infrastructure. There must be more community awareness programmes that promote school infrastructure and security.

Another crucial stage of the model is stage 6: ICT implementation, monitoring, and evaluation.

6.5.6 Stage 6: ICT Implementation, Monitoring and Evaluation

After all stages are adequately addressed and SMTs have satisfied themselves with each, the next critical stage is implementation, monitoring, and evaluation. The practical implementation of ICT in classrooms requires meticulous planning due to its complex and multidimensional nature (Dlamini, 2022). This stage is the core of ICT integration in schools. If SMTs have carefully and thoroughly gone over every stage, the implementation stage will be successful. The stage tests whether the SMTs have successfully and adequately covered other stages. Implementation must be carefully monitored to ensure there are no challenges. If challenges arise, the maintenance team must address them immediately. The SMTs must draft an evaluation plan and assign SMT members to conduct the evaluation and provide feedback.

In summary, if all six stages of the SMT Digital Transformation Model (SMT-DTM) are properly observed, adhered to, and followed, SMTs can effectively implement ICT in schools to improve teaching and learning. The SMT Digital Transformation Model

(SMT-DTM) was designed through a critical analysis of the challenges SMTs faced when integrating ICT into primary schools in the Ekurhuleni North District. The model accounted for schools' challenges and their geographic locations. It also took into consideration SMTs' computer competencies. The model is user-friendly and can help SMTs implement ICT in schools.

6.6 RECOMMENDATIONS

This study aimed to explore and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in South African primary schools. After discussing and analysing the case study findings, the following recommendations were made.

6.6.1 Adequate and proper ICT training for SMTs

The study found that most SMTs possess basic to minimal computer knowledge, which hindered their ability to successfully integrate ICT into schools to improve teaching and learning. Therefore, the case study recommends that the GDE, through the Ekurhuleni District, implement a comprehensive ICT training programme for SMTs to equip them with the skills needed to integrate ICT into schools.

6.6.2 ICT policy training and awareness

The study found that most SMTs had not read the National Educational ICT Policy. It was also discovered that some SMTs did not even know whether the policy existed or if the school had one. Additionally, the case study found that schools that were not full ICT schools lacked a proper school-based ICT policy. The case study recommends that the GDE and Ekurhuleni North District should undertake a programme to ensure that SMTs, as school leaders, are familiar with policies, particularly the ICT integration policy. It also suggests assisting SMTs in drawing up school-based ICT policies that address ICT implementation.

6.6.3 Adequate financial support

The study found that inadequate financial support from the GDE significantly affects the integration of ICT in schools. Since all schools are in quantile three and are no-fee schools relying on government support, the study recommends additional financial

assistance to help them fully implement ICT. It also suggests that GDE should partner with the private sector to raise funds to support ICT integration in schools.

6.6.4 ICT infrastructure support

The study found that ICT integration in schools is hampered by a lack of ICT infrastructure, including inadequate buildings and ICT equipment, as well as poor Internet access. It was also revealed that most of the buildings are old; computer labs were converted into storage facilities, and some were labelled “white elephants” due to their condition. Internet access topped the list. SMTs felt this was one of the most significant challenges hampering ICT integration in schools. Therefore, the case study recommends that the GDE should undertake a thorough asset management review to identify schools that need urgent support for ICT infrastructure and develop measures to support SMTs.

6.6.5 ICT maintenance and technical support

Based on the study findings, most schools lack adequate infrastructure maintenance and district-provided technical support. SMTs noted that the process of obtaining technical support or personnel to provide physical support in schools is very slow and tedious. They expressed concerns that they cannot fully rely on ICT integration because the infrastructure sometimes fails them, and arranging for technicians to visit schools is a lengthy process. As a result, they revert to traditional teaching and learning methods. Therefore, the study recommends that the district should support schools by providing technical personnel who can work within a cluster of schools or be stationed at individual schools.

6.6.6 Using the SMT Digital Transformation Model (SMT-DTM)

The SMT Digital Transformation Model (SMT-DTM) was designed through a critical analysis of the challenges SMTs faced when integrating ICT into primary schools in the Ekurhuleni North District. The model accounted for schools’ challenges and their geographic locations. It also took into consideration SMTs’ computer competencies. The model is user-friendly and can help SMTs implement ICT in schools. Therefore, the study recommends that the GDE and the Ekurhuleni North District follow the model’s simple stages for implementing ICT in schools.

6.7 IMPLICATIONS FOR FURTHER STUDY

This study involved only five schools from one circuit in the Ekurhuleni North District, Gauteng province. Similar studies can be carried out on a larger scale in other circuits and districts within Gauteng province to gain broader insights into the findings. Consequently, further research is needed to explore the experiences and challenges SMTs face when integrating ICT in primary schools to improve teaching and learning. There is also a common perception that, since ICT was introduced into the education system, ICT integration has not yet achieved its intended success. Therefore, researchers may investigate the experiences and challenges SMTs encounter when integrating ICT into schools for teaching and learning. Leadership competencies, ICT policy implementation gap and practice.

6.8 EVALUATION OF OBJECTIVES

The study aimed to achieve the following objectives.

- Assess the SMTs' understanding of ICT integration in teaching and learning.
- Explore the challenges SMTs face in integrating ICT in schools.
- Determine the existing support structures and systems that enable SMTs to integrate ICT in schools.
- Review and analyse the National ICT Policy and the School-Based Policy to evaluate their effectiveness in guiding SMTs to integrate ICT in schools.
- Investigate and develop a model that SMTs can use to accelerate the successful integration of ICT in schools.

The study confirmed the achievement of all planned objectives after examining the data collected through interviews, document analysis, and observations. The study assessed the SMTs' understanding of ICT integration in teaching and learning. This goal was achieved by discussing and analysing SMTs' responses from the interviews, as well as the National ICT policy and the school-based policy. The study explored the experiences and challenges SMTs faced in integrating ICT in schools. Furthermore, the case study identified the support structures and systems that enabled SMTs to incorporate ICT. In addition, the study reviewed and critically analysed the National ICT policy and the school-based policies to evaluate their effectiveness in guiding

SMTs to implement ICT in schools. Different models were also examined, and the study developed the SMT Digital Transformation Model (SMT-DTM), which SMTs can use to accelerate the successful implementation of ICT in schools.

This study found that most SMTs lacked the necessary computer knowledge and skills to integrate ICT effectively in primary schools. They also faced challenges such as resistance to ICT adoption, reluctance to learn, insufficient funding to support ICT integration and maintenance in schools, and inadequate SMT training to support ICT integration. Furthermore, the study found that the unavailability and non-functionality of ICT building infrastructure, theft and vandalism of ICT gadgets and poor Internet connectivity and network coverage hindered ICT implementation in schools. Furthermore, the study found a shortage of maintenance and technical support for ICT infrastructure, which affected ICT integration. Moreover, the study found that SMTs lacked understanding of the National ICT policy guidelines, and the absence of a school-based ICT policy also contributed to the lack of ICT implementation. The study further revealed that although SMTs received support from the district, they received inadequate support in schools that are not ICT-enabled.

Based on the study's findings, it achieved all the desired objectives.

6.9 CONCLUDING REMARKS

The study was to enquire about and describe the experiences and challenges faced by SMTs in integrating and implementing ICT into teaching and learning in primary schools in the Ekurhuleni North District, South Africa. The study revealed that SMTs in the Ekurhuleni North District of South Africa were unable to integrate ICT into schools to enhance teaching and learning because most SMTs lacked the necessary computer knowledge and skills for effective ICT integration in primary schools.

They also faced challenges such as resistance to ICT adoption, reluctance to learn, insufficient funding for ICT integration and maintenance in schools, and inadequate SMT training for ICT integration. Furthermore, the study found that the unavailability and non-functionality of ICT building infrastructure, theft and vandalism of ICT gadgets and poor Internet connectivity and network coverage hindered ICT implementation in schools. Furthermore, the study found a shortage of maintenance and technical

support for ICT infrastructure, which affected ICT integration. Moreover, the study found that SMTs lacked understanding of the National ICT policy guidelines, and the absence of a school-based ICT policy also contributed to the lack of ICT implementation. The study further revealed that SMTs received inadequate support in schools that are not ICT-enabled.

Based on the findings, the case study achieved all the desired objectives. To assist the SMTs, the study recommended that all SMTs should be adequately trained and aware of the contents of both the National ICT policy and the school-based policy. The study also recommended that the GDE should guarantee infrastructure support for SMTs, including adequate funding for ICT integration and sustainability. The study proposes these recommendations for schools in the Ekurhuleni North District in Gauteng province. If implemented effectively, they could achieve excellent results.

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APPENDICES

APPENDIX A: INTERVIEW SCHEDULE

INTERVIEW SCHEDULE FOR SCHOOL MANAGEMENT TEAMS (SMTS)

Semi-structured interview questions

Thank you for volunteering to participate in this interview as part of my Doctor of Philosophy in Education (PhD) degree on the topic: **School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study.**

Main question	**Guiding question**	**Possible interview questions**	**Probes /Follow-up questions**
What are the experiences and challenges faced by school management teams (SMTs) in integrating and implementing ICT into teaching and learning in South African primary schools?	What is the SMTs' level of understanding of the concept of ICT integration in teaching and learning?	• Do you have any computer literacy skills? • What is your understanding of ICT integration and implementation in school teaching and learning? • Have you received any training on integrating ICT in the classroom as an SMT member?	What kind of ICT training did you receive?
	What challenges do SMTs face when integrating ICT in primary schools?	• What challenges do SMT members experience in integrating ICT in schools? • Do you have any challenges with the computer infrastructure	

		(computers, network/internet)?	
	What support structures and systems are in place to assist SMTs with integrating ICT in primary schools?	• What kind of support or training can enable you to accelerate the integration and implementation of ICT in your school? • Do you get the district's support on integrating ICT into the school?	What type of support does the district offer?
	How do the National ICT policy and the school-based policy support SMTs in effectively integrating ICT in primary schools?	• Does the school have a school-based ICT policy document? • What are the key performance areas of the ICT school-based policy? • How do the SMT members monitor the ICT school-based policy? • Does the National ICT policy provide any guidance on integrating ICT in schools?	Can you share the ICT school-based policy document? How elaborate more?

APPENDIX B: CONSENT FORM

LETTER OF CONSENT TO THE SMT

Feb/September 2024

Letter of permission to conduct research: SMT.

School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study.

Dear Sir/Madam

My name is **Brighton Tshuma.** I am a Doctoral student at the University of South Africa (UNISA). My doctoral degree study title is "**School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study."**

This study explores the SMTs' experiences and challenges in integrating ICT into teaching and learning in South African schools in Ekurhuleni North District, Gauteng Province. I am working under the supervision of Prof K.S. Malatji from the School of Interdisciplinary Research and Graduate Studies, College of Graduate Studies at the University of South Africa (UNISA).

As a participant, I kindly invite you to take part in this study. This research has three phases: an interview (using semi-structured interview questions). The interview will be scheduled per your availability and at a convenient venue. The interview should take nearly 50 minutes. Another fieldwork phase includes physically observing available ICT resources and taking pictures of all computer labs and classrooms available in the school. Observation of ICT resources and taking pictures will take about 30 minutes. The third phase will be document analysis. The school's ICT policy will be requested for further study, and the results will be used to determine whether SMTs are

successfully integrating ICT into teaching and learning in schools. This process will occur simultaneously with the semi-structured interviews.

Your participation in this study is voluntary, confidential, and anonymous. You have the right to withdraw at any stage during the research study without any explanation, and your decision will be respected. Pseudonyms will be used in place of your real names. You will be asked for permission to record audio during the semi-structured interview. The purpose of these recordings is to ensure the validity and authenticity of the data transcription. The recording will be safely kept at the University of South Africa (UNISA).

You may ask questions before or during your participation. Please notify my supervisor or me if you have any concerns regarding the data generation procedures. As a participant, you will have the opportunity to access and verify the recorded views and the transcriptions of interviews, in case there is a need to do so. We would also like to request your permission to use your data confidentially and anonymously for further research purposes, as the datasets are the intellectual property of the University of South Africa (UNISA).

Please indicate by signing your understanding of the information shared above, the purpose being to give your consent to participate.

Kind regards

_____

Brighton Tshuma

E-mail address: britegugu@gmail.com

Contact number: 078 714 9266

Supervisor: Prof K. S Malatji

Contact number: 073 131 4054

E-mail address: emalatsk@unisa.ac.za

PERMISSION FOR RESEARCH
I, _____, hereby permit to/ do not give my consent to include me as a participant in your research on **School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study.** Signature: _____ Date: _____

APPENDIX C: ETHICAL CERTIFICATE

UNISA university of south africa

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2024/04/10

Ref: **2024/04/10/43205542/20/AM**
Name: Mr B Tshuma
Student No.:43205542

Dear Mr B Tshuma

Decision: Ethics Approval from 2024/04/10 to 2029/04/10

Researcher(s): Name: Mr B Tshuma
E-mail address: 43205542@mylife.unisa.ac.za
Telephone: 078 714 9266

Supervisor(s): Name: Prof K.S Malatji
E-mail address: emalatks@unisa.ac.za
Telephone: +27 731314054

Title of research:

School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study

Qualification: PhD Curriculum Studies

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 2024/04/10 to 2029/04/10.

*The **medium risk** application was reviewed by the Ethics Review Committee on 2024/04/10 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.

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 **2029/04/10**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2024/04/10/43205542/20/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

APPENDIX D: PERMISSION LETTER

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	18 June 2024
Validity of Research Approval:	08 February 2024– 30 September 2024 2024/144
Name of Researcher:	Tshuma B
Address of Researcher:	273 Lotty Street
	Pretoria Gardens/Pretoria
Telephone Number:	078 714 9266
Email address:	britegugu@gmail.com
Research Topic:	School Management Teams' Experiences of the Integration of ICT into Teaching and Learning: A South African Case Study
Name of University:	UNISA
Type of qualification	PhD
Number and type of schools:	5 Primary Schools
District/s/HO	Ekurhuleni North

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

18/06/2024

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

1. *Letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*
2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. ***Because of the relaxation of COVID 19 regulations researchers can collect data online, telephonically, physically access schools or may make arrangements for Zoom with the school Principal. Requests for such arrangements should be submitted to the GDE Education Research and Knowledge Management directorate.***
4. ***The Researchers are advised to wear a mask at all times, Social distance at all times, Provide a vaccination certificate or negative COVID-19 test, not older than 72 hours, and Sanitise frequently.***
5. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
6. *A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
7. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
8. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
9. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
10. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
11. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
12. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
13. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
14. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
15. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
16. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Dr. Gumani Mukatuni
DCES: Education Research and Knowledge Management

DATE: 18/06/2024

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

APPENDIX E: PHOTOS


PLEASE WEAR
YOUR MASK
Bidvest

APPENDIX F: EDITING CERTIFICATE

Marieta Grundling (MBA)

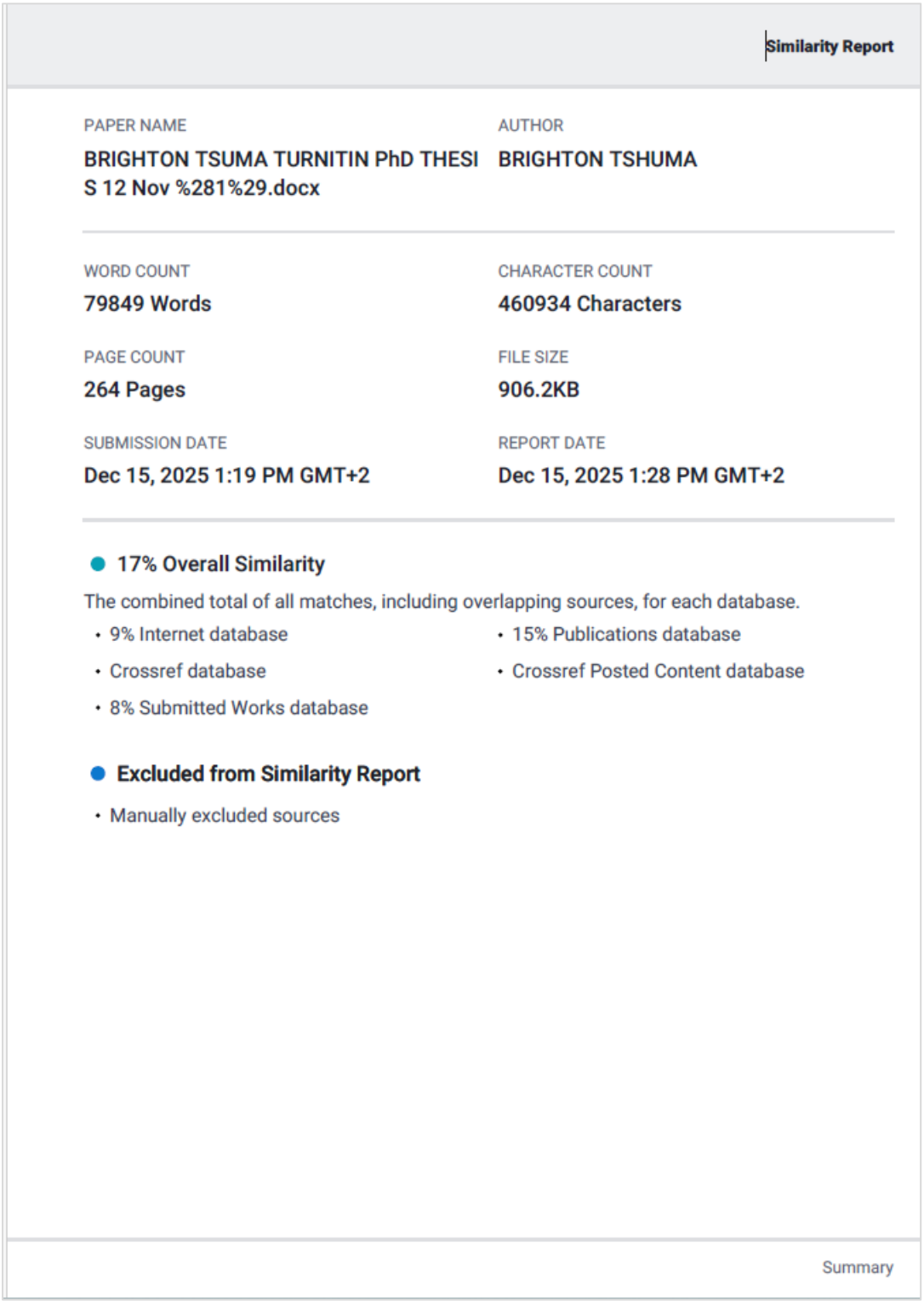
9 Akasia Street
Vierfontein Ontwikkelingsgroep
2615
081 354 1596
edit@profeditmba.co.za
12 November 2025

To Whom It May Concern

This serves to confirm that the thesis: **School Management Teams' experiences of the integration of ICT into teaching and learning: A South African Case** by *Brighton Tshuma* was edited. The language, presentation, referencing system (both in-text and against the Reference List), were checked and corrected.

M Grundling
12 November 2025

APPENDIX G: TURNITIN SIMILARITY REPORT



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