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Exploring Principals' Leadership Roles in Supporting Information Communication Technology (ICT) Integration in Teaching and Learning in Secondary Schools

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A dissertation submitted in fulfilment of the requirements for the degree of Master of Education in the Discipline of Educational Leadership Management and Policy

Supervisor: Dr P. E. Mthembu

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DECLARATION

I**, Sboniso Wilberforce Mngadi,** declare that:

I. The research reported in this dissertation, except where otherwise indicated, is my original work.

II. This dissertation has not been submitted for any degree or examination at any other university.

III. This dissertation does not contain other person's data, pictures, graphs, or other information unless specifically acknowledged as being sourced from other persons.

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STATEMENT BY SUPERVISOR

This dissertation has been submitted with my approval.

[redacted]

29/01/2021

Supervisor: Dr P. E. Mthembu

Date:

DEDICATION

This dissertation is dedicated to my mother, Silindile Claudette Msani, who is the pillar of my strength. Thank you for your support and unconditional love. You have constantly given me strength and unfailing love. I thank God to have given me the kind of a mother that you are.

"I can do all things through Christ who strengthens me". Philippians 4;13

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ABSTRACT

The fourth industrial revolution (IR4.0) is fast-paced, complex and global, which then demands every human to have the capacity to face its uncertainty. During such unprecedented and fast-paced change, school principals, are grappling to find solutions to the challenges of leading teaching and learning in this era. The purpose of this study was to explore principals' leadership roles in supporting ICT integration in teaching and learning in secondary schools. The study explored these roles in the perspective of secondary school principals as instructional leaders, examining how their experiences regarding ICT integration in schools could be explained, and how their leadership strategies and practices enhance ICT integration in the process of teaching and learning. The relevant literature provides evidence that, because of the 4th Industrial Revolution, new technologies for teaching and learning emerge and that principals should play key roles in supporting ICT integration in teaching and learning. Thus, there is an intertwined relationship between ICT integration and principal leadership.

This qualitative research study was located in the interpretive paradigm. Its participants were five secondary school principals in the Ugu district, and the study used face-to-face semi-structured interviews as a data generation method. Complexity leadership theory was used as the theoretical framework.

The findings revealed that some principals had a clear understanding of ICT integration and its importance in the teaching and learning process. Above that, principals appeared to be cognisant of their integral roles as instructional leaders in schools. Furthermore, principals' leadership roles, practices and strategies were key to supporting ICT integration to teaching and learning. It also became apparent that, while there may be challenges facing principals in leading ICT integration, all seem to be benefiting from it. The findings indicate further that other stakeholders play a pivotal role in giving support to their schools. As the world changes drastically, schools, as institutions of learning, are becoming change agents in preparing learners for survival in the competitive world of the information age. Finally, findings revealed some challenges principals face in leading ICT integration. This study conclude that there is a need for the professional development of principals as instructional leaders, which would include the leadership capacity to lead ICT integration in teaching and learning, especially in township and rural secondary schools.

LIST OF ACRONYMS AND ABBREVIATIONS

AL	Adaptive Leadership
AL	Administrative Leadership
ATP	Annual Teaching Plan
CLT	Complexity Leadership Theory
CAS	Complexity Adaptive System
DBE	Department of Basic Education
EL	Enabling Leadership
ELM	Educational Leadership and Management
IA	Information Age
ICT	Information Communication Technologies
IoT	Internet of Things
IR4.0	Fourth Industrial Revolution
KPE	Knowledge Production Era
LTSM	Learner Teacher Support Material
PL	Principal Leadership
STI	Science Technology and Innovation
UDS	Ugu District School
WEF	World Economic Forum

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CHAPTER 1

INTRODUCTION AND ORIENTATION TO THE STUDY

1.1 Introduction and background

The fourth industrial revolution (IR4.0) is fast-paced, complex and global, which then demands every human to have the capacity to face its uncertainty. Schwab (2018) believes that, with IR4.0, humanity has entered a new phase. Seemingly, as this technology emerges, the demands for highly skilled workers have also increased while workers with less education and lower skills becoming less in need. Its effects on employment appear to be complex, potentially intensifying inequality by reducing demand for low levels of skills (Schwab, 2018; Sutherland, 2020; Ayentimi & Burgess, 2018). As a result, this has disrupted almost every industry and exacerbated social inequalities and tensions (Schwab, 2016, 2018). During such unprecedented and fast-paced change, different leaders, including school principals, are grappling to find solutions to the challenges of this most complex era.

IR4.0 involves revolutionary change based on recent diverse technologies by which science and technology advancement is stimulated (Lee, Yun, Pyka, Won, Kodama, Schiuma & Yan, 2016; Liao, Loures, Brezinski & Venancio, 2018). It is the digital revolution that has been occurring in the middle of the third industrial revolution, characterised by a fusion of new technologies (Schwab, 2016). Such an exponentially paced IR4.0 seems to have changed almost every sector across the globe. Ahmad and Ghavifekr (2015) highlight that changes that took place in the last decade surpass what has happened in the past twenty years and the world has become a much more complex environment to live in with the rapid advancement of technology. These changes came with numerous impacts on the education system as well. Shahroom and Hussin (2018) share the same sentiment that IR4.0 has changed the landscape of educational innovation and consequently delivered a new model of education for the future. One element of this is the integration of ICT in teaching and learning. Alenezi (2019) points out that ICT integration is a growing trend globally. Moreover, ICT integration can be a broad concept. However, Ghavifekr and Rosdy (2015) define ICT integration as technology-based

teaching and learning process that incorporates learning technologies in schools. ICT integration is a valuable innovation within an educational setting as it provides an enhanced platform for teachers and learners, through its ability to ease and facilitate communication and encourage learner agency, thus leading to more effective learning (Ghavifekr & Rosdy, 2015).

In the IR4.0, new platforms aimed at making teaching and learning much easier seem to emerge (Oke & Fernandes, 2020). Therefore, teaching and learning in the IR4.0, when information is readily available in various platforms, allow both learners and teachers to have a shared contribution in the process of teaching and learning. Oliveira, Behnagh, Ni, Mohsinah, Burgess and Guo (2019) point out that the accelerated pace of technological advancement in recent years has led to a pressing need for educational research that can assist schools in better understanding how to integrate technology into teaching and learning. In that context, learning may not be a classroom event, but it can take place on various platforms, especially with the increasingly young and dynamic population of digital natives. Thus, ICT integration in the IR4.0 goes beyond the common use of computers to involve technologies that can help learners participate in the virtual world (Keane, Boden, Chalmers, & Williams, 2020). However, while digital technology advances at an exponential rate, the education sector seem to remain behind. Oke and Fernandes (2020) report that as the IR4.0 gains impetus with an exponential advancement in technology, the pedagogical skills needed in the current era remain unclear. Perhaps, there is a lot that needs to be explored with an attempt of preparing schools to meet the demands of the IR4.0. Moreover, it is imperative to note that while some schools have begun this process of integration, most South African rural schools are facing several challenges in this regard (Madida, Naidoo, & Rugbeer, 2019).

The literature points out that many learners in rural schools will continue to remain behind, since they have limited access to the use of technology. Perhaps this may be one of the reasons they may not be performing optimally comparing with those who are exposed to technological tools of learning. Economic uncertainly, poorly developed ICT infrastructure and unreliable electricity supply seem to make it challenging for the majority of rural schools (Madida et al., 2019). This trend may exacerbate inequalities among schools and widen the gap in life chances

between learners. Nevertheless, what seems to remain less explored are the principals' leadership roles in supporting ICT integration in schools and the implementation of some of the South African government's policies that speaks to ICT integration in schools. A study by Chang and Chen (2018) points out that the field of educational leadership has relatively few studies on technology leadership. There is evidence of the paucity of empirical studies that address issues around educational leadership roles in supporting ICT integration in schools. Perhaps, this is one of the reasons schools particularly in developing countries like South Africa, continue to fail to implement ICT integration in teaching and learning. Hence, the South African system is facing challenges to harness an anticipated IR4.0.

ICT have now become commonplace entities in all aspects of life in modern society (Adams, Kutty & Zabidi, 2020). In accordance with this development, one may argue that a growing trend of ICT integration in schools seems to have gained impetus. Such impetus emanates from one of the schools' objectives, which is to use technology to enhance teaching and learning. According to Alenezi (2019), educational fields have been affected by ICT, which have certainly affected teaching and learning. Moreover, drawing from recent literature, ICT integration is believed to have the potential to prepare learners for the work environment and the global competition. Commenting on the advent of the IR4.0, Oke and Fernandes (2020) claim that the education system has the potential to harness the innovations that come with IR4.0 through research and teaching to enhance learners' experiences. Therefore, it appears that there is a strong relationship between ICT integration and quality teaching and learning for innovation. Beers (2011) argues that, by using technology in teaching and learning, the world is in the classroom. This means that the use of technology may result in effective learning, and learners may be able to understand and communicate with the world. What is of vital importance for the South African government, therefore, is to invest more in the education system. Such investment will enable schools to provide the necessary resources for ICT integration to be implemented. However, there should be compelling evidence on the allocation of funds for technological resources that are aimed at facilitating and supporting ICT integration in schools. A study by Noor-Ul-Amin (2013) highlights that ICT integration has the

potential to innovate, accelerate, deepen learning skills, strengthen teaching, and help schools change.

Ghavifekr and Rosdy (2015) maintain that ICT is considered to have the potential to assist educators in meeting the demands of global requirements and becoming a major element in transforming the country's future. Hence, several studies on ICT integration have shown vehement support for ICT integration in education across the globe. The South African education system, through its policies such as White Paper 7 (2004) on e-education and the Government Gazette, on the South African Standard for Principals (2016), highlights the significance of ICT integration in teaching and learning. A key factor towards realising effective ICT integration would be the availability of adequate technological resources for teachers to use whenever they need them. This may become a major challenge for rural and township schools, where such resources are usually minimal. Madida et al. (2019) consider challenges such as lack of ICT resources and poor infrastructure as driven by unaffordability, due to high costs associated with them. Having said that, Leithwood, Harris and Hopkins (2008) argue that leadership entails action that demonstrates the capabilities of leadership. These actions include building a vision and setting directions, understanding and developing people, and redesigning the school as a learning organisation. In the context of the study, the emphasis is on principals' leadership roles in taking the school to greater heights, despite all the challenges that may hinder the school performance as far as ICT integration is concerned.

The relevant literature that addresses ICT integration in schools has started to focus attention on principals' leadership roles in this process. A study by Ghavifekr and Rosdy (2015), for instance, put principal leadership as a prime aspect when trying to analyse the effectiveness of its role in supporting teaching and learning processes in classrooms. Consequently, there has been considerable literature on principals as key in leading the processes of ICT integration. For example, Kannan, Sharma and Abdullah (2013) highlight that principals have the paramount role in leading ICT integration in their respective schools. These roles include portraying a passionate commitment to ensuring that teachers can access professional development to build up their skills in ICT. Kannan, Sharma and Abdullah (2012) also highlight those key roles that principals should play in leading ICT integration are such as

supporting ICT integration, facilitating change and intervention strategies, ensuring that resources are in place and setting up training programmes for educators in ICT. In other words, principals should mobilise their teachers and learners around the development of a supportive culture around ICT. By these roles, it may become clear that principals' leadership roles are key in leading ICT integration.

In accordance with the literature that provides evidence favouring ICT integration, the South African education system seems to have started to focus on ICT integration in education. The government has developed policies that set out how such technology is used in education. For instance, the Government Gazette, White Paper 7 (2004) on e-Education stipulates that digital media have revolutionised the information society and advances in ICT have drastically changed the learning and teaching process. This policy gives evidence that the South African education system has begun to make attempts that support ICT integration in teaching and learning. Subsequently, a Government Gazette on the South African Standard for Principals (2016) states that principals are required to lead schools into the future, through the use of ICT. This further gives evidence of the significance of principals' leadership roles in leading ICT integration. Furthermore, there seems to be an intertwined relationship in the above-mentioned policies, in that there is a strong relationship between principal leadership and ICT integration.

So far, it has become noticeable that many educational reforms have put leadership and management as a prime concern, as reflected in scholarly work. The same thing to ICT integration, principals' leadership roles remain the most significant component in supporting the implementation of ICT in schools. According to Spaull and Jansen (2019), discussions about educational reform in South Africa typically revert to a focus on leadership and management. This also applies to ICT integration to teaching and learning, wherein principals have an integral leadership role to perform. Mestry (2017) argues that principals are required to supervise the curriculum and improve the instructional programme of the school as a learning organisation. Therefore, principals need to develop their leadership skills to perform this role effectively. A study by Mestry (2017) reveals the need for the Department of Education to provide sufficient support for principal development, so that they lead their

schools well. In that way, principals can acquire relevant skills needed for ICT integration, particularly in the digital age.

1.2 Rationale of the study

As stated above, this study focuses on principals' leadership roles that support ICT integration in teaching and learning. Principals are seen as professionals in the area of leadership and directly influence the instructional success (Maifala, 2017; see also Mingaine, 2013). With this, they need to ensure that ICT integration is widely accepted so that it can improve education in schools. As a result, it has started to emerge from the literature that principals should play such a vital leadership role in integrating ICT if they are to realise quality learning. A study by Hamutoglu and Basarmak (2020) reveals that technology integration is becoming a focus in almost every educational establishment since it has the potential to improve teaching and learning. However, the literature presents evidence that some principals are still struggling with their roles. Mestry (2017) argues that school principals are inadequately trained for their leadership roles. Besides the fiscal constraints, seemingly principals demonstrate a capacity related lack of ability to lead schools as the education system changes. According to Kearney, Okilwa and Goldhorn (2016), school principals' roles evolve since they are to conform to the demands for reforms in curriculum and goals of improving school quality. Therefore, the development of principal leadership skills is of integral significance in the knowledge production era.

The Department of Basic Education has made efforts in developing school principals since the beginning of IR4.0. Nevertheless, what continues to emerge from policies and literature are the issues around principals' leadership roles integrating ICT in schools. School leaders should build on the existing capacity to support professional development in digital learning at the school, according to DBE (2014). This requires that school leaders should be prepared to learn how to use ICT and have a clear vision and strategic plans in implementing ICT (Mingaine, 2013). ICT integration in schools demands principals who are in possession of quality leadership skills and understand the use of technology in teaching and learning. According to Santoso and Lestari (2019), basic ICT skills include understanding and having the ability to

use ICT equipment. Recently, there is a shift from a traditional style of leadership to a contemporary leadership style that allows principals to adapt to the new developments in the system. This means that, as principals' roles evolve, they become more similar to those of chief executive officers as they assume multiple roles.

A revolutionised education system has led to the significant use of ICT in the classroom, particularly in IR4.0. Thus, the use of technology in the classroom has changed the teaching and learning process. Ahmad and Ghavifekr (2017) assert that, with technological advancement, the world is in the classroom. Hence technology has gained momentum in the learning environment in many countries around the globe. Consequently, the introduction of ICT in schools is developing new ways for learners and educators to engage in information selection and gathering. Beers (2011) reports that numerous studies and reports became apparent in the past decade that aimed at identifying the life, career, and learning skills that define the skills needed in the new educational dispensation. During this period of IR4.0, skills are to be infused into the content knowledge so that learners may better understand what they are learning.

Drawing from literature, one can argue that ICT integration enables schools to improve the quality of education they provide to learners. Nsolly and Charlotte (2016) concur by stating that the belief in the efficacy of technology has led to many governments setting up programmes to integrate technology in education systems. However, it is essential to note that a well-articulated vision and strategic plans in ICT implementation underpin an effective ICT integration process. According to Hamutoglu and Basarmak (2020), technology integration is a complicated process and barriers are facing this process. Therefore, principals need to own in-depth knowledge about the use of technology in the school. Over and above, principals should model, motivate and empower school communities through their leadership practices, in working towards achieving ICT integration (Mingaine, 2013).

1.2.1 Professional and personal motivation

In my nine years of teaching experience, I happened to have taught in three different schools. Surprisingly, I have never ever heard a school principal talking about how best we can utilise technology in the classroom to improve our teaching practices and strategies. In one of these schools, we were fortunate to have been provided with a smartboard by the department, but no one has used it until today. It is as good as keeping it in the strong room. Prior to that, there has been wireless networking technology (Wi-Fi) which we as the staff were not aware. No one had an opportunity to utilise it except for one colleague who was teaching computer applications technology. Such a culture has been prevailing for a number of years, and it has been taken as the norm. This brings confusion because according to the Government Gazette, White Paper 7 (2004) on e-Education, every teacher and learner in General and Further Education and Training must have access to ICT infrastructure. What is happening in our school is totally in contradiction of what the government gazette stipulates.

What seems to be fascinating me the most about this research study is the role principals play in integrating ICT in teaching and learning in their respective schools. The dawn of the new democratic government in 1994 had anticipated that education could be the tool to dismantle the apartheid legacy. Similarly, in this day and age, education seems to be the tool that can be used to prepare learners for the future. Ahmad and Ghavifekr (2017) argue that we have to prepare our children for a world of work that may not be the same as what we know. The change that comes with globalisation and the fourth industrial revolution has much influence on how schools as learning organisations need to be structured, particularly the classroom environment. Therefore, it becomes imperative for school principals to use their leadership roles and skills in creating a conducive learning environment.

The use of ICT in the classroom is believed to enhance learner performance. Ahmad and Ghavifekr (2017) argue that with technology, the world is in the classroom. For this reason, the principal's role can be seen as most important because they are to ensure that all the necessary resources are available for effective teaching and learning to take place. However, one may wonder whether school principals do understand their roles. If not so, what could be the

possible reasons behind that? Having failed to perform this role, how many lives may suffer in terms of life the opportunities of young individuals?

1.3 Statement of the problem and purpose of the study

In the 21st Century, principals' leadership is key in leading transformation in schools to cope with the demands that come with IR4.0. This is reflected in the policies and education reform agendas in education (RSA, 2011; DBE, 2014). The call for introducing the use of ICT into educational settings is based on the belief that this could also fast-track quality teaching, bring changes in education and ultimately improve student learning (Farrelly, 2018; Schwab, 2018). Principals, as instructional leaders, have the fundamental role of ensuring effective teaching and learning in schools. Kearney, Okilwa and Goldhorn, 2016; see also Mestry, 2017) assert that the evolution of principal leadership has resulted in principals assuming multiple and complex roles. These roles include preparing teachers to face IR4.0 and the challenges it brings to teaching and learning. Furthermore, with the IR4.0 bringing the Internet of Things (IoT) into almost all aspects of our daily lives, principals' leadership, as well as the school's teaching and learning practices in the classroom have to evolve to adapt to it (Schwab, 2018). Advocates of ICT integration in schools posit that principals' leadership can impact positively on the training of teachers, the provision of adequate technical support, and the availability of and proper use of ICT as well as accessibility to ICT infrastructure (DBE, 2004; RSA, 2016; Schwab, 2018).

However, there are problematic issues concerning ICT integration or coping with the demands of IR4.0 in schools, especially in rural and township schools. This consequently results in principals facing unprecedented leadership challenges (Adams, Kutty & Zabidi, 2017). Principals who are leading rural and township schools particularly are experiencing challenges as their schools are struggling with limited resources and infrastructure (Maifala, 2017). Therefore, ICT integration seems to be a challenge in rural and township schools. According to Maifala (2017), rural and township schools have to deal with very different conditions to those faced by schools in urban areas. Further to such issues is also an issue around principals' unpreparedness to lead and manage ICT integration in schools. Maifala (2017) points out that

the 21st Century has seen innumerable changes in technology and has made the world a smaller space. However, the unpreparedness of school principals impedes ICT integration. Hence technology integration is given little attention in some schools. Attempts to address this lack need evidence-based solutions, yet what seems to be evident from the literature is that there are still few studies on principals' leadership roles in ICT integration.

Therefore, the purpose of the study is to explore those leadership roles of principals that support ICT integration in teaching and learning. The study also seeks to examine principals' leadership practices and strategies in ICT integration. Lastly, the study wants to draw lessons that could be learnt from principals' leadership roles, practices and strategies in integrating ICT in schools.

1.4 Objectives of the study

1. To explore secondary school principals' understanding of their leadership role in supporting ICT integration in teaching and learning.
2. To examine how principals understand to be the leadership strategies that enhance ICT integration in teaching and learning.
3. To draw lessons that could be learned from the principals' leadership role and strategies in leading ICT integration to teaching and learning.

1.5 Research questions

1. What are the secondary school principals' understanding of their leadership role in supporting ICT integration in teaching and learning?
2. How do principals' leadership understand to be strategies that enhance ICT integration in teaching and learning
3. What can we learn from the principals' leadership role and strategies in leading ICT integration to teaching and learning?

1.6 Significance of the study

The significance of this study is that it will extend the understanding in the literature regarding the possibilities for ICT integration in schools. In addition to that, the study will provide an insight into leadership roles that may enhance the use of ICT for teaching and learning. This study's findings could also assist principals, especially those who will be reading my work, to understand issues regarding ICT integration.

1.7 Clarification of key concepts

Concepts used in this study are clarified as they may have varying meanings in other contexts. The aim is to align concepts to the study and to eliminate misconceptions to the reader. The following concepts will be discussed as they underpin this research study: fourth industrial revolution, information communication technologies, ICT integration and educational and principal leadership.

1.7.1 Educational leadership

According to Bush (2007), educational leadership can be defined as the ability to influence others' actions to accomplish the desired objectives. Although other scholars make a distinction between educational leadership and management, there seems to be a thin line between these concepts. However, educational leadership is more about influencing actions, while management deals with maintenance and arrangement. For instance, Grace (2020) argues that there should be a reciprocal influence among leaders and followers in educational leadership, with a common purpose to create real change. Drawing from the fact that it is a concept that has been discussed over the years, educational leadership is a broad concept. Hallinger (2003) highlights that, in the past 25 years, considerable empirical studies around educational leadership have been conducted. Since it is a broad concept, it entails a variety of approaches. These approaches include instructional leadership, transformational leadership, shared leadership and organisational leadership, to mention a few. However, Hallinger (2003) points out that both instructional and transformational leadership are core in the sense that they

contribute directly to school performance. As more educational reforms emerge, educational leadership has started to be examined even further. Dimopoulos (2020) argues that educational leadership is receiving more attention. This could be the result of the external demands of the IR4.0 that seem to be changing the education sector as a whole. In that, principals are now getting an exposure to new styles of leadership that may enable them to understand their roles from a different perspective. It is important to note that educational leadership is generally regarded as an essential element in school improvement. Hence, it is believed to have the potential to enable schools to meet the demands of IR4.0 through the use of ICT in enabling more effective teaching and learning.

1.7.2 Fourth Industrial Revolution (IR4.0)

The advent of the IR4.0 touches every aspect of life. It has driven both social and economic growth and the leveraged development of different nations, despite their level of development. The IR4.0 is now influencing both developing and developed countries in one way or the other. This IR4.0 can be defined as the revolutionary change based on recent diverse technologies by which science and technology advancement is stimulated (Lee et al., 2018; Liao, 2018). As institutions of change, schools have to take a revolutionary change in adjusting to the demands of IR4.0. This will help to minimise the gap between learners and create more opportunities to participate in the global market. Education has the potential to harness the IR4.0 because of the perceived inevitability of technology change (Webster, 2016). This means that schools need to design or adapt to new learning settings that will accommodate the use of technology in teaching and learning. Therefore, through the leadership of their principals, schools should be prepared for such a fast-paced technological advancement.

1.7.3 Information communication technologies (ICT)

New technologies are portrayed as knowledge-making tools designed to improve the world in which we live. These newly emerging technologies have impacted almost all sectors in the world. The education sector, with no doubt, is not immune to such changes in technology. Oliveira, Behnagh, Ni, Mohsinah, Burgess and Guo (2019) points out that the accelerated pace

of technological advancement in recent years has led to a pressing need for educational research that can assist schools in better understanding how ICT can enhance school education. Halili (2019) highlights that schools are starting to revamp classrooms to embrace the use of ICT in teaching and learning. These ICT include 3D printing, augmented reality, virtual reality and the Internet of things. Therefore, there is a rising trend of schools having to adapt to new pedagogical approaches that incorporate information communication technologies in the teaching and learning process. Beers (2011) also share similar sentiments by arguing that, with new technologies, the world is in the classroom. Thus, technological advancement has become a driving force in schools. Drawing from this literature, one can argue that evidence abounds that technology advancement gives rise not only to new ways of seeing and understanding the world but also to new ways of being-in-the-world (Oliveira et al., 2019).

Having said that, it appears that the emergence of new technologies in education has shaped the classroom and learners' experience (Oliveira et al., 2019). This emergent has led to a large amount of research around ICT integration. Noticeably, this large amount of literature consistently argues that ICT integration has to potential to improve teaching and learning and consequently learner attainment. Halili (2019) believes that ICT integration will help schools to stay relevant. Moreover, it has become apparent that the majority of African countries are progressively integrating ICT in teaching and learning (Nsolly & Charlotte, 2016; Halili, 2019).

1.7.4 Principal leadership

Over the years, principal leadership has been associated with both school and learner success. Adams and Muthiah (2020) confirm a considerable amount of research studies that prove that effective leadership by principals positively impacts learner performance. Therefore, school principals should create the school's vision, do the administrative work, and allocate resources for teachers to teach and design developmental programmes where necessary. Zepeda and Lanoue (2017) argue that principals' roles should include that they ensure teacher development. This can be done by using formal and informal observation of classroom practice and responding to what has been observed. Principals should also play a fundamental role in leading teaching and learning. By being instructional leaders, they have a key role in leading ICT

integration in schools. Moreover, Tran, Hallinger and Truong (2017) also maintain that the development of a learning culture appears to require effective principal leadership. This brings evidence to the central role of principal leadership in understanding the school as a learning organisation. Nasreen (2019) observes that principal leadership ranks high in the list of priorities for school reforms, in this day and age. Thus, in a changing world, the school principal's role has become one of the fundamental components. The principal should be proactive in their instructional role, ensuring that it is fully supported. A study by Hallinger, Walker, Pan, Nyeu and Chen (2015) highlights that principals drive the school community to achieve school goals. Thus, they should have a shared vision, a clear system of teaching objectives and academic commitment.

1.8 Limitations of the study

The research design of this research study is a multi-case study of both rural and township secondary schools. This limits the data generated to a specific context. As a result, this research study's findings may not be transferable, and it cannot be assumed that similar results will be attained in a different context. The study is based specifically on principals' leadership roles in secondary schools. In generating data for this research study, the researcher had to follow COVID-10 regulations such as the use of face masks and social distancing. It could be sometimes difficult to have clear audio-recordings. Above that, it was sometimes problematic to set up meetings with principals as they were busy preparing the schools to comply with COVID-19 regulations.

1.9 Delimitations

Firstly, this study was delimited to five secondary schools that integrate ICT in teaching and learning in one district. These selected school principals were already enacting their leadership strategies in supporting ICT integration in their respective schools. While these principals accounts may not be generalised to other principals, their accounts might give insight and lessons which may be useful to other principals. This study's findings also contribute to a less explored area of principals' role in supporting ICT integration to teaching and learning.

1.10 Overview of the study

This study comprises of six chapters:

Chapter One has offered the introduction of and provided an orientation to the study. The chapter is organised under the following main headings: introduction and background of the study, the rationale of the study, the statement of the problem, research questions and the objectives, the significance of the study, clarification of concepts, limitations and delimitation of the study.

Chapter Two provides a discussion of the relevant literature on IR4.0, ICT integration, education and principal leadership as a key factor in leading and supporting ICT integration. The chapter explores literature through international and local empirical studies.

Chapter Three presents theoretical framework underpinning the study. It provides a comprehensive understanding of educational leadership, particularly in the 21st century.

Chapter Four presents the research design and the methodology used in the study. It highlights the research paradigm, approach, design, sampling, data generation method, instruments, data analysis method, issues of trustworthiness and ethical considerations of the study.

Chapter Five gives a presentation of the data generated in the field, analysis and discussion of the findings.

Chapter Six offers a reflection of the entire research journey. It starts with a summary of the study. Then it gives an in-depth discussion of key learnings and conclusions. The study then concludes by giving recommendations emanating from the study and supported by literature.

1.11 Chapter summary

This chapter introduced the whole study and set out how it is oriented. This included the introduction and the background of the study, followed by the rationale and the problem statement of the study. The research questions, objectives and the significance of the study were

also presented. It presented and clarified the key concepts and gave a brief review of the literature about the topic. Lastly, it gave the limitations and the delimitations of the study. The following chapter will engage in an in-depth review of the related literature together with the theoretical framework underpinning the study.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The first chapter established a discussion on the key issues of the study. This chapter seeks to investigate the literature relevant to the study. It is made up of four sections. In the first section, I examine key concepts, these being educational leadership, principal leadership, ICT integration, and principals' leadership roles in supporting ICT integration. In developing this chapter, I will draw on both the international and local empirical studies to. This chapter also presents an intertwined relationship between the 4IR, ICT integration and educational leadership. Next, I then discuss related studies in ICT integration. Lastly, I move to the conclusion of the chapter.

2.2 What the fourth industrial revolution (IR4.0) consists of

The scope and complexity of IR4.0 have brought unprecedented effects on humankind globally. Its speed has no historical precedent (Schwab, 2016).

However, judging by empirical research studies, South African appears to remain behind in creating measures to meet the demands and standards of IR4.0. This could be the result of the historical background of the country itself. Sutherland (2019) study reveals that South Africa has a significant skills shortage, with a poor record in policy formulation and implementation across all departments. Hence, there is increasing evidence that signal problematic issues across all the departments. With no doubt, the Department of Education is not immune to such challenges.

Sutherland (2019) views IR4.0 as a rhetorical device to create particular economic and commercial futures. Both manufacturers from developed countries and the World Economic Forum (WEF) seek to persuade the nation-states to change policies that have unfavourable economic effects. Again, what seems to be creating more concerns around IR4.0 is that it

appears to favour developed countries, leaving developing countries behind. Hence the IR4.0 has received criticism for promoting the WEF.

Nevertheless, in response to the above issues, the South African government has designed a work plan aimed at taking advantage of these rapid technological changes. Furthermore, the work plan aims at redressing educational issues that could hinder school performance in the current era. A study by Sutherland (2019) highlights that the education system cannot produce sufficient graduates because schools cannot produce quality results. However, although there may be few prospects for the South African schools to meet the demands of the IR4.0, what appears to be the reality is that its changes are inevitable across the whole world. Hence, school principals need to quickly adapt to prepare learners for the use of technology, to develop critical thinking to create resilient societies and economies (Dixon, Montgomery, Horton-Baker & Farrelly, 2018). This could help in creating sustainable living in the complex and transitioning period known as the IR4.0.

2.3 Advantages and limitations of ICT integration in teaching and learning schools

ICT in education refers to the use of computer-based communication incorporated into teaching and learning activities (Ghavifekr & Rosdy, 2015). It refers to new learning settings that incorporate technology to make teaching and learning more effective. ICT has been the phenomenon of the 21st century, with its expanding innovations continuing to play a dynamic role as an ideal tool to acquire, store, circulate and apply knowledge, more than ever before (Palagolla & Wickramarachchi, 2019; Alenezi, 2019). In that sense, the integration of ICT in diverse learning organisations has increased the importance of an imperative source of knowledge production in the 21st century. Palagolla and Wickramarachchi (2019) also highlight that ICT integration has become a building block of modern society. Hence it is not surprising to find exponential growth in the use of ICT in schools. Nevertheless, it is imperative to note that there are still very low levels of ICT integration in schools and of teachers' ICT competency, particularly in developing countries (Palagolla & Wickramarachchi, 2019). This could be the result of contextual and fiscal factors that at times, are beyond the school spectrum.

Spaull and Jansen (2019) raise a concern that the curriculum and pedagogy in developing countries have had a depressing sameness about it. Therefore, ICT integration in schools appears to be the solution to such issues, where there is chalk and talk teacher-dominated lessons. However, this cannot take away the potential of ICT integration in uplifting the standard of teaching and learning.

Over the last decade, ICT has provided what Navaridas-Nalda, Clavel-San Emeterio, Fernandez-Ortiz and Arias-Oliva (2020) refer to as 'Educational Digital Resources (EDRs)' that have considerable potential for transforming education. In response to this trend, different countries have begun to allocate more funds in their education system to help schools to have technological resources. With that, ICT integration in teaching and learning has become a growing trend across the globe (Alenezi, 2019). This trend emanates from positive evidence of the impact that ICT integration has brought in teaching and learning. Palagolla and Wickramarachchi (2019) indicate that radical technological revolutions in both developed and developing countries have had major impacts on different sectors. As one of the sectors, the Department of Education has begun to design strategic plans through policies to meet ICT integration demands in teaching and learning in schools. In some schools, principals, through their administrative, adaptive, and enabling leadership skills, have begun to align digital resources to create a new learning environment in supporting the integration of ICT. This shows that ICT integration has recently gained impetus and that school principals are cognisant of the positive impacts of ICT integration in teaching and learning. Therefore, schools have an urgent task of providing technological resources. By doing so, learners will be able to use technological resources to come up with solutions to the global complexities of this industrial era. Dixon et al. (2018) point to the fact that technological tools can offer learners the capacity and transferable skills to improve social and environmental conditions. Moreover, learners will be able to use technology to take advantage of the labour market. Palagolla and Wickramarachchi (2019) report that there is enough evidence to suggest that ICT integration has the potential to impact almost all aspects of schooling activities.

Teaching is a complex process that requires teachers to draw upon all strategies, knowledge, pedagogies, and resources to make it effective (Masingila, Khatete, Maundu, Foley, Ndethiu &

Twoli, 2019). In response to such complexity in the teaching process, the education sector has made several attempts in coming up with strategies that can make teaching a much more productive process. Drawing from literature, it has become apparent that ICT integration could fast-track the teaching and learning process and ultimately improve learner performance. A study by Masingila et al. (2019) indicates that ICT integration can support student learning and eventually lead them to a deeper conceptual understanding of what they learn. ICT is considered a strategic resource in schools. Thus, the great benefits associated with the adoption of ICT in schools have made addressing it an essential element in educational change (Alenezi, 2019; Masingila et al., 2019). Hence the adoption of ICT in schools is crucial; it is thought to be central to enabling learners to become active participants in the process of teaching and learning (Alenezi, 2019).

Beers (2011) argues that tools for information access have significantly impacted how we live, work, and learn. Hence the classroom environment changes over time, as different technologies evolve frequently. Ahmad and Ghavifekr (2017) argue that, with a quick advancement of technology, particularly ICT, the nature of schools and the meaning of learning changes radically. Because of technology, learning has changed into a new setting that is completely different from what we knew. Lindsay (2016) asserts that schools are no longer places where learners learn about the world but rather the environment where learners learn with the world.

2.3.1 Technological advancements and integration in teaching and learning

In education, ICT advancement and integration also referred to as education 4.0, is fast becoming a key instrument in maintaining educational quality. Using technology-based tools and resources in imparting knowledge is receiving more attention in the digital age. Vavik and Salomon (2016) state that ICT and educational technology in schools increase the status and use of digital tools as the fifth basic skill in all subjects at all levels. IR4.0 encourages non-traditional thinking by incorporating technology into the process of teaching and learning. Ahmad, Adnan, Yusof, Kamal and Kamal (2019) highlight that the adoption of new technologies is critical to the advancement of the field of education. Unlike traditional thinking, ICT integration focuses on the use of technology to make learning faster and more productive.

According to Halili (2019), incorporating the latest technologies can raise teaching and learning effectiveness and enable learners to become more active in their learning. Such an idea can be realised through redesigning classrooms, organising a fluid and organic curriculum and utilising diverse teaching methods. According to Male (2018), the 21st Century calls for a new learning environment in school that impacts young people. All these components are integral and underpin a flourishing teaching and learning process. With the use of technology, information is readily available and learning processes become dynamic as the technology widens access to education (Halili, 2019; see also Katuli-Munyoro & Mutula, 2018).

Recent developments in education have further heightened the need for incorporating technology in learning. There have been initiatives established through the NDP vision 2030 (RSA, 2011) and other educational policies such as the White Paper 7 (2004) on e-education to support ICT integration in schools. Also, there has been an increase in the literature that speaks more about ICT integration locally and abroad. What seems to be central in policies and literature is the assimilation of new technologies into the process of teaching and learning for the betterment of learner attainment. Lindsay (2016) argues that classrooms should be designed to allow learners to learn with the world through a connected and collaborative learning approach. These new technologies include, among many, 3D printing, virtual reality, biometrics and the Internet of things. All these technological advancements can be used to make learning interesting and productive. Ahmad et al. (2019) reveals that the integration of both verbal interactions and online materials has shown great possibilities for teaching and learning.

Integrating ICT in learning helps learners to acquire more skills. These skills include, among others, problem-solving, critical thinking and innovation. Munyoro and Mutula (2018) assert that integrating ICT allows both learners and teachers to tap into better educational content. By so doing, the content becomes more relevant and applicable in our lives. Waghid, Waghid and Waghid (2019) share similar sentiments that, nowadays, learning is conceived of as an educational encounter that should respond to the demands of IR4.0. In this case, it has become part of our lives. Furthermore, the content may be useful in solving various problems. Beyond

that, integrating ICT in teaching and learning allows teachers and learners to share information. Munyoro and Mutula (2018) assert that with technological advancement in ICT, people may be able to communicate, interact and share information. Perhaps despite all the challenges that the Department of Education is faced with, it may be that ICT integration is foregrounding quality teaching and learning in the era of knowledge production.

2.3.2 The advantages of ICT integration in school

ICT integration embodies some of the best strategies that could enhance quality teaching and learning (RSA, 2019). Ultimately, ICT can be used to develop such skills as curiosity, creativity and aspirational thinking. As the White Paper on Science, Technology and Innovation stipulates, the IR4.0 and attendant rapid technological changes are creating opportunities for improved quality of life and national competitiveness. Ghavifekr and Rosdy (2015) state that ICT integration can improve learner achievement, especially in those subject areas that involve complex concepts and skills. As learners master these concepts and skills, they will then be able to perform optimally in their subjects. Alenezi (2019) asserts that ICT integration is associated with fostering a positive attitude towards technology, substantial savings in teaching time and helping learners in becoming better problem solvers. Butt, Siddiqui, Soomro and Asad (2020) share similar sentiments that ICT helps to transform teaching and learning into an active, appealing, enthusiastic and pleasant process connected to the daily life routine.

Nsolly and Charlotte (2016) reveal that the importance of technology in education has drawn the attention of educationists since the early 1920s. As new technologies emerge, new learning settings are created with the potential for more effective learning. Thus, ICT integration enhances quality teaching and learning and promotes learner participation. A study by Amin (2019) reveals that ICT have the potential to innovate, accelerate, and enrich skills that motivate learners to engage with their learning. Male (2018) highlights that educational technologies can change radically how effective learning environments are created, sustained and enhanced as we move further into the 21st Century. Such new settings allow learners to become actively involved in the teaching and learning process. Contemporary settings are now favouring

curricula that promote competency and performance (Noor-Ul-Amin, 2013). Lindsay (2016) states that learning does not happen in isolation and modern learning revolves around the use of technology to learn with others in a multitude way. Hence, educationists and scholars have developed an interest in the use of technology for educational attainment.

With the effective use of technology in the classroom, knowledge can be generated and shared easily. Learners can also acquire certain skills that may help develop knowledge in various contexts. Beers (2011) also points out that in the digital age, skills such as creativity, innovation, critical thinking and problem-solving are to be infused through the content knowledge provided in the school. In that way, learners may be able to use such skills to solve problems. Through ICT integration, learners may be able to access information from various platforms. The teacher may not be the only source of information. Therefore, incorporating technology in teaching and learning may enhance the quality of learning.

2.3.3 The implications of ICT integration for teaching and learning

Across the world, technology is an important part of schools' teaching and learning (Madida, Naidoo & Rugbeer, 2019). Hence, the use of technology in teaching and learning has transformed classrooms into a digital learning space. For such transformation to be effective, there come several aspects that need to be taken into account. The cost of ICT resources, Internet access and electricity challenges form part of the challenges that affect rural schools in particular. As we are in the information age, school communities, which includes teachers and learners, are spending an increasing amount of time and money using the Internet to acquire more knowledge (Kritzinger, 2019). With technological advancement, teaching and learning have changed drastically. There is now an active interaction between teachers and learners.

Ghavifekr and Rosdy (2015) state that ICT integration helps learners enhance their collaborative learning skills and develop transversal skills that develop social skills, problem-solving and the capacity for reflection and initiative. Reynolds and Pellegrini (2017) also believe that learners in the 21st century should be problem solvers, creative thinkers and work in collaboration with others. Learners themselves can now discover their knowledge and are

becoming more innovative and critical in all that they do. Kritzinger (2019) argues that children of today have been born into a world where technology is the new paradigm that will shape their future in ways that are currently unthinkable. Technology in teaching and learning has become much more interactive, creating new learning spaces. Ghavifekr and Rosdy (2015) argue that technology in education contributes a lot to the pedagogical aspects in which the application of ICT will lead to effective learning. Eventually, learners may develop a skill of creativity for them to be able to come up with different ideas to solve different problems. According to Gabriel and Montenegro (2019), learners have to learn and understand how different knowledge can be combined and applied to invent something in the real world.

2.4 Educational leadership

Educational leadership is a key instrument in almost all educational reforms. It is considered one of the most important requirements for school improvement. Hence, the question as to what constitutes effective educational leadership is increasingly debated in the education fraternity (Leithwood, Sun & Schumacker, 2018). As a result, more literature seems to be emerging that attempts to develop a comprehensive understanding of educational leadership; especially now when it is undergoing a significant change. A study by Dimopoulos (2020) highlights that there is an assortment of questions concerning educational leadership. Moreover, it has also become apparent that educational goals are now focused on preparing both teachers and learners for the 21st century (Fullan, 2020). Such development in educational leadership literature makes it more interesting and fascinating.

The literature on educational leadership produces very varied understandings as to what constitutes effective educational leadership. A study by Fullan (2020), for instance, highlights that an individual's effective leadership demands one to be a 'system player'. Principals should also be able to use all strategies available to improve school performance. This can be achieved through networking with other stakeholders in various levels, such as Micro, Meso and Macro Levels. In other words, the principal should be able to communicate with other stakeholders at different levels of the education system. On the one hand, some scholars view and define educational leadership as the ability to influence the flow of the school as an organisation to

achieve educational goals (Dimopoulos, 2020). On the other hand, some view it as the product of three intertwined components that include leaders' characteristics, behaviours and styles. Nevertheless, considering its significance, educational leadership has gained much attention whenever there is educational reform, particularly in the South African education system. According to Spaull and Jansen (2019), it is rare to engage in a conversation about improving South African education without focusing on leadership and management.

There is considerable evidence that educational leadership is a significant factor in learners' attainment (Leithwood, Sun & Schumacker, 2020). For success in that, school principals as instructional leaders should effectively perform their leadership roles in ensuring quality teaching and learning in schools. These roles include administrative, adaptive, and enabling leadership roles that the principal is expected to perform. It is also important to be cognisant that, as the world is becoming much more complex and non-linear, problems are becoming deeper. Therefore, in responding to such complexity, educational leadership should be improved and developed. Hence, more dynamic and interactive forms of educational leadership are required (Fullan, 2020).

2.5 Principals and their leadership roles

Palaiologou and Male (2018) highlight that the study of leadership in educational settings has been dominated by western cultures, particularly in developed countries such as the United State of America. From its origin, it has developed two near-identical models that are known as instructional or learner-centred. From this perspective, ideally, principals as educational leaders were seen as managers rather than instructional leaders. They often understood themselves as superiors who are only responsible for administrative tasks. But, as time goes by, things have changed. Mestry (2017) argues that principals' roles have expanded as they are expected to meet new demands. They now have to align their practices towards realising learner attainment. Palaiologou and Male (2018) allude that learner-centred leadership, also known as instructional leadership, focuses on developing a foundation for an effective learning process. To ensure a solid foundation for effective teaching and learning, there are fundamental roles

that principals should focus on. For instance, coordinating human resources and influencing teachers to achieve the school's primary goals and objectives form part of principals' leadership roles (Bada, Ariffin & Nordin, 2020). As the world changes, educational leadership remains a fundamental tool that can enable the schools to meet the demands of changes in the education system. In that, school principals are required to be well acquainted with their roles. Mestry (2017) highlights that many nations around the world have undertaken wide-ranging reforms of curriculum, instruction, and assessment, with the intention of better preparing principals for the educational demands of life and work in the 21st century. Such an attempt may improve principals' capacity, especially in the knowledge production era. Hence, Uhl-Bien, Marion & McKelvey (2007) suggest that a radical change in how leadership is perceived is important, because the context in which leaders operate is both radically changing and diverse. This may help schools to survive, especially with the revolutionary change of the information age where learning, innovation, and rapid production of knowledge are dynamic.

Huber, Tulowitzki and Hameyer (2017) also assert that historically speaking, educational leadership in Germany was initially in charge of administrative tasks. However, as the world changes, with a fast-paced technological advancement, this ideology has also changed. The world of principal leadership has drastically changed. New roles have emerged and became more pivotal. In that, leadership is not perceived as an individual event but a process of leading for adaptability, knowledge and learning (Uhl-Bien et al., 2007). Certainly, in the knowledge production era, where technology advancement is stimulated, it may not be possible to talk about educational reform without having to put educational leadership as a prime concern. Mestry (2017) argues that school principals must accentuate their role as instructional leaders by emphasising the best teaching practices for enhancing learner achievement. This has led to principals being faced with new demands and more complex decisions than ever before. Fullan (2018) states that educational leadership is undergoing a significant change as educational goals are fundamentally everchanging to preparing learners and teachers for the 21st century. This calls for capacity building focused on pedagogy, collaboration and leadership for effective change. Principals themselves need to be well equipped to meet the demands of the information age, where technology is advancing exponentially.

2.6 Principals' leadership roles in teaching and learning

The advent of ICT integration in schools brings new challenges to the leadership role of principals. According to Adams and Muthiah (2020), the remit of school principals requires functional competency as educational reforms emerge, with principals viewed as instructional leaders. School principals lead teaching and learning and should have the skill and required leadership strategies to make things happen. They should find new ways to deal with the current issues that face the schools that they lead. Collaboration appears to be of paramount importance if they are to lead schools in the dynamic world. They also need to have an overarching understanding of the schools they lead to make informed decisions. Adams and Muthiah (2020) state that, other than managing schools, principals in recent years need to equip themselves with the knowledge and skills to do their work effectively. The ability to solve problems, think critically and work autonomously becoming a key trait required from school principals in the IR4.0. Such traits underpin the quality leadership roles of principals and enable them to succeed in the knowledge era. Organisational leadership needs to take new forms to manage the hardships of the information age (Baltacı & Balcı, 2017).

There is a strong relationship between principal leadership and school and learner performance. International evidence and substantial research indicate that principal leadership affects school and learner performance (Adams & Muthiah, 2020). Seemingly, the use of ICT has drastically changed the classroom environment and principals have been trusted in enhancing ICT integration in teaching and learning. Many sub-Saharan African countries are progressively integrating ICT in their education systems (Nsolly & Charlotte, 2016). Principals in their respective schools have a role to play in ensuring that ICT are integrated. A study by Mingaine (2013) highlighted that principal leadership determines how ICT is implemented and whether ICT is considered a priority in the school or not. Thus, drawing from the literature, it can be argued that there is an intertwined relationship between principal leadership and effective ICT integration. Such a relationship needs to be maintained for the sustainable integration of ICT in the school.

Nevertheless, it seems to appear that some school principals are still struggling with their roles, particularly in the 21st century. Spaull and Jansen (2019) raise a concern that the research on school leadership and management is making a presumption that leadership and management is already present at school. Hence, there may be insufficient programme aimed at equipping principals for their new leadership roles. (Nasreen (2019) alludes to the world of school principals is becoming complex and ever-changing, with many issues that revolve around it. Seemingly, this may be the consequence of the failure of the department to design and develop adequate programmes that prepare and support principals to embark on their new roles.

Therefore, effective principal leadership is of fundamental importance in creating a new learning environment and aligning necessary resources for teaching and learning to take place effectively. In the knowledge production era, school principals are also expected to support new learning approaches, outcomes, and conditions that would enhance both learners and school performance (Fullan, 2020). In addition to these roles, principals are also responsible for providing adequate support to both teachers and learners; thus, ultimately enabling the school to adapt to new learning environments especially in the 21st century.

2.7 Preparing principals for ICT integration

Several attempts have been made to improve principals' skills to lead schools, particularly with ICT integration. Such efforts aimed at uplifting principals' capabilities to incorporate technology in learning for improving school performance. Bitsadze (2019) argues that new practices and job requirements may lead to principal preparedness issues that incapacitate them and prevent them from performing their roles adequately. Over the last decade, strong efforts were made to ensure that upcoming school leaders gained adequate and accredited training that prepared them for the role of school leadership (Adams, Kutty & Zabidi, 2017). Preparing principals for ICT integration, it is hoped, could realise the potential for successful ICT implementation in schools. Subsequently, successful ICT implementation may enhance the quality of teaching and learning. Adams, Kutty and Zabidi (2017) argue that the 21st century educational leaders are a necessity in improving school performance to meet the demand of the

21st Century. Drawing from this argument, one may realise that preparing principals for ICT integration is of vital significance.

Previous studies have raised debates on what makes an effective educational establishment and how learning processes are scrutinised to meet targeted outcomes. A study by Liethwood, Sun and Schumacker (2018) report that, as the world changes, there is an increasing debate on educational leadership. It has become acknowledged that principal leadership is of vital importance in achieving educational outcomes at a school. Therefore, preparing school principals for ICT training has now become an urgent issue. Palaiologou and Male (2015) argue that the study of leadership should emerge to benefit school principals. In this way, principals will begin to be flexible as they think about the future. Bush, Kiggundu and Moorosi (2011) point out that there is a growing realisation that headship is a specialist occupation that requires specific preparation. Chances are, during the preparatory stage, they may develop the ability to become innovative and put things differently for the betterment of school performance.

Preparing principals for ICT integration is of central importance in that it may help them lead the process effectively. Naidoo (2019) supports the suggestion by the Minister of Basic Education, Angie Motshekga, that principals should undergo a competency test for their appointment. This may help the department to appoint principals based on their merit. In addition to this, principals should receive continuous professional development for them to lead schools in the digital age. Support and intervention programmes to empower principals to lead and manage schools effectively are of paramount importance (Mestry, 2017; see also Naidoo, 2019).

A clear vision and strategic plans for ICT integration are central to ensuring successful ICT implementation in schools. Principals should be trained in how to utilise and prioritise ICT in their schools. According to Fullan and Leithwood (2012), principals as instructional leaders should be able to align resources and priorities. In this case, teaching and learning are the priority and ICT are resources that they can utilise to make learning more effective. Otherwise, ICT integration may not be effective due to the failure to align these two.

2.8 What ICT integration requires from principals

Identifying factors that promote and hinder the effective implementation of ICT integration is useful in developing a strategic plan to guide the successful integration of ICT in teaching and learning processes (Alenezi, 2019). Such a strategy can be productive and proactive, in the sense that it may allow the principal to have a variety of systems that may help facilitate it. In that way, the principal may be able to respond to the new demands, challenges and even contingencies that may arise along the way. It is essential to take into account that the school organisation and principal leadership are gradually changing as a result of ICT integration (Qureshi, 2013). Schools require more support and coordination from principals to integrate ICT for the teaching and learning process. Considering the nature of the world in which we live, which is influenced by globalisation, this appears to be a mammoth task for principals. A study by Qureshi (2013) points out that achieving effective ICT integration in the current era is a complex undertaking. Therefore, creating a space for interaction of stakeholders involved in the school may help the principal accumulate more knowledge and skills to strategically lead and support ICT integration effectively. The rapid production of knowledge and innovation is critical to organisational survival (Mäkinen, 2018).

Principals leadership for the 21st century is at the heart of our understanding of schools in the modern world. Therefore, understanding leadership in the 21st century may enable one to comprehensively understand how schools should be led in the era of knowledge production. From an overarching understanding of school in a contemporary period, school principals can develop the skills to create an atmosphere that complements the new learning settings that are best suitable for its use. The rapid evolution of technology has necessitated a change of teaching approach to incorporate technology (Yuen, Law & Wong, 2003). As the approaches to teaching using ICT change, the classrooms should also change. This means that being a principal in the 21st century comes with a lot of demands, though potentially this is also exhilarating. The principal has to bring into balance all parts of the school that are involved in the process of automating and reengineering change for effective ICT implementation.

As the literature indicates, leadership that understands its role in the new global economy has become a central aspect for enhancing organisations. Without a doubt, schools are certainly not immune to this. Nasreen (2019) argues that, as the world changes, school principals' responsibilities are becoming multidimensional as they have to perform multiple roles for school operations. Principals need to understand the dynamics that may influence schools. They should also be able to deal with these dynamics in a very strategic manner to overcome whatever backlogs that these dynamics may result in. Being a principal in this day and age comes with a mammoth task. Phonsa et al. (2019) believe that principals must develop characteristics and skills to cope and design an appropriate learning environment and to inspire teachers and learners to learn, invent, and create knowledge. The two underlying factors for the effectiveness of the above-mentioned principal roles are collaboration and consultation. Principals in the information age should always be willing to create platforms where the teachers as subordinates will discuss issues and ideas that affect their daily practices.

2.9 Principals' leadership roles in supporting ICT integration

There are three fundamental roles of principals as a leader of technology: role model, instructional leaders, and visionary (Carr, 2011). These roles appear to emphasise that principals should be knowledgeable enough about the use of technology. Hence, principals should have technological expertise. A study by Grosmire and Grady (2007) suggests that principals should establish a context for ICT integration and have an overarching understanding of how ICT can be used for restructuring learning that will enhance learner performance. It is also very important to note that the current generation has developed a close relationship with their virtual lives. Therefore, they may not be willing to leave their virtual lives at the school gate once they have developed that bond. It is, therefore, the responsibility of the principal to facilitate and support ICT integration into teaching and learning.

School principals are known to play critical roles in supporting ICT integration. Bada, Ariffin and Nordin (2020) argue that studies have mentioned that principals' leadership roles have become more complex and demanding, making instructional leadership the central role of

school principals. They perform multiple leadership roles in supporting ICT integration. These roles include, amongst many, developing a vision and administrative plans for the use of ICT in schools, establishing strategies to promote teachers' and learners' use of technology in teaching and learning, improving teachers' technological skills and facilitating an atmosphere conducive for the use of ICT (Apsorn, Sisan & Tungkunanan, 2019). For the above-mentioned leadership roles, principals are regarded as key driving factors in realising them. As such, school principals need to have a deep understanding of ICT integration. School principals need to capacitate themselves with the knowledge of modern technologies to foster a school culture of exploring new teaching and learning techniques through ICT integration. To fulfil these roles, principals should exert leadership power in using ICT for effective teaching and learning.

Ahmad and Ghavifekr (2017) argue that, with the quick advancement of technology, particularly ICT, the nature of schools and the meaning of learning change radically. This radical change has an impact on principals' leadership roles in leading the instructional core. According to Nasreen (2019), the principal belongs to a field where continuous development is important to make future generations successful. Therefore, the principal should have sufficient information that pertains to the school he leads. Maifala (2017) also asserts that principals should be well-informed about all the educational and environmental changes as they relate to schools. Thus, the role of the principal seems to surpass all other roles in the school as a learning organisation.

Most recent studies in the field of educational leadership have been emphatic that principals play a significant role in ICT integration. By being instructional leaders, principals are to ensure the incorporation of technology in the teaching and learning process. According to Mingaine (2013), principals should lead ICT integration and should also encourage the school community to be actively involved in its implementation process. This role may be complex, and therefore, principals should have skills in how to make it possible. Adams and Muthiah (2019) emphasise that principals need to equip themselves with the knowledge and skills to do their jobs effectively. However, until recently, there has been no reliable evidence that reassures us of principals' capability to lead ICT integration in schools. Mestry (2017) contends that school

principals are struggling to perform their role partly because they are inadequately trained. It seems evident here that principals lack quality leadership skills to do their work, including leading ICT integration. Drawing from literature, school leaders should have clear visions and strategic plans for implementing ICT in their schools (Maifala, 2017; Mingaine, 2013).

Principals should demonstrate a skill to lead ICT integration to support learners learning in a world that is fast changing. This can be realised through roles that principals should perform. Some of these roles include, amongst many, building suitable infrastructure, organising necessary resources and supporting the school community for implementation. According to the Government Gazette on the South African Standard for Principals, principals' core purpose is to manage the quality of teaching and learning and ensure that every learner is given full support (RSA, 2015). In this way, the instructional core can be secured in the school as a learning organisation. The policy states that principals should also place ICT integration as a prime concern if they are to realise quality teaching and learning in schools. However, what seems to be evident from the literature is that principals are failing to perform their roles due to contextual constraints. Maifala (2017) argues that the contexts and circumstances to which schools are exposed seem to have much influence on the ability of school principals to perform their roles. Having said all that, Nasreen (2019) argues that principals should be dynamic and energetic in continually learning more about their leadership and management roles. Without acquiring relevant skills, perhaps principals may continue to struggle to perform their roles in this day and age. The study now turns to the specific areas that principals need to address for their leadership in the area of ICT integration to become effective.

2.9.1 Strategies for effective ICT integration

Integrating technology into learning systems is an ongoing process and it is vital in shaping all aspects of learning. Principals, as technology leaders are to provide adequate support for its effectiveness. This support may contribute considerably to the implementation of ICT integration. For an effective ICT integration strategy, there should be a development of an explicit ICT school policy plan that stresses a shared vision about the role of ICT in education

(Tondeur, Coopert & Newhouset, 2010). This appears to be a dynamic process that involves interacting factors. Thus, as instructional and technology leaders, principals need to develop strategies on how best technology can be incorporated in teaching and learning. To achieve this strategy, principals should acquire more skills and knowledge. Defining the mission of the school is an essential element in a strategy for underpinning the effective implementation of ICT integration and thus improving learner performance (Bada, Ariffin & Nordin, 2020). While on that note, it is also imperative for the school principal to manage and lead instructional programmes within the school. The above-mentioned strategies can help the principal to influence the school outcomes and learners' academic performance.

Developing a positive school learning climate is a further element in a strategy that the school principal can develop. Members of the school community will enjoy working in an environment where the conditions allow them to perform to the best of their abilities. Bada, Ariffin and Nordin (2020) highlight that a principal's instructional leadership strategies are significantly associated with teachers' job satisfaction and self-efficacy. What seems to be of vital importance for principals is to facilitate a digital transformation through their capacity to foster a solid terrain that allows the school communities to see the integration of ICT as important as possible (Navaridas-Nalda et al., 2020). Through that solid terrain, teachers may become eager to use ICT in their pedagogical strategies as an opportunity to improve outcomes.

2.9.2 Providing the necessary resources

ICT have also been the most used tools during the spread of the Coronavirus pandemic. Countries such as China came up with "School's Out, But Class's On" as a measure to mitigate the spread of the virus. Cheng (2020) reports that the Chinese Ministry of Education has postponed learning programmes and suggested home-schooling via the Internet. Other countries, including South African, followed the same pattern with an attempt to ensure an uninterrupted learning program. However, many issues escalated as some of the schools did not have the necessary measures. Cheng (2020) reveals that the "School's Out, But Class's On" made online teaching the main teaching method. This could not be realised in the South African

context because transforming conversational teaching resources into digital resources can be a long process.

The accomplishment of any school programme and attainment of any educational goal, depending on the principal in charge. Hence the provision, evaluation and supervision of the material resources are part of the principal roles (Bada, Ariffin & Nordin, 2020). Inequitable provision of basic resources in schools continues to be a reality across the South African schooling system. This may exacerbate the inequalities among schools and limit opportunities to the majority of the previously marginalised masses (Spaull & Jansen, 2019). The principal as an instructional leader of the school must make it a point that resources are readily available for teaching and learning to take place. This may not be an easy task to perform but it is of fundamental importance. Etor, Mbon and Ekanem (2020) suggest that for effective use of ICT in teaching and learning in schools, there should be an adequate supply of ICT facilities for both teachers and learners. Adequate resources may save time and eliminate the level of conflict within the school. In other words, there should be prudent management of ICT by the school principal. Hence, crafting an ICT policy can help the principal in managing ICT resources. The principal has to monitor ICT and ensure that all teachers and learners have access to them for use as the need arises (Etor et al., 2020).

2.9.3 Providing necessary support

The principal is expected to guide and inspire teachers and guide curriculum development (Bada et al., 2020). Failure to do so creates a high possibility for the school to become dysfunctional, which may result in ineffective teaching and learning. Above that, dysfunctional school leadership may result in poor management of teachers (Spaull & Jansen, 2019). Consequently, as a human resource, teachers may not be able to work towards realising the school's objectives, one of which is learner performance. A study by Olsen and Huang (2019) highlights that there is a strong relationship between principal support and teacher performance which has been consistently associated with teacher job satisfaction. In simple terms, if teachers are given adequate support, it becomes easier for them to perform optimally. Arokiasamy,

Abdullah and Ismail (2014) support this assertion by stating that the principal should build the teachers' confidence by providing necessary training and encouraging team building.

Changes in the educational sector have placed a range of expectations on principals. According to Mestry (2017), these expectations have moved from the demands of principal management and control to the demands on them to foster professional development among educators. In this way, the principal may be able to give support to teachers and maintain a sustainable working environment that allows effective teaching and learning. Similarly, with the case of ICT integration, principals should play an essential role in giving support to teachers as well. Advocates of ICT integration in schools posit that principals' leadership can impact positively on the training of teachers, the provision of adequate technical support, and the availability of and proper use of ICT, as well as accessibility to ICT infrastructure (DBE, 2004; RSA, 2016; Schwab, 2018). It is crucial to note that the changes experienced by principals and teachers over the past decade remain unprecedented. However, what is of most importance is the support that principals give to teachers as people who are directly involved in the teaching and learning process.

A study by Butt et al. (2020) highlights that effective ICT integration in the school depends on teacher training. However, the responsibility does not lie only with the principal. Nasreen (2019) argues that both principals and teachers are important for creating a conducive learning environment in the school. This means that there should be a well-balanced developmental programme that will capacitate both teachers and principals to achieve an effective ICT integration in the school. In addition, a healthy relationship among them is of vital importance as it may result in a sustainable and effective learning experience for a child. Having said that, perhaps one may argue that a considerable amount of literature has been published on educational leadership. However, what seems to be raising a concern is the selection of educational leaders. For instance, a study by Nasreen (2019) reveals that some principals expressed their concern that seniority-based promotion does not give evidence that the person selected is competent for the principals' position. Nevertheless, the collaboration between

principals and teachers can be an underpinning strategy for creating a conducive work environment.

2.9.4 Constructive feedback for teachers

Constructive feedback is a fundamental property of establishing a desirable work environment. In the educational setting, feedback goes a long way for everyone who is part of the schooling community. From learners to the teachers and up to the principal, feedback is essential. In all the activities in which principals and teachers engage, constructive feedback is important. For example, principals do classroom visits at random intervals. After each class visit, a constructive discussion may contribute to the teacher's performance. The current changes in the world of the information age demand that principals execute the right skills to support the change of conditions that will encourage teachers as subordinates to perform (Phonsa, Sroinam & Phongphinyo, 2019).

2.9.5 Monitoring, supervising and evaluating teacher performance

The principal is supposed to monitor, supervise, and evaluate teachers to ensure that their work aligns with the school's mission and vision. One of the goals of a five-year strategic plan is developing a knowledge testing system per subject, evaluating progress, and monitoring implementation progress (DBE, 2015). Monitoring and supervising teachers in the schooling environment serves as a guiding strategy for teachers to work according to the school's predetermined goals. Presumably, if teachers are well monitored, it may be easier for the principal to see if they go off track. Teachers also may be able to reflect and become more cautious in their practices. It may also regulate and alter their behaviour (Butt, Siddiqui, Soomro and Asad, 2020). As for ICT integration, in particular, principals' roles, as mentioned above, may contribute to a sustainable and effective ICT integration, thus ensuring that it fully supports the learning process. It may also help the principal for accountability purposes. In other words, there will be no grey areas where the principal is unaware of how and why things are happening in the school. As Fullan (2018) states, accountability increases professional expertise.

2.9.6 Continuous and effective communication with teachers

In the changing world situation, a principals' role is leading schools with a clear and strategic vision to ultimately achieve goals, which primarily is to improve teaching and learning. He must maintain a sustainable relationship with teachers as his followers. By so doing, teachers may develop a sense of ownership and begin to work towards achieving the objectives of the school. Based on the acknowledgement of the significant contribution of ICT in enhancing the teaching and learning process, the principal needs to communicate a clear vision that stresses the importance of ICT integration (Aslan & Zhu, 2018). The work of the principal can be easier if the vision is well articulated to the staff. Subsequently, teachers may be willing to utilise technology in almost all their teaching practices, as they gradually move away from computer anxiety. So, the principal should make sure that teachers comprehensively understand the potential of ICT in their daily teaching practices and the learner attainment. Adams and Muthiah (2020) show a strong link between principal leadership and teacher efficacy that may have a major contribution in learner performance. However, communication is the underlying factor for the implementation of ICT integration. Lindsay (2016) argues that no principal can take credit for what has been accomplished and the project could not come into being without the participation of teachers and other stakeholders involved; such participation requires ongoing communication.

2.9.7 Teacher technological self-efficacy

One of the underlying goals for principals to achieve effective ICT integration is teacher technological efficacy. Lindsay (2016) report that pedagogical capacity and strategies continue to change as technology becomes more pervasive in creating new knowledge and ideas for teaching and learning. It is, for this reason, there is an increasing need for teachers' technological development. With that, teachers will be able to develop confidence in their teaching practices, especially in integrating ICT. This is what scholars refer to as self-efficacy. According to Butt, Siddiqui, Soomro and Asad (2020), self-efficacy refers to an individual's confidence and belief in one's ability to perform a given task successfully. Furthermore, Ahmad and Ghavifekr (2014) highlight that what is coming is uncertain, yet what is certain is that there

will be more change. Therefore, change cannot be a spontaneous event. Hence, the school personnel, particularly teachers, should recognise that they are in a constant flux of change. In collaboration with the Department of Education, this calls for principals to organise professional development programmes that will help teachers meet the demands of the new learning settings. Moreover, when principals work closely with teachers, teachers will be able to work productively. Olsen and Huang (2019) corroborate this assertion by stating that self-efficacy can be developed through collaboration and cooperation between the principal and teachers.

2.10 South African educational policies

South African education recognises the change that comes with IR4.0 around the world. This change has affected the education system in all spheres. Shahroom and Hussin (2018) share the same sentiment that IR4.0 has changed the landscape of educational innovation and consequently delivered a new model of education for the future. In responding to this change, the education system in South Africa has drafted policies that will give guidance on how a school should respond to the demands of the IR4.0. These policies include the Government Gazette, White Paper 7 of 2004 on e-learning (RSA, 2004), Policy on South African Standard for Principals (RSA, 2016) aa well as the most recent policy document specifically dealing with Science and Technology, White Paper on Science, Technology and Innovation (DBE, 2019). Nevertheless, what seems to be less explored is the implementation of these policies in ensuring that whatever that in stipulated in them is in practice. In this section policies that are meant to ascertain whether the 21st Century that came with IR4.0 is acknowledged in their specifications of the principals' leadership roles are cross-examined.

2.10.1 Government Gazette, White Paper 7 (2004) on e-Education

Teaching and learning are recognised as the core business of the school. In the new global economy, the transformation of teaching and learning settings has become a central issue for school improvement. Several attempts on improving school performance and learner attainment by both the Department of Education and the government have begun to enhance

quality education across the country. The government has been quick to grab the opportunity presented by the practical benefits of ICT to support teaching and learning in the 21st century (RSA, 2004). The Government Gazette White Paper 7 of 2004, on e-learning, is one of the developed policies to improve the quality of education in South Africa by integrating ICT in teaching and learning. This policy envisages that the use of ICT could overcome barriers of social and geographical isolation, increase access to information and education, and enable the poor to participate in making decisions that impact their lives. In the history of educational development, ICT integration has been thought of as a key factor in school performance, and this is recognised in this policy statement.

2.10.2 Policy on the South African Standard for Principals

As demonstrated above, principals' leadership is central to the schooling establishment. Nasreen (2019) reports that principals' leadership ranks high in the list of priorities for school reforms. The Minister of Basic Education, Angie Motshekga, thus, through the consultation of the Council of Education Ministers, published a policy on the South African Standard for Principals (RSA, 2016). The policy is intended to enhance the professional image and the competencies of principals. The intention is to capacitate principals to execute the leadership tasks needed in the current period, what the department regards as important in the role of the 21st Century principal. It views the principal leadership as extending well beyond the administrative roles. In leading teaching and learning in the school, principals are expected to perform five-dimensional tasks of leadership. These tasks include shaping the vision, direction and development of the school and creating conditions that will prepare learners for the future to mention a few. This policy lays a foundation and the guidelines of what is expected from principals as they lead schools in South Africa. What appears to be of vital significance is that as the world of knowledge production changes, with the expanding demands of principals, they also have to be strategic, innovative and critical in their leadership practices. As the policy stipulates, principals need to put in place plans that support improved academic achievement. Drawing from this view of principals' leadership, it can be argued that this policy is progressive

and envisions how principals in the 21st century will be able to lead the school to meet the demands of the IR4.0.

Under this role, the principal is expected, among other roles, to create a school organisation in which all staff members understand that every learner must be supported. This role involves leading the school by creating new conditions that will incorporate technology for effective teaching and learning. The expansion of ICT is driving significant changes in many aspects of human endeavour throughout the world (White Paper 7 on e-learning, 2004). As such, the principals' leadership roles in supporting ICT integration in teaching and learning are in line with the DBE's vision of a 21st century-oriented principal. The principal is further expected to be a strategic leader who uses dynamic planning to promote collaboration among those involved. This strategy could enhance both the school and the learners' academic performance. In this role, the principal is also expected to interact with teachers, parents, and communities to support, plan and make collaborative decisions about the school. This role is considered important in the 21st century since bringing the different stakeholders together has been supported by research as one of the significant ways in which schools can thrive.

2.10.3 National Policy for the Provision and Management of Learning and Teacher Support Material (LTSM)

Despite the belief that people have on the benefits of ICT in enhancing teaching and learning, schools suffer from several major drawbacks. As we are in the IR4.0, schools seem to be continually struggling with the availability of resources including the ones for incorporating technology in learning (ICT). Spaull and Jansen (2019) raise a concern that the inequitable provision of basic resources in schools continues to be a reality across the South African schooling system. This issue seems to perpetuate the imbalances that have been experienced by the majority of the rural and township schools for a long time. It continues to widen the gap between poorly resourced schools and those who were regarded as model C schools. However, the Department of Basic Education has tried to attend to the issue. Some of the factors that hinder the Department from overcoming the issue of resources may be fiscal. Above that, issues of theft appear to be escalating in the communities where schools are located. Nevertheless, the

vision of the policy is to make that learners and teachers have access to quality learning and teaching materials to meet the requirements of the curriculum. The learner/teacher support material is the foundation of the process of teaching and learning. It is therefore essential that resources are available for the process to be productive. One of the objectives of this policy document is to establish the conditions to support comprehensive access to all Core LTSM for learners and teachers in all South African public schools (DBE, 2015). In all that is stipulated in the policy, the principal remains central, in that he/she has to make sure that the policy is implemented.

2.10.4 White Paper on Science, Technology and Innovation

A large and growing body of literature has proven that technology, science and innovation are much more stimulated in the 21st century. Technology is advancing exponentially, placing the schools and principals under more pressure. Such pressure has led the Department to begin piloting some schools in trying to infuse technological programmes into the learning systems. The department started to realise that the schooling system needs an STI policy following the White Paper 7 of 2004 on e-learning. This policy document is entrusted with improving the educational outcomes by equipping learners with the thinking skills they will need in a technologically advanced world. Technology is believed to fast-track learner performance and facilitate effective teaching.

2.10.5 Professional Development Framework for Digital Learning

This policy document focuses on the teaching frame for digital learning, where teachers explore and develop new pedagogical approaches for new knowledge. By doing so, they use ICT to open more opportunities for learners. It is, therefore essential for the school principal to give adequate support that teachers might need. It addresses the potential that ICT integration has the power to enhance the teaching and learning process by allowing a space for interaction between teachers and learners. The policy stipulates that how digital tools and resources are used is a key factor in whether integration adds value to the learning process, student engagement and the achievement of curriculum objectives (DBE, 2014). The emphasis here is

on digital learning that is learner-centred and transformative, in the sense that it allows learners to utilise digital tools to the best of their abilities. Such an idea can be realised if the school is structured such that it allows learners to fully exploit ICT for their learning. Therefore, the teaching approaches should allow learners to explore digital tools that offer to learn. In that way, learners will be open opportunities for themselves.

2.10.6 Five-Year Strategic Plan 2015

In maintaining the quality of education in South Africa, the Department of Basic Education had designed a five-year strategic plan. The plan aims at opening access for people to lifelong learning opportunities. This is one of the plans that give support to the new learning settings that are expected in schools to meet the learners' needs. This plan acknowledges that backlogs in South African schools' infrastructure remain a big challenge and that the Department aims to construct new ones and maintain existing ones (DBE, 2015). By doing so, it will be then easier for school principals to use those infrastructures for ICT integration. However, in reality, this goal remains elusive as many schools continued to suffer, even after the plan was designed. Above that, the greatest concern of the five-year strategic plan is the provision of ICT infrastructure to ensure that schools conform to the developments of the era of advanced technology. In that, the Department of Basic Education will ensure that teacher resource centres in all provinces will have ICT programmes for teachers' professional development, exposing them to the use of technology in the classroom.

2.11 Chapter summary

This chapter reviewed the literature on principals' leadership roles and experiences in supporting ICT integration with a focus on secondary school principals. Literature was reviewed by presenting international and local empirical studies on IR4.0, ICT integration and educational leadership. This led into a discussion on the roles played by secondary school principals in leading and supporting ICT integration in teaching and learning. Issues such as the provision of technological resources, monitoring and support were highlighted as of primary importance. The literature on the leadership strategies in leading and implementing

ICT integration for effective teaching and learning was then discussed. Finally, the chapter concluded with policies foregrounding the implementation of ICT in schools. The next chapter presents the theoretical framework used in the study.

CHAPTER 3

THEORETICAL FRAMEWORK

3.1 Introduction

The previous chapter reviewed the literature on educational leadership, principals' leadership roles, ICT integration for teaching and learning and policies on principal leadership. This study draws on Complexity Leadership Theory (CLT), which is addressed within this chapter. As a framework, it is valuable as it provides 21st century principals with an overarching insight of what leadership roles will best suit the knowledge production era. CLT has particular relevance in that it provides us an understanding of the nature of leadership appropriate to complex times and it also shapes leadership practices for times such as these. Moreover, it makes principals cognisant that leadership of the information era may not be the responsibility of one individual only. This means that leadership in the information era involves all stakeholders.

3.2 Complexity leadership theory

Schools in the 21st century face the pressure to be innovative and respond with creativity to an environment where change and uncertainty create new risks (Mendes, Gomes, MarquesQuinterio, Lind & Curral, 2016). Such pressure emanates from the ever-changing world with a fast-paced technological advancement. Schools as learning organisations are believed to be the institutions of such change. As a result, schools are becoming dynamic systems where, ideally, managers introduce flexible processes that promote innovation across the learning environment (Mendes et al., 2016). In the new global economy, principal leadership has become a central issue for improvement. Thus, principal leadership has received more attention as it is believed to have the potential to enable the school through the creation of interactive platforms for new ideas and conditions. Lichtenstein, Uhl-Bien, Marion, Seers and Orton (2006) point out that the limitations of traditional views of leadership are becoming apparent in contexts of greater complexity. Therefore, leadership is becoming a dynamic interactive process. In that way, leadership becomes a product of an interactive space where

more ideas are created for new conditions that allow schools' adaptability. Such an interactive space can be realised through working in collaboration. While on this view, Uhl-Bien et al. (2007) believe that radical change in how leadership is perceived is significant, given that the context of leadership is changing fast and become more uncertain.

Complexity leadership theory is helpful in addressing the current challenges of leadership. It sets out a comprehensive way of identifying behaviour by leaders that enables creativity, learning, and adaptability in challenging situations (Uhl-Bien, Marion & McKelvey, 2007; Mäkinen, 2018). This theory explores how leadership can facilitate such processes in organisations, enabling people to work collaboratively and forming new sets of relationships. CLT is relevant to the study; it provides the perspective for assessing whether principals can develop new strategies to create a space for teachers to share their ideas on integrating ICT into teaching and learning. From the complexity leadership perspective, in a schooling entity, the principals are expected to accelerate systems and conditions through collaborative actions to benefit the school. This strategy may enable the principal to bring together ideas, knowledge, people, resources, and technology, building synergies that are responsive to the new situation (Mäkinen, 2018). Such an ideology is more relevant and applicable in the information age, where knowledge has become a commodity. It may also help the school principal to have a large variety of ideas in dealing with day-to-day challenges, as teachers will constantly have their views on whatever is taking place in the school. Leadership outcomes are based on the complex interactions of the people involved in the organisations (Uhl-Bien et al., 2006). Consequently, effective leadership may be seen as a product of interdependency. Seemingly, drawing from what Uhl-Bien (2006) has said, working together as a team is the primary ingredient of a school's success. In that leadership is not perceived as a product of an individual's effort. Mäkinen (2018) points out that the strengths of complexity leadership theory are that it fully takes into account traditional, bureaucratic forms of leadership. By revealing how leaders can shift their stance, they can address both administrative and adaptive forces.

3.2.1 Complexity adaptive systems

Studies of educational leadership show that leaders are subject to both external and internal pressures. These develop as both constraints and opportunities are engaged with (Mäkinen, 2018). As leaders fail to interact with the followers, dysfunction is likely to occur. For instance, in the school, if the principal is failing to communicate with stakeholders involved, it may result in resistance that may exacerbate conditions. Instead, there should a platform that allows those involved to bring in their own or others' new ideas. In that platform, new knowledge and innovations can be created. People who may be diverse in backgrounds learn to work collaboratively and form effective grouping with common goals (Mäkinen, 2018; Ochara, 2017).

Uhl-Bien et al. (2007, p. 305) define a complex adaptive system (CAS) as a complex interplay from which a collective power for action and change emerges when different agents interact in networks in ways that produce new behavioural patterns or new modes of operating. What appears to be central in the complex adaptive system is the ability to work together towards achieving a common goal. It emphasises the creation of harmony that allows everyone involved to pull in the same direction. Thus, leadership is understood as an emergent process rather than a single person. According to Uhl-Bien et al. (2007), a CAS emerges naturally in social locations; it is a process that helps people to address new challenges and resolve them through innovation and learning.

3.2.3 Administrative leadership

Many scholars hold the view that administrative leadership is bureaucratic and hierarchical oriented. For example, Uhl-Bien et al. (2007) and Meneds et al. (2016) highlight that viewing leadership as a bound by ideas of hierarchy and control is no longer relevant. Its main focus is on the performance of the administrative task. Functions are embedded in authority and status (Marques-Quinterio, Lind & Curral, 2016). With this leadership function, the principals see themselves as superior, and see their task as performing the managerial roles. These roles include, amongst the many, the provision of resources and the assignment of duties.

Administrative leadership is defined as 'the actions of individuals and groups in formal managerial roles who plan and coordinate organisational activities' (Uhl-Bien et al., 2007, p. 305). Drawing on this view, it may be argued that administrative leadership addresses concerns and processes that are not effective in the current environment of fluidity.

3.2.3 Adaptive leadership

Adaptive leadership refers to the ways in which actors use flexibility and innovation in responding to systems of complexity and the resultant conflICT (Uhl-Bien et al., 2006; Mendes et al., 2016). In terms of this theory, more conflict may arise as it allows the interaction of all those involved in the organisation. In those interactions, more ideas are generated. Adaptive leadership helps the principal to create a platform where teachers, for instance, may be able to share their ideas. In that way, new ideas may be developed. Adaptive leadership can also be defined as 'an interactive event in which knowledge, action preferences, and behaviours change, thereby provoking an organisation to become more adaptive' (Uhl-Bien et al., 2006, p. 306). From those interactions, new ideas are created and, in the case of this study, the school community may find new ways of drawing on the resources provided through ICT. It is important to note that this kind of leadership results from conflICT and tensions produced by the introduction of new ideas, new knowledge and new learning that do not connect well with the established ways of operation (Mäkinen, 2018). It is not based on hierarchies of leadership but is rather a creative response to the challenges of the present. Mendes et al. (2016) believe that focusing attention primarily on the leader in such situations provides a limited view of what is developing in the new interactions.

3.2.4 Developing new identities in the process of adaptive leadership

As people interact together, they begin to develop a sense of belonging and define who they are and what they are doing through their interactions. This sense of belonging may benefit the school as a learning organisation. The school is most likely to achieve good results if all the teachers are given opportunities for full participation. Bäcklander (2018) believes that the primary outcomes that mark a team as best performing are delivery and continuous

improvement. With regards to ICT integration, these are the factors that principals should observe to ensure that ICT are integrated into teaching and learning in ways that are truly effective. Moreover, perhaps working in collegiality may help improve school performance. Therefore, as ICT integration seems to be elusive to most schools, particularly the rural and township schools, what appears to be the most important thing to do is allowing all stakeholders to participate. Creating space for the stakeholders to make greater contributions may also help the school face the new challenges of a rapidly changing world. In other words, with complexity adaptive leadership, the objective of the school can never depend on the efforts of one person. Instead, people should work together if they are to achieve more. In terms of CLT, all stakeholders need to recognise the significance of their own diverse roles in the creative and collaborative response to the new challenges; this builds a new identity for the organisation (Mäkinen, 2018).

3.2.5 Enabling leadership

According to Uhl-Bien et al. (2006), enabling leadership theory addresses how leaders can create the conditions for new, adaptive forms of leadership can emerge, given that existing administrative leadership still persists while there is pressure for change. This theory of leadership focuses on how one creates appropriate conditions for enabling stakeholders to develop creative and innovative responses. Bäcklander (2018) believes that enabling leadership is a key balancing force in complexity leadership theory. Principals may use this leadership to facilitate the flow of knowledge to make those who are involved (teachers) understand the intended objectives clearly. Therefore, it is the duty of the principal to create a conducive condition that will allow a teacher to perform effectively while aligning them with the vision of the school. In that way, teachers will feel supported as the environment allows them to work effectively without experiencing challenges.

With enabling leadership, the school can achieve more, since the environment allows them to perform to the best of their abilities. Baltacı and Balcı (2017) define enabling leadership theory as an action-centred kind of leadership that involves decision-making mechanisms employed in crises. In most cases, the principal clarifies and reviews principles, observing change,

resolving conflict, and encouraging constructive interactions. In that way, the school may be able to deal with the current crises faced. By crises, in this case, I am referring to the rapid changes that emanate from technological advancement. Enabling leadership requires adequate resources and skills for it to be effective. It may be impossible for the principal to create a conducive learning environment without having the necessary resources. While creating new learning classrooms for ICT integration, the principal may require the skill of influencing teachers to see the need for ICT in their teaching practices. Marques et al. (2016) point out that the enabling function of the leader means that he must manage the complex and often conflictual relationships between hierarchical and adaptive roles. The principals can do this by having the skill of developing collaborative approaches with teachers. In this process, there should be a platform where all those who are involved will have an opportunity to let their voices be heard. At the time, as a technology leader, he has to model ICT integration.

3.2.6 Managing the entanglement

As the world changes, leadership is increasingly recognised as a serious, worldwide concern. The main concern is about the leadership model that may fully capture the leadership dynamics in today's complex environment (Murphy, Rhodes, Meek & Denyer, 2017). In the information age, where a large variety of both internal and external factors present distinctive challenges, there is an increasing demand for flexible and dynamic leadership. Murphy (2017) believes that leadership in the 21st century is embedded in a complex interplay. Drawing from this point, it appears that principals in the knowledge era should be able to create a balance between administrative functions and an emergent interaction of adaptive systems. From this juncture, school principals need to be in possession of a set of innovative qualities for leadership practices. Those qualities will enable them to create a positive atmosphere for their schools to produce good results.

While administrative leadership functions such as planning, and resourcing seem to be fundamental, adaptive and enabling roles are increasingly gaining impetus. Creating a space for sharing ideas and enabling conditions for those ideas to be implemented can play an integral

role in imbuing the school community (Uhl-bien et al., 2007; Murphy, 2017) with a sense of confidence and hope. Such an idea is important if stimulating novelty for more ideas that can enhance school performance. Above that, enabling leadership is crucial in managing tensions emanating from the need for stability to coordinate, structure and control school activities. With the trend of ICT integration in schools, adaptive and enabling leadership is more relevant from the initiation to the implementation stage of the process. As this seems to be a long process, principals need to have the skills to balance all three leadership functions while ensuring that the goals of effective ICT integration are realised.

With this study, CLT is relevant as principals perform multiple roles in trying to enable schools to adapt to the demands of the information age. Male (2018) believes that introducing ICT can bring dramatic change to how we imagine, plan, and maintain effective learning environments in the present context. Therefore, principals should have clear visions and strategic plans for implementing ICT in their schools (Maifala, 2017; Mingaine, 2013). Such leadership roles demand more complex qualities of leadership. According to Baltaci and Balci (2017), with complexity leadership theory, the leader focuses mainly on finding out and developing strategies and behaviours that foster continuous learning, resonating with new conditions and creativity in organisations with a dynamic, collaborative management mentality. Moreover, principals should be able to facilitate conditions favourable for performance. Principals should also be willing to change and work collaboratively with all stakeholders involved in the school. Consequently, principals may be able to mobilise the school community for effective ICT integration. Uhl-Bien, Marison, Seers and Orton (2006) indicate that as complex adaptive needs of schools emerge, leadership must also be in a process of transition.

3.3 Chapter summary

This chapter has set out the theoretical framework underpinning this research study. In this chapter, CLT has helped develop a comprehensive understanding of the principals' role in the 21st century. As was set out in chapter 3, the pressures on school leadership require that principals both adapt to change and manage change in their schools, to meet the demands of

the information age. Moreover, principals in the 21st century need to create platforms that promote interactions that develop the ideas that may enable schools to adapt to the new learning settings. Furthermore, because of the technological advancement in the 21st century in schools, principals should exert their leadership skills in leading ICT integration for effective teaching and learning. Also, principals should, therefore, give support to both teachers and learners. They can perform this task by using their leadership strategies and working closely with stakeholders inside and outside schools. The principal therefore is a key fundamental instrument in leading ICT integration in schools, as the world changes drastically. The following chapter presents the research design and methodology.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

Chapter 3 discussed the theoretical framework underpinning the study. This chapter discussed the research design and methodology that were used to answer the research questions. Bertram and Christiansen (2014) define research design as the systematic art of collecting and analysing the data that is needed to answer the research question. The research design sought to answer questions such as what evidence the researcher needed to collect in order to understand the phenomenon, how the data was collected and what the researcher did with the collected data. This means that the research design provided a logical structure for how the research study was be conducted. I first addressed the research paradigm guiding this study, then presented the research design and data generation methods. After that, the methods for data generation and analysis were discussed. The chapter outlined the strategies that attempt to ensure the trustworthiness of the study. Finally, the chapter set out the relevant ethical issues. Throughout this chapter, I referred to the relevant literature to justify the choices regarding methodology and design made during the inquiry. The methodological process is set out below in a table.

Table 3.1 Design and methodology

Research paradigm	Interpretive paradigm
Research design	Qualitative
Methodology	Multi-case study
Sampling	Five secondary school principals working in rural and township school

Data generation method	Face-to-face semi-structured interviews
Data analysis	Inductive content method
Issues of trustworthiness	Credibility, transferability, dependability and confirmability
Ethical considerations	Permission letters from the gatekeeper, informed consent, explanation of research purpose and procedures, and ethical clearance from the University of KwaZulu-Natal

4.2 Locating the study within the interpretive paradigm

I chose to locate this qualitative research study in an interpretive paradigm. In this paradigm, the focus is on how people understand and clarify social phenomena (Bertram & Christiansen, 2014; Cohen, Manion & Morrison, 2011). An interpretive paradigm acknowledges the close relationship between the researcher and what is being studied; it aims to develop an understanding of the social context (in the social sciences) of the research (Bertram & Christiansen, 2014; Cohen, Manion & Morrison, 2011). As an interpretive researcher, I, therefore, positioned myself in this paradigm, recognising that the way that people 'know' reality is a social construction. Thus, it was of critical importance for me to open up the meanings that research participants make of their lives. For me to understand principals' leadership roles, I was dependent on the closeness and trust in the interactions between me and the research participants in their respective contexts. I understand that research data could lead to various interpretations of how principals support ICT integration in secondary schools. The task was to set out the data in ways that enable the reader to judge the credibility of the interpretations presented.

4.3 Research approach

This study is a qualitative approach to inquiry based on an interpretive, naturalistic approach to the world. Merriam (2009, p. 22) states that a key element of qualitative research is that 'individuals construct reality in interaction with their social worlds'. Creswell and Creswell (2017) affirm that, in qualitative research, researchers study things in their natural settings, working with the ways in which people already give meaning to their lives in these settings. Hence, I collected data to interpret and make sense of the phenomenon. A qualitative researcher aims to give further meaning to experiences and social situations (Rubbin & Babbie, 2012; TerreBlanche, Durrheim & Painter, 2006). Creswell (2014, p.17) asserts that 'qualitative research intends to understand a particular social situation, event, role, group, or interaction and is largely an investigative process where the researcher gradually makes sense of a social phenomenon by classifying and comparing the object of study.' Therefore, I intended to interview the participants in a natural setting and then use the collected data to establish patterns and themes that will help me understand the natural and social constructions of the phenomenon. Such a strategy can give me the advantage of collecting greater depth of data as the participants will be enjoying expressing themselves in their environment. Creswell and Creswell (2017) state that, in qualitative inquiry, researchers go directly to participants' location and collect their data at that location, where the issue or problem is experienced. They do not take an individual to a laboratory. Hence, I will go to their respective schools. The choice of qualitative research inquiry is relevant and suitable for my study, which aims at making sense of principals' leadership roles that support ICT integration in teaching and learning in secondary schools. However, some participants may provide false information, just for the sake of portraying a good image of their schools.

4.4 Research design

This study made use of a multi-case study design. Merriam (2009, p. 49) defines a multi-case study as a research design that 'involves collecting and analysing data from several cases. The intention was to treat each principal as a case (a bounded system) to provide a unique example of principals' leadership role in supporting ICT integration in secondary schools (Merriam,

2009; Rule & John, 2011). Also, I intended to scrutinise some commonalities among participants. Stake (2006) highlights that, in a multi-case study, there are various cases, each of which is significant. Therefore, treating each principal as a case will enable me to have diverse responses to the study's central questions. Merriam (2009) argues that this research design is most effective in its interpretations when there is more than one case in the study. Hence, I decided to use a multi-case study design to gain insight into the phenomenon by using not one case, but several cases.

4.4.1 Sampling method

This research utilised purposive sampling to recruit five school principals as my research participants. In support of purposive sampling, Merriam (2009) highlights that, in every study, there exist numerous sites or people to be interviewed. Purposeful sampling was employed in qualitative research by selecting individuals and sites for the research study (Creswell & Creswell, 2017; Creswell & Poth, 2016). Merriam (2009) highlights that a purposive strategy means that one finds a small number of participants who clearly meet the criteria that have been determined for inclusion in the sample. Therefore, I purposively selected five secondary school principals who are clearly taking leadership roles in the Ugu District. The purpose was to recruit five principals who are already practising their leadership roles in supporting ICT integration in their schools. Merriam (2009) also asserts that the researcher must decide what to observe, where and when to collect data, and whom to observe or interview. One school was located in a township and the other four in rural areas. This gave me some degree of difference in the settings in which the principals' leadership roles are taking place. The choice of purposeful sampling was made because the researcher knew that this sample would provide participants who can readily grasp and provide insight into the key phenomenon of the study, in this case ICT integration in relation to the leadership roles of principals (Merriam, 2009).

4.4.2 Data generation method

Creswell and Poth (2016) report that qualitative researchers become directly involved in the process of data collections. The qualitative data they collect typically is drawn from reading

documents, observing behaviour and interviewing participants. The primary method of collecting data for this study was the use of semi-structured face-to-face interviews to assist me in answering the research question. Interviews are frequently used to collect data in qualitative studies in such fields as education (Merriam, 2009). Data collection involves addressed the anticipated ethical issues through getting the necessary permissions, developing the suitable strategy for sampling, determining the methods and means for the collection of data, addressing necessary issues in the process of data collection in the location and ensuring that data is secure (Creswell & Poth, 2016). Key advantages in the use of semi-structured interviews were the flexibility in my ability to respond to issues, such as using follow-up questions if I needed to ensure understanding and to go into greater depth. During the interviews with my participants, I used an audio recorder, which participants were made fully aware and consented to. The use of an audio recorder was done to assure the quality of their responses and also to give me time to note their gestures. When setting up the individual interviews, I took into consideration the times that the secondary school principals were available.

4.4.2.1 Face-to-face semi-structured interviews

This qualitative study employed semi-structured face-to-face interviews. This was aimed at allowing an in-depth conversation with participants. Hence, all interviews conducted in this research study were intended to be one hour in duration; all the participants agreed to this after discussion. According to Creswell and Poth (2016), an interview involves a conversation, an interaction between people; it is believed to have the ability of knowledge construction. A conversation between the interviewer and an interviewee (participant) may create a space where participants are able to present their understandings, views and experiences related to the phenomenon of the study. Work by Merriam (2009) on qualitative data reports that in the interview process, it typically takes the actual words of participants regarding what they know, what they experience, their feelings and thoughts. I needed the principals who were participants to speak freely, reflecting on their situation. Their actual words provided me with insight, as they were relevant to the research questions and also provided a level of detail and nuance. I needed to understand how they saw their leadership roles, even if they had not previously

reflected in-depth on them, in relation to supporting ICT integration in teaching and learning; what they have been experiencing in leading ICT integration and how they have employed leadership strategies in ensuring effective implementation of ICT in their respective schools.

Creswell and Poth (2016) affirm that it is the qualitative interviewer's task to ensure that participants are comfortable and speaking freely. Therefore, it was vital for me as a researcher to further elaborate the interview questions to give interviewees more clarity to understand the questions. Furthermore, I was able to ask follow-up questions where necessary, if I needed further responses to clarify an issue.

A study by Creswell (2016) suggests that the researcher should use suitable recording methods when collecting data in interviews. To ensure that, the researcher has asked permission from the participants to use audio recordings. I had prepared in advance the interview schedule and followed that sequence in the questions, see Appendix C. After the initial process of data analysis, the researcher decided to have a follow-up interview for the two of the five participants. This aimed to gain clarity in some of the sections that seemed not adequately explained by participants. This resulted from my realisation that these participants may have misunderstood some of the questions, as their responses were not particularly relevant. I thus pursued the same issue again with a slight variation in the wording. The intention here was to balance the consistency of questions with the requirement that each participant gave full and relevant responses to the questions, thus finding a way to meet both requirements as best as possible, in the interest of trustworthiness.

4.4.3 Data analysis method

Patton (2002) reports that data analysis involves a process of transforming data into findings that will best suit the research study. Creswell (2009) argues that the process of data collection and analysis strategy begins with the initial collection that involves a sequential approach where the researcher obtains relevant statements from participants. This generates the data that must now be analysed; in this study, considerable data was collected in the semi-structured interviews. To begin the analysis process, I read transcripts written from the interviews

conducted to scrutinise this data for recurring points that would reflect participants' understanding of principals' leadership roles in supporting ICT integration in teaching and learning in secondary schools. Thereafter, I used thematic analysis wherein, through open coding. I have use data generated in the study to address the research questions. In that, I have grouped all the responses into different themes so as to make meaning of what participants have shared. Following that, I inductively developed emerging themes. Bertram and Christiansen (2014) state that, with inductive reasoning, the researcher can have a clear theoretical framework beforehand and use that framework to analyse the data.

4.4.4 Issues of trustworthiness

For the trustworthiness of the study, I addressed the issues of credibility, transferability, dependability, and confirmability. These aspects of trustworthiness are the most significant factors in ensuring the integrity of the study (Shenton, 2004). In qualitative research, and within an interpretive paradigm, it is imperative for the research to be credible. Therefore, for this research study's strengthened credibility, I used audio-recording devices to record interviews to identify the actual reality of the interviews and avoid gaps in the collected data. Bertram and Christiansen (2014) state that using audio-recording devices to record interviews enhances the quality and the accuracy of transcripts. To ensure credibility, I applied member checking; I took the preliminary findings back to the participants to check whether my interpretation gives a true reflection of their accounts. Opportunities for scrutiny of the project by my supervisor were taken into consideration to ensure the credibility of my research. I also intended to present findings at the conference, whereby I would receive feedback from the delegates (Shenton, 2004). However, due to COVID-19 regulations, that was not possible.

The issue of transferability was addressed by my attempts to ensure that there is sufficient detail and information regarding the study to allow the reader to determine the accuracy of my conclusions (Cope, 2014; Lincoln & Guba, 1985; Rule & John, 2011). As suggested by Shenton (2004; see also Lincoln & Guba, 1985) to enhance transferability, I presented full descriptions to enable others to form their own conclusions on the basis of the evidence provided and to

judge the degree to which findings were transferable to other similar contexts (Merriam, 2009). This required me to ensure that the data collected is rich, thick and useful.

In addressing the dependability of the study more directly, I reported the processes of the research in detail, thus enabling other researchers to replicate the work (Lincoln & Guba, 1985; Shenton, 2004). This was also intended to ensure that those following this study would be able to determine whether the research procedures were followed as intended (Shenton, 2004).

For confirmability, I took steps to ensure, as far as possible, that the research findings were the result of the experiences and ideas of the participants (Merriam, 2009). With this in mind, I used member checking by sending transcripts and findings to participants to check if I captured their experiences well. In an attempt to seek more clarity from participants' responses, I also used probing questions to go into greater depth where a response was incomplete or raised significant issues that had not been explored before (Lincoln & Guba, 1985; Merriam, 2009). Moreover, I detailed my methodological description to enable the reader to determine how acceptable are the data and findings emerging from the study. Critical to this process, I kept the "audit trail", which enabled me to trace the different procedures followed in the study in the sequence followed.

4.4.5 Ethics in research

Prior to the commencement of conducting the study, my application for ethical clearance was approved by the University of KwaZulu-Natal (UKZN) Ethics Research Board. After it had been granted, I was able to continue with the research process. I asked for permission from participants to participate in my research study voluntarily. Bertram and Christiansen (2014) highlight that consent means that the respondents agree that they are taking part in the research study. Clandinin and Rosiek (2007) state that such approval is a necessity for all researchers before they start on data collection. I further gave my participants a full explanation of my research and assured them that their names would not be divulged in the study's reporting stage. I also assured them that I would be transparent in decisions, and my interpretations will be faithful to what they tell me in the research process. I assured participants that I would maintain

anonymity by using pseudonyms to hide their schools' identities and anonymity (Bertram & Christiansen, 2014). This helped me to make participants feel comfortable when providing information during the interviewing process.

During interviews, I always reminded them that this research was exploring the leadership roles that support ICT integration in teaching and learning. I also asked permission from them to record the interview for quality purposes. Participants also signed a consent form for permitting me to use audio-recordings during the interview session. Participants were also made aware that they were free to withdraw from the study as they participated voluntarily without providing a reason for withdrawal. During the transcription stage, participants' names and their schools were coded instead of using their names. Participants were kept free and comfortable during and after the interview process. The gatekeeper permission came in the form of letters from the respective schools where these principals serve.

4.5 Limitations of the study

Possible limitations varied from a personal to a professional level. Gustafsson (2017) points out that the case study approach has received criticism for resulting in findings that can be difficult to generalise to other contexts. However, this study intended not to generalise findings in other settings; rather, it intended to develop an understanding of the participants and their relationship to the phenomenon in depth (Merriam, 2009). Some participants tended to provide limited responses that sometimes did not answer the interview questions fully. Using probing questions, I could partially address this limitation. It is important to note that at times some participants did not avail themselves for the interviews on the mutually agreed date. Some participants could not spend an hour for an interview session as they were busy preparing schools for COVID-19 regulations. As a result, I had to use WhatsApp interviews.

Consequently, this was time-consuming. With the pandemic, COVID-19 and its regulations, more limitations occurred. The novel coronavirus necessitates health precautions that call for social distancing. With this, I anticipated some challenges in meeting principals for interviews.

4.6 Summary of the chapter

This chapter has set out the research design for the study and methodology adopted in addressing the research questions. The chapter explains how a qualitative research approach was used with a multi-case study design. The sampling of five secondary school principals and the relevant methods for data collection and analysis were set out and justified. The next chapter will provide data presentation and discussion of the research findings.

CHAPTER 5

DATA PRESENTATION AND DISCUSSION

5.1 Introduction

The previous chapter set out the design for the research and the methods used to generate data for this study. This chapter reports and discusses the findings drawn from data generated in the field using face-to-face semi-structured interviews with five school principals in five secondary schools in the Ugu District. First, I presented a detailed profile of the research sites and the participants. Understanding the sites and participants enables the reader to have a comprehensive understanding of the study's context and other relevant factors. This is then followed by the presentation and discussion of findings. To protect the identities of the participants, pseudonyms were used in presenting and discussing findings in this chapter. Five themes that I have identified are also discussed. The themes identified in the data generated include the following: conceptualisation of ICT integration, the importance of principal leadership, principals' leadership roles in supporting ICT integration, principal leadership strategies and ICT resources. The findings that are set out and discussed are responses to the following research questions:

1. What are the secondary school principals' understanding of their leadership role in supporting ICT integration in teaching and learning?

2. How do principals' leadership understand to be strategies that enhance ICT integration in teaching and learning?

3. What can we learn from principals' leadership roles and strategies in leading ICT integration to teaching and learning?

5.2 Profiling the research sites and participants

The five sampled secondary schools were located in the Ugu district in the province of

KwaZulu-Natal. As this is a district dominated by rural settlements, schools are scattered and are dominated by traditional leadership. This means that research in the schools should be done in consultation with the traditional leaders for approval. All five schools are no-fee schools; they fall under quintile one of the Amended National Norms and Standards for School Funding (ANNSSF) (DBE, 2011). Quintile one schools are schools that are categorised as schools that are in most impoverished communities with very limited resources. Details regarding the research sites and participants are in Table 4.2.1 below.

Names of schools	**Demographics of schools**	**Name of participants**	**Gender**	**Teaching experience**	**Years in the current position**	**Subject taught**	**School enrolment**	**ICT facilities**
UDS1	Rural	Vico	Male	32	19	Technology	1350	Computer laboratory
UDS 2	Township	Southbroom	Male	19	4	Accounting and Business Studies	1400	Media centre
UDS3	Rural	Edward	Male	30	9	Technology	1353	Computer laboratory
UDS 4	Rural	Ndwebu	Male	18	14	Geography	1200	Computer laboratory
UDS 5	Rural	Valley	Male	25	16	None	1450	Media centre

Table 4.2.1 Research sites and participants

As can be seen, the table above sets out the fundamental details of participants and the schools as sites from Ugu district schools 1 to 5 (UDS). The schools are located in five different settlements of the district. It is apparent from this table that four out of five schools are located in rural areas and one is from a township. Three of them are using a computer laboratory for ICT integration, while the remaining two have resources centres. The table shows the number of learners in each school, ranging from 1200 to 1450 learners. To understand the principal

leadership strategies for ICT integration and how they are implemented for effective ICT integration, it was important to also have information on the factors that may cause difficulty in rolling out these strategies.

The table above also shows that principals have had between 18 and 32 years of teaching experience, with two having held the principal position for 15 years or more. This means that they all are not new to the profession; there is a wealth of experience in these posts. Four of these principals also have subjects that they teach in their schools. This gives evidence that they do integrate ICT for teaching and learning in their schools. Two of the participants teach Technology, the third one teaches Business Studies and Accounting, the fourth one teaches Geography, and the fifth one does not teach due to the size of the school. Their histories could mean that the data acquired from these participants reflects understandings and experiences built up over a long period.

5.3 Principals' conceptualisation of ICT integration

As participants shared their understanding of ICT integration, it seems as if participants believed that this term refers to using digital technology to facilitate teaching and learning, in the interests of the learners. Some participants believed that ICT integration is the use of technological devices such as cell phones to interact with others on various platforms like WhatsApp. When participants were asked about their understanding of ICT integration, this is what Vico said:

> *[ICT integration] simply means using the current technology to facilitate teaching and learning to ensure that learners get what they need*.

Ndwebu shared similar sentiments in his understanding of ICT integration and further extended his definition by including IR4.0:

> *ICT can be defined as a situation where one learner is using his own laptop and a teacher is using his own computer, particularly in the fourth industrial revolution…*

> *ICT integration entails the use of cell phones, digital devices, WhatsApp groups and Facebook for teaching and learning. With ICT integration, learners can interact with learners across the globe because the curriculum is the same.*

The above quote seems to suggest that the use of modern technology, which includes laptops, computers, cell phones and other digital devices, can assist learners in meeting their needs. These technological gadgets can help learners interact in sharing ideas; hence the curriculum may be the same. As ICT expand, innovations continue to play a dynamic role as an ideal tool to acquire, store, circulate and apply knowledge, more than ever before (Palagolla & Wickramarachchi, 2019; Alenezi, 2019). In that, learning may not only be a classroom event. While living in the information age, ICT can be used in closing the gaps between countries by giving learners exposure to what is happening in other countries. By so doing, the learners may become competitive and ultimately open opportunities for themselves. This is how Mr. Valley explained it:

> *…We are living in an information age. It is just that there are gaps between countries. Some are the well-developed countries and the developing countries and the less developed countries. This is the way to go considering that technology or e-learning is the way to go in the 21st century…So, we need to make sure that we expose learners so that they can be competitive even if they go and work or study in other countries like America, UK and other countries. So, without exposing our learners to e-learning or technology, we are depriving them of the opportunity to compete with the world.*

Drawing from the above quotes, it can be argued that ICT is seen as key learning tools that can enhance teaching and learning in the 21st century. Above that, ICT has the potential to influence practices and procedures of nearly all forms of endeavour within the private and public sector (Noor-Ul-Amin, 2018). Schools as socially oriented institutions have begun to integrate ICT as part of their strategy for strengthening learning, a new resource that using a range of innovations, providing ideal tools to acquire, store, circulate and apply knowledge than ever before (Palagolla & Wickramarachchi, 2019; Alenezi, 2019). Hence, we are now beginning to see even rural and township schools joining the trend with different stakeholders and

government coming together to invest in education. Such gestures indicate that they believe in schools to have the ability to enable learners to cope with the demand of the current period, as the world changes drastically. Aslan and Zhu (2018) assert that how we live, work and learn is constantly changing. Therefore, the use of ICT in schools may enable learners to survive in the current period.

5.3.1 The importance of ICT integration in teaching and learning

What seemed to come up from participants' responses, is that there is considerable evidence that ICT can make teaching and more manageable task to perform. ICT save time, simplify everything and facilitate learning to develop learners' interest. When asked about the necessity to integrate ICT, this is what Vico firmly said:

> *Modern technology in schools will always assist in making teaching and learning easier. With technology, teaching becomes faster. You can finish the ATP faster than when you are using old technology, the chalkboard when writing notes. Then, the ICT facilitates the ease of teaching, and I think while you are teaching, technology will create interest in the learner… They become more focused and more interested in the subject.*

What appears to be interesting from the above quote is that modern technology in schools has the potential to change pedagogical methods to fast-track teaching and learning. Hence, teachers' roles are gradually changing as more technological devices penetrate the process of teaching and learning. Teachers are now becoming facilitators as the use of ICT in their daily teaching activities makes teaching easy and faster, ultimately helping them develop learners' interest. In that, learners themselves are becoming more actively involved in their learning. Perhaps, this could be a significant grain from the use of ICT in schools. Furthermore, the use of technology, particularly in rural schools, may prepare learners for the university style of learning. Moreover, the use of ICT in classrooms can also reduce the gap between urban and rural schools and dismantle the apartheid legacy. In response to the question: 'Why do you think ICT integration is important?' Southbroom indicated that:

> *... Since we are coming from the apartheid regime, our schools which are located in the rural and township areas are far behind. We need to assist these learners using the technology, especially those who go to the university so that it would not be difficult to use technology.*

The above quote appears to give evidence that participants believe that there is a connection between ICT integration and the learners' ability to meet university standards and expectations. Firstly, it appears that ICT devices are significant tools for ensuring frequent communication among the school community members, which involves the principal, teachers, and learners. Secondly, there are also a lot of values that come with ICT integration in schools. These values include teachers' ability to freely interact with learners and monitor their learners' performance simultaneously. When participants asked about the significance of ICT integration for learner effectiveness, most of them believed that the use of ICT in this process makes communication easier and enhances learners' interest. This is what Edward had to say:

> *... These ICT devices make it easy for us to communicate with learners. One, it easy to communicate with your stuff wherever you are, and also you can be able to communicate with your learners if you are a teacher. There is a lot of benefits that come with these digital tools which make learning and teaching easier... our learners currently are very technological inclined because they use technology and understand technological devices which makes it easier for them to develop an interest in what they are being taught and in fact it gives an opportunity for teachers to be able to interact freely and monitor the response of their learners...*(Edward)

The above quotes point to the fact that technology advancement is fast becoming a key instrument in maintaining the quality of education, as it is believed to effectively impart knowledge. Hence, the adoption of new technologies is critical to the advancement in the field of education (Ahmad, Adnan, Yusof, Kamal & Kamal, 2019). Consequently, such belief has necessitated schools to develop new learning settings and platforms that will incorporate technology. Rural and township schools are beginning to join the trend with the hope that they will use ICT to improve their results and learner performance. As Vavik and Salomon (2016)

state, ICT integration in schools has developed skills, across all grades, related to the use of digital tools. This means that, as teachers and learners use technology in the classroom, they develop the skill of critically acquiring knowledge and new ideas to solve different problems. Waghid, Waghid, and Waghid (2019) share similar sentiments that, nowadays, learning is perceived as an educational encounter that should respond to the demands of IR4.0. As a result, teaching and learning is no longer a place where learners are expecting teachers to tell them what to do but is rather an interactive process.

5.3.2 The impact of ICT integration on school performance

Drawing on participants' responses, there is ample evidence that, with ICT integration, schools are performing optimally. This performance is evidenced by schools that are integrating ICT that continue to produce good results. Two out of the five participants indicated that ICT integration has improved their results as the school. They also have indicated that digital tools also assist in enabling schools to overcome factors that may hinder learning programmes. For instance, these factors include the issues of lockdown regulations that were aimed at mitigating the spread of the Coronavirus pandemic. Schools that integrated ICT in their teaching programmes have managed to continue with uninterrupted teaching while others remained behind. When participants shared the impact of incorporating ICT in their schools, this is what Southbroom and Vico had to say:

> *I would say to a greater extent because 60% are doing well. After all, we are from the Covid-19 where schools were closed, but some teachers were busy teaching using WhatsApp. By doing that it assisted them because now they are writing their trials exams and their performance is not that bad because during the lockdown period. They were learning hand in hand with the teachers through ICT integration.*

Vico shared a similar sentiment in his response to the question:

> *…in fact, as a school, we were achieving around 50 to 60 %, but now we are among the 90s.*

Drawing from what the participants have said in the above quotes, it is becoming apparent that incorporating technology in teaching and learning has the possibility to improve the school results to a great extent. It also appears that schools can use technology to ensure uninterrupted learning programmes, even during unscheduled events, as has happened during the spread of the Coronavirus pandemic. Therefore, as schools use technological resources in their learning, much can be achieved. Preparing for lessons and managing issues of learners with indiscipline can be well achieved, as technology gives teachers the space to prepare themselves well in advance before they begin to teach. With regards to the impact of ICT on school performance, Edward concurred with what Southbroom and Vico shared but further extended his response by highlighting the contribution of ICT to teacher preparedness and learner discipline. This is what he said:

> *When teachers go to the class, we find that they already understand what they are going to do. This helps teachers to deal effectively with the learner behaviour, because, once you get in the class prepared, you don't have hiccups in terms of the content because you prepared yourself and now you are able to better deal with whatever event that may hinder the smooth running of teaching and learning in class… In my school, this has helped a lot in terms of behaviour and discipline.*

Interestingly, the above quote reveals that recent developments in the digital space have heightened the need for ICT integration. As the participants believe, incorporating ICT in the learning process creates a space for learners to innovate and enrich skills that gradually motivate them to engage with their learning (Amin, 2019). Thus, as they engage with their learning, new ideas may be developed. As they develop such skills, they will be able to solve problems on their own and have more contribution as they engage with other learners in a class. Ahmad and Ghavifekr (2017) argue that, with the quick advancement of technology, particularly ICT, the nature of schools and the meaning of learning changes radically. Therefore, as new technological resources emerge, it becomes easier for learners to do research and discover new knowledge on their own. A study by Male (2018) highlights that using such

digital technologies may positively impact the creation of new environments for learning in the present context.

5.4 The importance of principal leadership in ICT integration

What appears from participants is that they have a strong belief that they form an integral part of the ICT integration process. By being resource managers and having to lead by example, by modelling ICT activities in the school, that automatically grants them power in leading ICT integration. Participants believed that they are directly responsible for creating a conducive environment for teachers to implement ICT integration in their teaching activities. Principals firmly shared sound reasons as to why they see themselves as most important in leading ICT in their schools. The overall responses from participants to this question were very positive. This is what Edward said:

> *As a principal, I am a resource manager. So, the process of managing in an attempt to improve both working conditions and learning conditions of our learners, I must be able to make it point that teachers as workers have fertile ground to develop and I also have to avail resources and provide in terms of technological devices… The principal must lead by example, he must be the person who is driving the ICT so that the followers would follow him or her.*

The above quote points to the need for principal leadership for leading ICT integration in the school effectively. The quote also seems to point to the fact that principals' leadership can take different forms and inevitably has a number of roles to perform. Some of these roles include the ability to influence and manage the school community by creating a conducive atmosphere that encourages both teachers and learners to perform. In addition to that, for effective use of ICT resources in teaching and learning, the principal as a resource manager should make sure that ICT resources are available. Hence, it appears that principal leadership in leading ICT is integral. While on this view, participants point to the fact that it is also of vital importance to note that new technologies are expensive. They further reported that they are directly involved

in the school budgeting and other tasks that revolve around it. With regards to the importance of principal leadership in ICT integration, this is what Vico further said:

> *Technology is expensive. So, you cannot just say anyone can lead these technological based things because the funds of this technology are mostly managed by the principal…when it comes to teachers maybe when going for training then it is the principal who has got the powers to make sure that teachers attend training.*

Overall, this theme indicates that principal leadership is central to the school for effective learning and learning to take place. Principals perform multiple roles in supporting ICT integration, as confirmed by Mingaine (2013). Therefore, they should be at the forefront in leading ICT integration. These roles include amongst many, establishing strategic plans to develop both teachers and learners in their abilities to incorporate ICT and facilitating an atmosphere that promotes the use of ICT (Apsorn, Sisan & Tungkunanan, 2019). Such roles contribute to the positive school culture where both teachers and learners develop more skills in integrating ICT in the learning activities. Moreover, ICT efficacy can be easily developed, which may result in good school performance. Kannan, Sharma and Abdullah (2012) suggest that principals should be able to lead teachers in developing a culture related to technology. This entails a commitment to ensuring that teachers have opportunities to develop skills in the area of ICT.

5.4.1 Principals' understanding of leadership roles in supporting ICT integration

As participants laid their accounts on leadership roles in supporting ICT integration, they identified several roles that they perform in their schools. Two of the five participants stated clearly the specific action they taken to promote the integration of ICT educationally in their schools. A key point that emerged is the need for an explicit policy to implement ICT integration. One of the five participants commented that, for effective implementation, it is important to make resources readily available for teachers to teach. Participants also believed that monitoring teachers is fundamental. In response to principals' leadership roles in

supporting ICT integration, two participants expressed a common view. This is how one participant shared his view:

> *Firstly, effective integration into teaching and learning goes beyond the provision of computers and software. In other words, I mean that supporting ICT integration is much more complicated. Therefore, my roles in supporting ICT integration into teaching and learning include the following:*
>
> *Developing a strategic school policy plan that talks a shared vision about the role of ICT in teaching and learning. Secondly, I need to avail means to realise this goal or vision and, by means, I mean resources. I then need to have a valid leadership to guide efforts to realise ICT integration. I also need to have professional development and support for the implementation of ICT integration in my school. Monitoring is also important as well. As a principal, it is also my responsibility to create a good working condition to support the use of technology in my school. I also need to influence teachers to be actively involved and make them feel that I am behind them to give support where applicable. Even when challenges arise, they will feel free to voice their concerns. I also need to network with other stakeholders for school improvement as far as ICT is concerned. Monitoring and evaluation are part of my roles. If all this is done, I can guarantee you that successful implementation of ICT integration in the school is possible…*(Ndwebu)

The above quote confirms that the policy that foregrounds principals' leadership roles in supporting ICT integration is essential. The policy stipulates everything about the implementation of ICT integration. In other words, the policy can help the principal to lay a solid foundation on how things should be done. In case there are challenges in the implementation process, it may be easier to go back to the policy and check if things are still in line with the policy itself. The policy may also help align and manage the resources to ensure that ICT is utilised for effective teaching and learning. Having said that, the data generated in the study appears to support the contention that working together with different stakeholders is important. The data also revealed that there would seem to be a definite need for a structure

such as a committee responsible for allocating and maintaining effective teaching resources. Moreover, drawing from what participants said, it is almost certain that support committees for teacher development may improve the school performance in the long term. In his account of principals' leadership roles, this is what Edward had to say:

> *…As the principal of the school my roles in supporting ICT integration are as follows: Ensuring the availability of resources. Providing suitable infrastructure for teachers to work effectively. Communicate with school stakeholders for assistance where applicable. Organise developmental workshops for teachers. Elect ICT committee for effective use of ICT in the school. Craft a school policy that will aim at managing and maintaining ICT. Create reflection sessions where educators will be voicing their challenges in utilising ICT for teaching and learning. Making sure that I organise a support committee for developmental purposes. Assess the progress to ensure that I provide support where necessary. When doing school budget, I also allocate funds for new ICT resources that may enhance our teaching and learning and also allocate funds for teachers to attend workshops…*(Edward)

The above quotes accord with the fact that principals undertake a wide range of managerial and leadership roles. Such roles include the management of physical, human and financial resources, the initiation and the implementation of tasks and other developmental programmes aimed at enhancing the school performance. School principals are directly responsible for ICT integration in schools. Kannan et al. (2012) identify three roles that principals should assume regarding ICT integration: role modelling, instructional leadership and visionary leadership. As instructional leaders, they are directly leading teaching and learning and accountable for what should be happening at school. Their roles involve a large spectrum of tasks that they perform, starting with planning, where the idea of ICT integration is initiated, managing and implemented. Mestry (2017) argues that principals are faced with multifaceted tasks as the world changes. In other words, they are expected to deal with multiple roles considering that schools are becoming a much more complex environment. The roles of the principal include, among many, developing a vision and administrative plans, establishing strategies for

developing both teachers and learners and facilitating ICT resources (Apsorn, Sisan and Tungkunanan, 2019), making school principals central to the process of integration of ICT. Li, Hallinger and Ko (2016) report that numerous dimensions of principal leadership make a crucial contribution to school performance. These dimensions involve the alignment of structures in the school which subsequently affect teacher professional learning. Thus, participants concur that, in ICT integration, principals' leadership roles are of paramount importance.

5.4.2 Principal lived experiences in leading ICT integration

When participants shared their experiences in leading ICT integration, a range of responses was elicited. Most of the participants highlighted that leading ICT integration in teaching and learning had not been an easy journey, particularly in deep rural schools. However, other participants indicated that there had been bad and good experiences along the way. They have also pointed out that some of the factors that made them integrate ICT in their schools was to respond to what the policy on e-learning stipulates and that has come with its challenges. On the other hand, principals indicated that there were also good experiences as ICT enabled their schools to improve their performances. When commenting on their personal experiences in leading ICT, this is what Southbroom said:

> *There are good and bad; the good ones are that learners understand quickly, and their performance becomes good…The ICT assists us because it boosts our performance although there are problems. The problem that we are facing is that learners don't have phones to communicate on online learning. Learners don't have data since most of their parents are not working. That's making us not be able to communicate with them.*

The above quote shows that ICT integration is essential for enhancing teaching and learning and school performance. Using technology in teaching and learning activities helps learners to better understand what they learn. Having said that, it is of vital importance to address the socio-economic factors that may hinder ICT integration. However, bad experiences do not mean that principals should not try and find strategic plans on how to integrate ICT effectively.

Vico also added and further pointed out both the constraints and benefits of ICT that he had experienced in his school. This is what Vico had to say:

> *We started a long time ago somewhere in 2007. When we were introducing Information Technology as a subject… At first, it was not easy because Information Technology is more difficult and a more challenging subject… We have been using the laptops and they are very handy because even when you are going to class, you can just take a laptop and project work; and even if teachers are not in school it is easy to go with the laptop and learners can copy whatever that was projected and then, when the teacher comes back, he will explain what was projected to the learner.*

This quote is quite revealing that leading ICT integration is a process. This process consists of both rewarding and demanding factors. One participant commented that strategic leadership skills that may assist the school's principal in developing new ideas on how ICT integration can succeed are significant. In response to the question about their experiences in leading ICT integration, Valley commented that:

> *My only comment is to encourage other colleagues, be it rural or township schools, to join the line in terms of ICT integration in schools. There will be no point where you can say now, I have all the resources I need. You start from the sketch, then you grow.*

Edward and Ndwebu seemed to have been experiencing positive outcomes from integrating ICT. From their experiences, they pointed out aspects such as teaching methods, learner participation and exposure, and a teacher's role, which they think have been the results of ICT integration. In response to the question, this is what they had to say:

> *I have a positive experience, I basically saw my teachers gradually engaging in the modern teaching methods rather than the traditional teaching methods, they became facilitators instead of information givers. I saw learners participating actively in the learning process and they started even to ask questions because they are well informed by their teachers. The teacher is guiding the learners to be good researchers around*

the learning process. Whatever they do at school is still accessible even at home through the Internet. The negative part is that some stuff gets stolen on their way and this need to be attended to…(Edward)

It is fascinating and very interesting especially for myself, who likes to use digital devices. It is quite interesting to come to class when you see, especially learners when it is their first time using computers. They do not even know the mouse but is very interesting to be in a school where you find that learners are in the digital world. Also, you will be surprised when learners know everything, especially the use of devices. Sometimes you come with the software and they will tell you that they know this software. It is quite something that is interesting…(Ndwebu)

What seems to come out from this theme is that principal leadership comes with accountability and is a key element in ICT integration. A considerable amount of literature gives a significant role of principal leadership as technological advancement emerges. Bitsadze (2019) argues that new practices and job requirements may potentially lead to issues of principal preparedness that incapacitate them and prevent them from performing their roles adequately. This information age requires principals to be well versed in using technology for teaching and learning. They also need to lead by demonstrating the necessary skills in ICT. Principals should have a high level of commitment in performing their roles. If that is so, the school community will be able to have a sense of ownership of the decisions and activities taking place at school. As a result, the school community will also be able to implement whatever decision is taken within the school. So, the effective implementation of ICT integration depends more on effective principal leadership. Nevertheless, what seems to remain less explored are the intervention and support programmes that can assist principals not only in leading schools, but developing strategic skills on how to deal with the multifaceted demands as the situation changes. Support and intervention programmes to empower principals to lead and manage schools effectively are of paramount importance (Mestry, 2017; see also Naidoo, 2019).

5.5 Principal leadership strategies

From the data generated in the study; it appears that principals use different strategies when enhancing ICT integration in their respective schools. Some of the strategies were common to almost all participants. For instance, asking for donations from companies and involving stakeholders appeared from most participants. Seemingly, from participants' responses, it could also be noticeable that principals are actively involved in planning their leadership strategies. These strategies include amongst the many, working with different stakeholders and companies, developing teachers' interest using incentives, conducting workshops and using documents such as PAM [Personnel Administrative Measures] which regulate conditions for teachers in South Africa. When asked what leadership strategies he uses in enhancing ICT, Ndwebu responded and said:

> *I make sure that I am always visible in the ICT programmes… I also encourage some other stakeholders to come and do their presentation in terms of how to use ICT programmes…I make sure that I am there as a person who facilitates everything and also who network with other companies to make that the ICT programme around the community is established.*

Valley also shares a similar strategy:

> *I think part of the strategy is to make sure that all the stakeholders are involved; that is your parents, governing body, leaders representing learners, as well as educators including the community.*

From this quote, what seems to be a critical aspect of establishing a fertile terrain for effective ICT integration is strategic planning. Principals need to plan to ensure that the use of technology in the school is as productive as possible. Having said that, it is of primary importance to note that strategic planning is a process. This process consists of various stakeholders that may influence the school. Therefore, it is integral to involve all stakeholders during the planning process to ensure that the plan is accepted and understood by all those involved. All these can be realised through the principals' leadership skills. Involving and networking with

stakeholders is always important, especially when one is willing to listen and learn from their views. More contributions and ideas can support the principal in leading the school effectively as stakeholders are actively involved. With regards to leadership strategies in leading ICT, this is what Edward had to say:

> *As a principal, what I always do is to always listen and learn because technology is fast developing especially in our country. What I do is make it a point that teachers develop an interest in these resources and they must understand and see the need for the use of these resources… I do my workshop at the school level and give a certificate for people which will help them know to use devices… I also refer teachers to our PAM document which also highlights how these resources should be used according to the state.*

While Southbroom seemed not to be using visibility as one of his strategies, unlike Ndwebu, he did have a strategy. Southbroom appeared to have worked very closely with different companies in mobilising them to donate to the school. This is what he had to share:

> *We normally ask for donations at Vodacom and write letters to mines of minerals that are located in Gauteng. There is a committee that ensures that the process of ICT is well managed. They always report to me and I also advise if they have problems.*

Interestingly, drawing from the above quote, it seems to reveal that central to the entire discipline of educational leadership are principals' leadership roles. Principal leadership in the school as a learning institution comes before anything else. Thus, there is a considerable amount of literature that considers principal leadership as a prime concern. As Afshari, Bakar, Luan and Siraj (2012) argue, principals are central to the effective implementation of new initiatives and need to model what they expect to see implemented. When both technology and principal leadership are studied, scholars use various terms such as school technology leadership, digital leadership and leadership of online communities (Gencer & Samur, 2016). This gives evidence of the intertwined relationship between technology and principal leadership. As a result, expectations from principal leadership communicate the need for effective use and integration of ICT in schools. School principals are expected to respond to

the new requirements to implement learner-centred classrooms and improve their performance (Bitsadze, 2019). As the world changes, more roles are added to principals' day-to-day tasks and they are no longer viewed as managers but rather instructional leaders, requiring a greater emphasis on the necessity for the professional development of principals (Bitsadze, 2019). Kannan, Sharma and Abdullah (2012) also argue that principals should play a central role in the integration of ICT, including modelling the use of technology and ensuring that there is appropriate education and training to ensure its adoption is made viable. This may well change the way that principals operate.

5.5.1 Putting systems in place for integrating ICT

As participants shared the systems they use to ensure effective ICT integration, what seemed to be noticeable is that they are actively involved in all ICT integration processes. Principals shared a range of systems that they use in leading ICT integration, such as making interventions for teacher development. Some of these principals conduct training for teachers who are experiencing challenges in implementing ICT when teaching their subjects. When asked about the systems in place for ICT integration, this is what participants had to say: *…have to intervene and help and make sure that educators are capacitated to be able to implement ICT learning in the school…*(Valley). Southbroom further said: *we train those who are struggling maybe once a month because we also have two specialists who are assisting even if they encounter are a challenge.*

Drawing from these quotes, I would argue that principals should have a set of mechanisms that are designed to support strategic plans to realise successful ICT integration. Perhaps, having these mechanisms can help the principals in dealing with challenges that may arise during the process of ICT integration and at the same time, ensure that the strategy is progressing. Halili (2019) asserts that incorporating the latest technologies can raise teaching and learning effectiveness and enable learners to become active in their learning. Therefore, having systems in place can help the principal overcome the challenges that may arise during implementation.

5.5.2 Principals' view on how teachers and learners respond to ICT integration

When principals asked about their views on how both teachers and learners respond to ICT integration, what appeared is that principals had different views. It appears that there have been unprecedented technological changes experienced by schools over the past decade. As a result, technological advancement has brought both positive and negative impacts to schools, teachers, and learners as well. What came from participants is that learners are much happier with the use of ICT in their learning. On the other hand, the data revealed that some teachers remain uncertain about the changes that come with technology. Some are very positive with the use of ICT and some are very uncomfortable. The participants revealed that they even think that technology is going to add more burden on them. Moreover, one participant pointed out that there are also a group of teachers who feel that the use of ICT may expose those learners who are technologically incompetent. However, some participants seemed to have received a positive response from teachers with ICT integration, as they claim to have benefited a lot from it. This is what principals shared in response to the question of principals' view on teachers and learners' response to ICT integration:

> *I would say learners are very positive. Teachers are very positive as well, but there are some factors, especially with teachers. Some of them who are not literate or who are less literate feel discouraged by the use of technology because they think they will get exposed by the learners that they do not have enough performance capabilities around ICT*...(Valley).

Ndwebu shared similar sentiments as he seemed to be receiving a positive response from teachers and learners as well. He further highlighted some benefits that he enjoys through ICT integration in his school. This is what Ndwebu added:

> *For teachers, it helps them to teach well; I would say so. To make their lives easy to interact with learners, very easy, because all work is loaded in the computer and it is downloaded in the computer. When they are using WhatsApp group which is part of our learning programme in a school.*

This quote is quite revealing as it demonstrates that some teachers are sceptical regarding the benefits and disadvantages of ICT integration. The data indicates that some teachers develop fear and uncertainty instead of adapting to change. Probably, if all school community members were to accept and adapt to new changes that take place in the school, a lot could be learned and accomplished at the same time. What is of vital importance is the ability to learn. A school is a learning organisation and therefore, developmental programmes within the school may capacitate both teachers and learners to integrate ICT in the school. Perhaps, with that system in place, teachers and learners may become technologically inclined. Modern technology appears to be a very powerful tool, as it allows the teacher to use modern teaching approaches that may boost learners' interest. As a result, to that, learners may begin to engage with others in the classroom. In response to the question of principals' view to teachers and learners' response to ICT integration, this is how Edward responded:

> *In term of the staff, which is my teachers, I like it when I see them preparing the slides, that certain level, that a teacher is being prepared in a modern way under that particular topic makes me happy and I appreciate that and my learners are not bored unlike when we were using the traditional method because now they can ask question freely.*

Vico was certain to share that teachers are eager to have their ICT resources as they enhance their teaching practices:

> *Most teachers would even like to have their equipment and to use this equipment because it makes teaching a very easy job… Teaching becomes clean and easy. You can easily store (save) what you have taught and then repeat it whenever learners need that part. So, teachers are enjoying using technology and the learners too.*

This theme reveals that teachers and learners may enjoy several benefits from integrating ICT in teaching and learning. Learners themselves may be able to access information on various platforms. Naidoo, Madida and Rugbeer (2019) suggest that learners of today are digital citizens, and their learning preferences are digital as well. Teachers as well may not be the only

source of information. In that way, learning can take place more fluidly. Ahmad and Ghavifekr (2017) argue that, with the quick advancement of technology, particularly ICT, the nature of schools and the meaning of learning change radically. In other words, a positive attitude from both learners and teachers in this manner is the underpinning factor for effective ICT integration. Kannan et al. (2012) argue that teachers' willingness to integrate ICT into their work is likely to be driven by the commitment displayed by the principal. Furthermore, though, Naidoo et al. (2019) point out that teachers will also respond to the perceived benefits and disadvantages of the new technology. Nevertheless, despite its possible benefits, what remains the key component in its effectiveness is principal leadership. According to Adams and Muthiah (2020), the key issue is principals' leadership in driving technological development.

5.5.3 Factors that influence principal leadership in leading ICT integration

After discussing factors that influence them from leading ICT in their schools, they were able to openly share a wide variety of factors. Interestingly, all participants responded to this question as they all had something to say in response to the question. Noticeably, most of the participants shared negative factors that have hindered them from leading ICT integration effectively. While there may be similarities, in the participants' responses, again, they displayed different levels in experiencing these factors. While one participant had more to share than others, what seemed to be common in the majority of participants was the issue of limited funds allocated in their schools. Three out of five participants raised a concern that the funds allocated in their schools make it impossible for them to lead ICT integration optimally. One participant raised the issue of having to deviate from the school budget to maintain technological devices. Another factor brought forward by almost the majority of participants was criminality and theft of devices, which seemed to negatively impact their leadership and support of ICT integration. Participants also pointed out that the promotion of teachers to other schools is beyond their control. As a result, some schools would remain without a teacher after he has been promoted. In one way or the other, this affects teaching and learning as it there may be delays in finding another teacher who will teach the subject, especially if that teacher was taking the lead in incorporating ICT in teaching and learning. Participants highlighted that

at times they remain without a teacher for a long period, waiting for the department to employ another one. Another challenge raised by one participant was about the unreliable electricity supply, which disturbs ICT integration for teaching and learning drastically. Shortages of data bundles were also part of the negative factor. This is how Vico spoke concerning the factors that affect principals' leadership roles:

> *We live in a dynamic world, taking from the experience of theft we had this year, I can say that although we have got other measures in place to protect whatever we have, the theft, the ingenuity of people outside it is something that we cannot control… Another thing is the resources. We can wish to have as much as we can have but in terms of finances that are not in our control, it depends on what the department decides to give us at that particular point in time. It depends on the willingness of the sponsors to give at that particular time.*

What seemed to be revealed by the above quote is that as the world changes, schools also need to change, and leading schools is becoming much more complex. The quote is quite revealing that the complexity of leading schools comes in different forms. These complexities include criminal ingenuity, minimal funds and schools' financial dependence on sponsorship. Drawing from participants' responses, these challenges appear to present problems beyond what would normally be expected to be the principals' ability in leading ICT integration effectively. In addition to that, the above quote points to the fact that the Department of Basic Education seems to have failed principals to lead ICT integration effectively. Issues of minimal funds allocation and the dependence on sponsorships provide evidence that the department still has a lot to do to support principals and their schools to implement ICT integration effectively. Some participants raised a concern that technological devices do not match the number of learners enrolled in their schools. Edward shared similar sentiments and said:

> *The issue of budget is that it is difficult to mobilize funds so that you could get all the needed devices into the school, you have to go an extra mile… the other thing is the maintenance of the devices, it goes back to the budget makes us need more funding.*

The above quote point to the fact that the minimum budget allocated to schools seem to be so demanding that principals are expected to use this minimal budget to run the school and find ways to protect resources from theft at the same time. Such issues appear to be beyond the control of principals. Sometimes these factors depend on other service providers such as the provision of electricity in schools, which is not within the Department of Education jurisdiction. While on this issue, this is what Southbroom had to say:

> *Shortage of electricity during load shedding, shortage of data, and network makes it impossible to communicate with learners.*

Ndwebu seemed to be more concerned with educators' ability to teach with it. He further highlighted cases where teachers get promoted as one of the major factors in his school. These were his concerns:

> *The major one I would say it is the educators to teach with the ICT and also the theft that I have indicated… you find that the good teacher who was in your school, he get promoted to go and teach in another school and then you do not have the teacher who is going to teach.*

This theme highlights that leading ICT integration in teaching and learning is complex. The burden of managing these complex processes of resourcing and initiating the entry of new technology provides an additional challenge for principals (Afshari, Bakar, Luan & Siraj, 2012). As this process unfolds, there may be factors that directly influence how principals lead ICT in their schools. Some of these factors may be external and some may be internal.

Moreover, it is important to note that some of the factors may be beyond the principals' normal range of responsibilities and they may hinder the effectiveness of the implementation of ICT based teaching programmes in the school. However, what is of integral importance is that principals should be cognisant of these factors so that they may find ways to overcome them. From the initiation stage till the implementation stage of ICT, proper consultation is important. Perhaps, what seems to remain unaddressed are professional development programmes that will capacitate both the principal and the school community. If this is done properly, it is quite

possible to achieve successful implementation of ICT integration in schools. Afshari et al. (2012) argue that, in the information age, principals should be able to demonstrate their confidence in using ICT and demonstrate their ability to apply them to the needs of the school. Nevertheless, Naidoo et al. (2019) point out that factors like the shortage or non-existent technology facilities due to the high costs of ICT resources are critical issues that most rural and township schools are faced with. Above that, the conditions for facilitating, social impacts such as theft and the unstable economic status of parents can contribute to some of the mentioned factors.

5.6 ICT Resources

As participants list the available resources in their schools, a variety of ICT resources were mentioned. Some participants identified the systems in place for making sure that ICT resources are safe. Beyond that, some participants also shared the procedures for accessing these resources. In some schools, ICT and related resources are allocated to each department, even where there is no proper plan and systems. Most interestingly, participants highlighted that some of these resources were donated. With regards to ICT resources available in schools, this is what participants said:

> *We use cell phones. We have allowed learners to use cell phones in schools because there are mainly connected to the network. We have wi-fi at school for the use of learners and staff. Inside the classroom, each teacher has a computer that is connected to a projector and, for that projector to work properly, there should be a whiteboard. We also have a device called a mobile view, it is a device that is like book size, it's got its own pen, when you write on it, what you wrote can be viewed in the projector, you can edit what you have projected in the projector…(Edward)*

Valley shares almost the same sentiments:

> *We do have a media centre. In the media centre, we do have interactive boards. We do have overhead projectors. We do have hardware computers. In case there is a need for*

printing we do have printers. We have computers with Internet access because computers may sometimes be useless if they do not have Internet access. So, all that is available for learners to use it and for educators' training and for learning as well.

Ndwebu reported his resources but he further extended his response by mentioning the sponsor which supplied him resources. This is what he said: *MTN sponsored the school with computers, Vodacom sponsored with the I-pads, we also use the whiteboard for teaching, we also use the overhead projectors.*

Drawing from what participants have shared, these quotes bring evidence that they have an overarching understanding of the technological resources that should be used for ICT integration. Nevertheless, these quotes reveal that ICT resources vary from one school to the other. What is of vital importance is that the quotes point to the fact that ICT resources are a fundamental mechanism for effective ICT integration in the school. They form part of the initiation stage of ICT integration, and it is up to the principal to ensure that these resources are in place. This may be a very critical role to perform as it involves other stakeholders such as the SGB that are responsible for the school governance and budgeting process. Some stakeholders may not be directly involved in these tasks but play a major role in enabling integration to take place. These include stakeholders such as surrounding companies that sponsor resources to the school. To a great extent, the school are dependent on these companies and should build a good relationship with them. In trying to effectively use ICT resources, schools need to have systems in place. These systems include the election of committees and policies that stipulate procedures on how to use the available resources. With regards to resources, this is what Southbroom had to say:

Since we have 4 departments, each department is given a chance to use them. Each department has to book before they use it. Each department must use it once a week. We also have the policy that every teacher who wants to use it must book it in the HOD first…

Vico stated:

> *Based on the need of the teacher and the time that the teacher will need them we keep the resources at a safe place then when the teacher needs them, they will request for the use of that particular resource.*

Clearly, ICT resources make a fundamental contribution to the effectiveness of ICT integration. They have the potential in enabling learners to acquire more knowledge without having to depend much on their teachers. Technological advancement has led to improvements in the provisioning of relevant information for all educational stakeholders in various educational environments, promoting quality, and innovation in the educational context (Msiza, Malatji & Mphahlele, 2020). Take, for instance, how the use of the Internet in teaching and learning may help learners to communicate and collaborate with other people locally and abroad. Such resources have the potential to develop learners' ability to discover more information. ICT has become ubiquitous in most people's lives **(**Vadachalam & Chimbo, 2017). However, there are still many who have not fully benefitted from it. Perhaps, the single major problem with ICT in rural and township schools is that resources are very minimal. There are further such issues as the geographical locations of schools and the social development of the community. For example, Msiza, Malatji and Mphahlele (2020) have explained how difficult the implementation of ICT resources has been since most schools are not connected to an electricity grid and cannot buy the required infrastructure.

5.6.1 Challenges facing principals in leading ICT integration

As participants shared their challenges with regards to ICT resources, what seemed to come up is that they only depend on the government funding to cover the basic norms and standards, which is very minimal. Some participants raised a concern about the difficulties of data bundles for Internet connection. They also raised a concern about the inconsistency of electricity supply and the unstable network. Above all, participants were also complaining about the high level of crime which has forced them to use more funds from the school budget to ensure the safety and security of their technological devices. This has resulted in principals going astray from

the school budget. As participants shared their challenges concerning ICT resources, this is what they had to say:

> *We are having a problem with data because this school is a no-fee school, it depends on the norms and the standards which make it difficult for our school to get data and also, we are having a shortage of these ICT tools. We also have a problem with electricity and network…I have experienced problems of not having enough funds…(Southbroom).*

Judging by this quote, what seemed to come out is that the Department of Basic Education's support to principals in leading ICT integration appears to be inadequate. Therefore, principals are struggling to provide all the necessary resources for ICT integration to be implemented effectively. On the other hand, participants seem to have been faced with the problem of theft. This is immensely affecting the school budget. Ndwebu added and said:

> *Most of the learners were coming from a poor background. They never had an ICT programme like computers…in terms of security also because since there is a lot of theft around the area and around the community, we have to make sure that we have to hire the security for the night and have to implement (install) the CCTV although it sometimes when there is no electricity it is not working…It takes from our budget because we have to service all these systems every time to make sure that the ICT programme is running at school.*

Perhaps one may argue that in some communities there seem to be a lack of responsibility and ownership. The high rate of burglary reported in schools gives evidence that members of the community surrounding the school do not give support to the school. As a result, it becomes more difficult for principals to lead ICT integration in schools.

As already noted, inequalities pervade the South African schooling system (Spaull & Jansen, 2019), continuing to disadvantage learners from poor backgrounds. Perhaps one may argue that the ideology of ICT integration will become elusive as a school continues to struggle with ICT

resources. Etor, et al. (2020) suggests that there should be an adequate supply of ICT facilities for both teachers and learners for effective ICT integration in schools. Having said that, it is important to highlight that the adequacy of resources cannot have a direct contribution on its own. Each school needs to ensure that resources are not just present but are being used for the right purpose. As the leader of technology in the school, the principal must have strategies and systems in place to ensure that resources are being used for the academic achievement of learners in the school. For an effective ICT integration strategy in schools, there should be a plan setting out the vision for using ICT for teaching and learning and the procedures for implementation (Tondeur, Coopert & Newhouset, 2010).

5.6.2 The role of the Department in assisting principals in this role

Participants reported that they receive some support from the Department of Education in leading ICT integration programmes in their schools. They pointed out that the department assists them with developmental programmes for principals, school visits and conducting workshops for principals as well. If there are any issues around computers, the department sends technicians to fix those computers. Regarding the support that they receive from the department, this is what participants said: In terms of the Department of Education, they have got programmes to develop the principal of the school and *other members of the teaching staff… We do the requisitions from the department to facilitate the purchasing of those items that we are going to need as a school…*(Vico). Southbroom further extended that the department helps them in addressing learners about the use of ICYs. This is what he had to say: *The Department of Education always visits the school to address and assist our learners.* While Vico and Southbroom pointed out developmental programmes for principals and addressing learners, Edward raised a concern and further said that: *…at the moment, at the level of the government there are not many workshops for the teachers on how to use technologically inclined gadgets.* Ndwebu pointed out that: *If there is a new virus, you find that the Department of Education will send the guy to fix up all those computers.*

These quotes provide evidence both for the critical support needed from the Department and also the reality that some, at least, is in place, enabling principals to play their role in leading

ICT integration in their respective schools. With support from the Department, principals may be able to use ICT to improve both the school and learner performance. One implication is that there is a need for workshops for principals to ensure that they are fully conversant with the ways in which ICT should be used for teaching and learning. This is an additional skill needed in this occupation, which requires considerable professional (Bush, Kiggundu and Moorosi (2011). Other than conducting workshops, there is a lot that the Department of Education can do in supporting principals in leading ICT integration. While there is increasing recognition of principal leadership's importance in school improvement, it is also essential for the department to support principals. Such support can enhance principal performance and ultimately contribute to sustainable school performance as well. Bush et al. (2011) raise a concern that across Africa as a continent, there is still no formal programme that is aimed at training principals. This will raise more questions about educational leadership in Africa in particular. What seems to be most contradictory is that, while policies on school governance, leadership, and management are crafted and available, they are not implemented in practice.

5.6.3 The roles of stakeholders in supporting school principals

As participant shared their responses on the support, they receive from stakeholders in leading ICT integration, and it came out that companies play a major role by donating to schools. These donations come in the form of cash, services such as workshops and monitoring programmes. This is what participants had to say:

> *Yes, we do ask for donations from other companies because they can advertise their brands… their support may be in the form of cash or assistance in terms of the workshops…We do try and mobilise donations from these companies because the school is basically able to advertise their brands. (Edward).*

Vico and Ndwebu also shared similar sentiments:

> *Businesspeople, some of them donate to the school* (Vico)…W*e do have some sponsors who also come and do monitor…*(Ndwebu)

As the above quotes suggest, working closely with companies surrounding the school is of vital importance. Their contribution may have a major impact on school performance. It is therefore important for the principal to strategically develop a good relationship between the school and companies. This will also help the school not to rely only on the department to provide resources for teaching and learning to take place.

5.7 Chapter summary

In this chapter, data was presented, analysed and discussed into five themes: the concept of ICT integration, the importance of principal leadership in ICT integration, principal leadership strategies, teachers and learners' response to ICT integration and ICT resources. While presenting, analysing and discussing data, the study sought to explore principals' leadership roles in supporting ICT integration for teaching and learning, as well as to develop an understanding of how principals' leadership strategies can enhance effective ICT integration. Moreover, the study sought to examine how principals' experience in leading ICT can be explained.

The next chapter offers summaries of the key findings of the study, presents conclusions and lessons learned.

CHAPTER 6

SUMMARY OF THE STUDY, IMPLICATIONS AND CONCLUSIONS

6.1 Introduction

While chapter 5 presented the study findings, based on the data from the semi-structured interviews, this chapter aims to reach conclusions on the principals' leadership roles in supporting ICT integration in teaching and learning in secondary schools. The study further examined how principal leadership practices and strategies could enhance ICT integration that advances the process of teaching and learning. Beyond that, it aimed to explain principals' experiences regarding their leadership roles in supporting ICT integration in schools. Finally, it sought to explore key learnings from principals' leadership practices and experiences in leading and supporting ICT integration. This study was based on the assumption that principals have a central role in ensuring that, as instructional leaders, they also enable effective ICT integration in schools. Therefore, the complexity leadership theory is underpinning this research study in order to have an overarching understanding of principal leadership roles, particularly in the era of knowledge production. Above that, this assumption is supported by a range of scholarly work and gazetted government policies. For example, a study by Navaridas-Nalda et al. (2020) indicates that principals' role can include enabling the transformation of the school community so that it adopts a culture of digital exploration; this requires creating opportunities for dialogue on how ICT use can strengthen teaching and learning. This provides evidence of the centrality of principal leadership in leading ICT for teaching and learning.

School principals should, therefore, give support to teachers in integrating ICT for teaching and learning. They should work in collaboration with them in achieving effective ICT integration. As it is well established, principal support is closely related to teacher performance and thus to teacher job satisfaction (Olsen & Huang, 2019). Working in collaboration with teachers could help the principal to achieve more in terms of ICT integration.

This chapter sets out a summary of the research journey. Then I will present the themes that emerged, aligning them with the theoretical framework together with the literature. Thereafter, this will be followed by lessons that I have learned. Finally, I present closing observations.

The research questions of this study were as follows:

1. What are the secondary school principals' understanding of their leadership role in supporting ICT integration in teaching and learning?

2. How do principals' leadership understand to be strategies that enhance ICT integration in teaching and learning

3. What can we learn from principals' leadership role, practices and strategies in leading ICT integration to teaching and learning?

6.2 The research journey

Chapter one introduced the study and oriented the reader to the whole research process, including the background, rationale, problem statement, key objectives, research questions, and significance of the study. The main aim was to highlight important issues of IR4.0 and its impact on schools. This chapter also brought the necessity of principal leadership as a key role in enabling schools to meet the demands of IR4.0. Following that, I intended to identify the gaps in the existing body of knowledge. What was established from the background was that, since we are in the 21st century, there has been a revolutionary change in the education system. This change emanates from rapid technological advancement. Due to the exponentially paced technology advancement, schools are beginning to change. The emergence of new technologies in education has shaped the classroom and learners' experiences (Oliveira et al., 2019). Such change emanates from the belief that technology can help learners meet and maintain the standards and expectations of the 21st century, where knowledge is a commodity. Thus, Oke and Fernandes (2020) believe that ICT integration can form the basis of a rapid diffusion and penetration of IR4.0. Teachers have begun to incorporate technology in the teaching practice.

The roles of principals are now expanding as new responsibilities are assigned to them. Mestry (2017) argues that principals' roles expand as they are expected to meet new demands. This, therefore, led to the need for principals who will be able to lead the change that is needed in schools. Hence, the world of principals is becoming much more complex. Drawing from the complexity of principal leadership roles, it is therefore of vital importance for them to have a comprehensive understanding of their roles. Such an understanding begins by demonstrating the ability to develop clear visions and strategic plans for implementing ICT in their schools.

Chapter two presented the literature review. I started conceptualising important concepts such as educational leadership, ICT integration and principals' leadership roles in leading ICT. I then highlighted the relevance and importance of ICT integration in teaching and learning and principals' leadership roles in supporting ICT integration. These roles include planning, assigning tasks to teachers, resourcing and providing support for effective ICT integration. The literature offered insight into principals' leadership roles in supporting ICT integration in teaching and learning, particularly in secondary schools. I drew from international empirical studies to highlight the historical background and pertinent issues of educational leadership. Palaiologou and Male (2018) indicate that the history of leadership in educational settings has been developed particularly in western cultures, and there is a need for a more inclusive research agenda. The review included a range of issues around principal leadership for teaching and learning, one of which is how leadership is perceived as the world changes radically. For instance, Mestry (2017) reports how major reforms of curriculum, teaching and assessment across different countries have identified the need to prepare principals more effectively for the emerging demands places on education. Uhl-Bien et al. (2007, p. 305) asserts that a complex adaptive system (CAS) as a complex interplay from which a collective power for action and change emerges when different agents interact in networks in ways that produce new behavioural patterns or new modes of operating.

In chapter two, I also highlighted policies that are foregrounding leadership and ICT integration in schools. These policies include White Paper 7 on e-learning, the Policy on the South African Standard for Principals, White Paper on Science, Technology and Innovation and the FiveYear

Strategic Plan. What seems to appear from these policies is that they are clear in terms of what should be happening in schools. However, in terms of practice, there are a lot of contextual factors that principals need to deal with before considering implementing them. Another issue is that they are designed as a one size fit all, yet schools are facing different contextual challenges as they are located in different demographics.

Chapter three moves to discussing the theoretical framework of the study. The study was underpinned by Complexity Leadership Theory, which allowed me to view educational leadership from a different perspective. Complexity leadership theory helped in developing an overarching understanding of leadership in the 21st century that is characterised by a radically changing world. What seems to be noticeable with complexity leadership theory is its recognition of the change in educational leadership. It recognises a shift from the emphasis on administrative and bureaucratic leadership to interactive and collaborative forms that allow organisations to develop innovation for new conditions that improve performance. Beyond that, it allows different and diverse actors, promote interdependence among them, and form dynamic collectives with common goals (Mäkinen, 2018; Ochara, 2017). Hence, principal leadership should always be willing to work together and develop a capability of bringing a balance between administrative functions and new dynamics that demand fresh ideas. Uhl-Bien et al. (2007) and Meneds et al. (2016) highlight that viewing leadership as a bound by ideas of hierarchy and control is no longer relevant. This necessitates the complexity leadership theory as a theoretical framework of the study.

Chapter four focused on the design of the study and its methodology. This study was informed by the interpretive paradigm, which enabled me to explore the principals' leadership roles in supporting ways of innovation ICT use in teaching and learning. The interpretive paradigm has also allowed me to examine how principals' practice and strategies could enhance such integration. Moreover, this paradigm allowed me to have the ability to better understand the experiences of principals regarding their leadership role in supporting ICT integration in schools. I conducted a multi-case study which enabled me to further understand the

phenomenon, using semi-structured interviews with participants, face-to-face, as the primary method for generating data.

In chapter five, I present data and the findings of the study. I developed themes, and therefore, the findings are presented in themes. These themes include principals' understandings of their leadership roles in supporting ICT integration in teaching and learning, principals' leadership practices and strategies to enhance ICT integration and principals' experiences in leading ICT integration. The summary of findings and conclusions are discussed below.

One of the first findings that emerged was that some principals clearly understand ICT integration and its importance in enhancing teaching and learning. They seemed to be explicit on how they should lead ICT integration in their respective schools.

Another finding that arose was that, while there may be challenges facing principals in leading ICT integration, all seem to be benefitting from it. The participants highlighted that ICT integration is making teaching and learning an easy job. One of the five participants seems to believe that with ICT integration, teachers can finish the annual teaching plan on time (more discussion is on page 67). Beyond that, to a greater extent, participants highlighted that ICT integration had improved their school performance. This gives considerable evidence that principals are in vehement support of ICT integration as it benefits themselves and enhances the school performance.

While participants highlighted some challenges, they are faced with in leading ICT, it appears that other stakeholders play a pivotal role in giving support to their schools. These stakeholders are giving donations to the school and sometimes come to schools for conducting workshops for capacitating teachers in integrating ICT. These stakeholders include private companies and other sister departments within the government. Seemingly, the relationship between these stakeholders and some of the schools is mutual, as they both benefit from each other. Two participants highlighted that they allow companies to assist them with ICT programmes as they need the school to penetrate the market for their new software.

A further finding is that schools, as institutions of learning, are becoming change agents in preparing learners for survival in the competitive world of the information age. Therefore, principals should perform several roles in leading ICT in school. In that, principal leadership is central in the school. Leadership in organisations appears to be a significant mechanism that could manage the hardships of the information age (Baltacı & Balcı, 2017). A study by Adams and Muthiah (2020) states that other than managing schools, principals in recent years need to equip themselves with the knowledge and skills to do their work effectively. Drawing from literature, one may argue that, as the world changes, schools through their principal leadership also need to change. Hence, principals need to create new learning settings that will accommodate the use of technology that is believed to enhance the quality of teaching and learning. This can be realised through effective principal leadership, strategies and novelty.

Finally, the findings revealed that principals were experiencing challenges in leading ICT integration. Four principals pointed out that the department's budget allocation is minimal, making it difficult to provide all the necessary resources for ICT to be integrated effectively. As a result, their schools' available resources were not equivalent to the number of learners enrolled in their respective schools. This resulted in an accumulation of hindrances, as they ended up not having a proper plan on how to allocate the resources for all the departments within the school. However, one out of the five participants seemed to have not experienced a problem with resources, as he pointed out that the Departments of Minerals has been supporting the school ever since they have started integrating ICT in teaching and learning.

6.3 Conclusions and key lessons drawn from findings

This section presents conclusions and the learnings that could be drawn from the findings of the research study. These are discussed below.

6.3.1 Principals' leadership roles in supporting ICT integration in teaching and learning

The first research question pursued to explore principals' understanding of their leadership roles in addressing ICT integration into teaching and learning. The findings revealed that principals do have an overarching understanding of the responsibilities they should be performing in supporting ICT integration. A study by Grosmire and Grady (2007) suggests that principals should establish a context for ICT integration and have an overarching understanding of how ICT can support learning and enhance learner engagement and progress. What was noticeable from the findings of this study was that most principals appeared to be cognisant that they have an integral role in enabling the schools they lead to meet the demands of the fast-paced changing world. There are three fundamental roles of principals as technology leaders: role modelling, instructional leaders, and visionary (Gosmire & Grady, 2007). Principals also indicated that ICT integration makes teaching and learning much more effective and productive as it saves time and information is readily available. Alenezi (2019) asserts that ICT integration is associated with fostering a positive attitude towards technology, substantial savings in teaching time and helping learners in becoming better problem solvers. Hence, principals should take the lead in supporting ICT for the process of teaching and learning.

Principals shared a range of leadership roles that they enact in supporting ICT integration. These roles include developing a plan that sets out the vision for how ICT will be integrated, providing resources and giving support to teachers for effective implementation. For instance, a study by Maifala (2017) confirms that school leaders should have clear visions and strategic plans for implementing ICT in their schools. Principals' understanding of their leadership roles in leading and supporting ICT integration appeared to emanate from viewing themselves as instructional leaders and resource managers. Bada et al. (2020) state that the provision, evaluation and supervision of material resources are part of principals' roles. Hence, drawing from what principals have shared, there seems to be a considerable amount of evidence that principals understand their roles in leading and supporting ICT integration.

What came up from principals as they shared their leadership roles, is that, as the world changes, they face new demands in making sure that schools meet the demands of the IR4.0. Mestry (2017) confirms that principals are faced with multifaceted tasks as the world changes. This confirms that principals in the 21st century are required to undertake a wide range of managerial and leadership roles. Tran et al. (2017) also maintain that the development of a learning culture appears to require effective principal leadership. Above that, principals in the 21st century should also create a platform where all the stakeholders will be able to share their ideas for their schools to reach greater heights, especially when they are to adapt to a new learning environment. Mäkinen (2018) indicates that adaptive leadership results from conflict and tensions produced by introducing new ideas, new knowledge and new learning that do not connect well with the established ways of operation. Therefore, as the world changes, the world of principals changes and becomes much more complex, with their roles becoming more integral. Hallinger, Li and Ko (2015) report that numerous dimensions of principal leadership make a crucial contribution to school performance.

While principals may have been clear of what they understand of the roles in supporting ICT integration, seemingly, they were experiencing some challenges in performing these roles. These challenges include inadequate professional development for principals, lack of support from the department, and limited resources and infrastructure. Moreover, what appears to be problematic is that policies that foreground ICT integration are well crafted but the means for implementing them are insufficient. This has resulted in more challenges for principals to lead ICT integration in schools effectively. The policies state that ICT can address the challenges of social and geographical isolation, foster improved access to information and education, and enable the marginalised to participate directly on significant decisions that will impact their lives (RSA, 2004). The issue of developmental programmes, resources and support from the Department became strongly into focus in the findings of the study, as principals repeatedly mentioned that the funds allocated to schools are very minimal. Principals also raised concerned that revealed that, for effective ICT integration, the Department of Basic Education still has a lot to do.

6.3.2 Principal leadership strategies that enhance ICT integration to teaching and learning

After looking at how principals understand their roles in supporting ICT integration, I then looked at how principals' leadership practices and strategies can enhance ICT integration in education in schools. For an effective ICT integration strategy, schools must adopt a clear and well-communicated plan that sets out the vision of how ICT will be used for teaching and learning (Tondeur, Coopert & Newhouset, 2010). When engaging with participants on this question, they shared different strategies that they use to enhance ICT integration. What appeared to be common to most participants was that they work closely with other stakeholders to enhance ICT integration in their respective schools. This strategy required these principals to maintain a good relationship with stakeholders. A study by Mäkinen (2018) states that complexity leadership theory suggests that stakeholders should be kept updated of any decision taken and of changes made in the organisation to take ownership of their role in the identity formation process. According to Uhl-Bien et al. (2006), enabling leadership theory addresses how leaders can create the new conditions and adaptive forms of leadership as existing administrative leadership still persists with a pressure for change. This may help the principal to enable the new learning settings needed in the school. Bäcklander (2018) believes that enabling leadership is a key balancing force in complexity leadership theory. Some participants refer to local companies as stakeholders, and some also referred to parents, teachers and learners. With those companies referred to as stakeholders, they highlighted that they work with those companies for sponsorships. These sponsorships assisted participants in buying technological resources. Some participants believed that it is in their interests to provide visibility to this generosity, to ensure that the implementation process is effective.

Principals' leadership strategies seem to be fundamental in the implementation of the ICT integration process and these strategies form a central role in the emerging practices required from principals (Maifala, 2017; see also Mingaine, 2013). What appeared to be common was that principals use their leadership strategies to ensure that ICT are well integrated for teaching and learning effectiveness. Bada et al. (2020) highlight that principals' instructional leadership strategies are significantly associated with teachers' job satisfaction and self-efficacy. Findings

also appeared to reveal that some participants conduct workshops to ensure that teachers are well acquainted in integrating ICT for teaching and learning. Principals need to facilitate a digital transformation, through their capacity to foster a solid terrain that allows the school communities to see ICT integration as important as possible (Navaridas-Nalda et al., 2020). Bäcklander (2018) believes that the primary outcomes that mark a team as best performing are delivery and continuous improvement. Above that, participants also conduct workshops for capacitating teachers to productively utilise ICT resources. One participant highlighted that he elects a committee that will manage the use of ICT in the school.

6.3.3 What can we learn from principals' leadership role and strategies in leading ICT integration to teaching and learning

Drawing from this study, there are several lessons that could be learnt. My intention was to explore principals' experiences regarding their leadership role in supporting ICT integration in schools. In the quest of exploring this, the finding of the study was that principal experiences in leading and supporting ICT integration vary from one principal to the other. Principals shared both positive and negative experiences. Some of the experiences shared by principals were context-based and yet beyond their spectrum. As a result, the lesson is that, principals should be well capacitated to execute their leaderships as their roles are fast ranging in the top of educational priorities. As they raised a number of issues they have been experiencing ever since they have started leading ICT integration in their schools, perhaps, this calls for professional development to equip principals to meet the demands of the 21st century. Support and intervention programmes to empower principals to lead and manage schools effectively are of paramount importance (Mestry, 2017; see also Naidoo, 2019).

On the one hand, the findings of the study are that leading ICT integration in teaching and learning has not been an easy task, particularly in deep rural and township schools. Drawing from data generated in the study, it is evident that some principals have been experiencing several difficulties in attempting to manage ICT integration. The lesson is that, as the world changes, with exponential advancement of technology, principals who are leading ICT integration in rural and township schools seem to be facing challenges that demand a high level

of commitment of their leadership roles. Some of these difficulties were even beyond their control. Mestry (2017) argues that the roles of principals expand as they are expected to meet new demands. Nevertheless, the lesson is that new ideas may arise where there are challenges wherein schools may develop new systems that may help the school adapt to the new learning environment. According to Uhl-Bien et al. (2007), CAS emerges naturally in social systems where leaders can solve problems creatively and learn to adapt quickly.

On the other hand, it is somewhat surprising and interesting that some principals appeared to have had a good experience in leading ICT for effective teaching and learning in their schools. They have highlighted a number of benefits that they have achieved ever since they started integrating ICT for teaching and learning in their schools. Some of these benefits were that ICT integration makes teaching an easy job. Teaching is becoming more interesting and can take place on different platforms such as WhatsApp groups, emails, tec. Moreover, principals indicated that with ICT saves time. Alenezi (2019) asserts that ICT integration is associated with fostering a positive attitude towards technology, substantial savings in teaching time and helping learners in becoming better problem solvers.

Drawing from the leadership strategies that principals have shared, we learn that leading ICT expose principals to unprecedented levels of change. This corroborates with Bada, Ariffin and Nordin (2020) argue that the leadership roles of principals have become more complex and demanding, making instructional leadership the central role of school principals. It has become clear that principals are not yet up to the challenges presented by the demands of the IR4.0. From this, the lesson is that if principals have a comprehensive understanding of the information age, it may be easier for them to lead and support ICT integration in teaching and learning effectively.

Moreover, what appeared to be evident from what principals have shared was that there had not been enough support and training from the Department of Education to effectively capacitate them to lead and support ICT integration in teaching and learning. The majority of principals raised a concern that the support from the department has been insufficient. One of

the issues is that the Department of Basic Education has not addressed the impediments that principals face, in enabling ICT integration in their schools, exacerbating inequalities between rural, township and urban schools and preventing a uniform standard of education across the country. However, the lesson that could be learnt from principals strategies is that, working closely with companies surrounding the school is of vital importance. This may have a major impact on school performance. It is therefore vital that principal to strategically develop a good relationship between the school and businesses. This will also help the school not to rely only on the department to provide resources for teaching and learning to take place.

6.4 Implications for further study

ICT integration can be viewed as a good initiative, as schools are approaching the IR4.0 and the related technological advancements. However, it could be more interesting and effective if principals were to undertake thorough training in preparing them for the new roles that come with IR4.0. Ahmad and Ghavifekr (2017) argue that, with a quick advancement of technology, particularly ICT, the nature of schools and the meaning of learning changes radically. The argument developed in this study is that we cannot assume that principals as instructional leaders, will have the capacity to lead ICT integration. Such an assumption may exacerbate the implementation process. In fact, this corroborates with increasing empirical studies that gives emphasis to the need for developing principals to meet the demands of the information age. Hence, the task that principals need to undertake, if they are to innovate effectively, appears to be a mammoth task, particularly in the township and rural areas. A study by Fullan (2020) confirms that more dynamic, and interactive forms of educational leadership are required in the 21st century. This calls for further empirical research studies that explore the role of the Department of Basic Education in preparing principals for the demands of the IR4.0.

6.5 Conclusion

This study set out to explore how the leadership roles of principals do already and can in the future enable the integration of ICT into teaching and learning. Evidence on the nature of these roles is critical if we are to understand the extent to which principals can manage the emerging

demands placed on them in this new context of technological development. The study also sought to examine principals' leadership practices and strategies in ICT integration. The ways in which they practise leadership roles and develop their leadership strategies have the potential to illuminate the roles needed in the 21st century. It becomes evident from the findings that principals have an integral role in supporting ICT integration in teaching and learning. Lastly, it was found that there is wide variation in the experiences in leading ICT integration, a variation that, in turn, impact how they lead ICT integration in their respective schools.

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APPENDICES

APPENDIX A: LETTER TO THE PRINCIPAL

Education and Development Studies,
School of Education,
College of Humanities,
University of KwaZulu-Natal,
Pietermaritzburg, Campus, KwaZulu-Natal

Date: 16 July 2020

Dear Principal

My name is Sboniso Wilberforce Mngadi (Student No. 207506375) a Master's (M. Ed) student in the School of Education, College of Humanities at the University of KwaZulu-Natal (Pietermaritzburg campus). As part of the requirements for this degree, I am required to conduct a research project. The title of my research study is: **Exploring principals' leadership roles in supporting Information Communication Technology (ICT) integration in teaching and learning in secondary schools**.

Many educational reforms have put leadership and management as a prime concern. This is reflected in different scholarly work as it is becoming evident that educational leadership and management come before anything else. This also applies to ICT integration to teaching and learning, wherein principals have an integral leadership role to perform.

In view of the foregoing statement, I intend to explore principals' leadership roles in supporting ICT integration in teaching and learning.

The objectives of the research are as follows:

1. **To explore principals' understanding of their leadership role in supporting ICT integration in teaching and learning.**
2. **To examine how principals' leadership practices and strategies enhance ICT integration in the process of teaching and learning.**
3. **To explain the experiences of principals regarding their leadership role in supporting ICT integration in schools.**

You are invited to please participate in the study because you are the principal that is leading ICT integration in your school. To gather the information, I am interested in requesting you to participate in this project by reflecting critically on your experiences, practices, and leadership roles in supporting ICT integration in your school. I will ask you questions during interview sessions. The study is expected to enroll five secondary school principals who are already practicing their leadership roles in supporting ICT integration in their schools in the Ugu District. It will involve the following procedures: Participants will be engaged in a face-to-face semi-structured interview as a primary data generation method. Each interview with each participant, will take at least an hour. To enhance the quality of the interview and data collection, I will use an audio recorder. During interviews, I will ensure that I will not disturb teaching and learning. Follow-up interviews may be conducted after the semi-structured interviews if I seek clarity in certain aspects. Each interview will be voice-recorded. However, due to COVID-19 regulations I may use WhatsApp, zoom, email and telephonic meetings. The duration of their participation if they choose to participate and remain in the study is expected to be 4-6 weeks.

This study will not involve any risks and/or discomfort for the school and participants. Also, the study will not provide direct benefits for the school or participants.

Your participation in this research study is voluntary and participants may withdraw participation at any point. In the event of refusal/withdrawal of participation the participants will not be penalised. There are no consequences for participants who withdraw from the study. No costs will be incurred by participants as a result of participation in the study and there are no incentives or reimbursements for participation in the study.

Your involvement is purely for academic purposes only and any information given by you cannot used against you, and the collected data will be used for purposes of this research only. All names of schools and participants will be changed, and pseudonyms will be used so that schools and participants remain anonymous. Information provided by participants will remain confidential and will not be shared with anyone else. Data generated through semi-structured interviews and follow-up interviews will be stored in the supervisor's office, at the School of Education, Pietermaritzburg campus for five years, and thereafter be destroyed. In terms of digital data generated, I will save it in one folder electronically and send it to the supervisor's office. Immediately after I have sent it, I will then delete it. It will then be kept at the supervisor's office and be destroyed after five years.

Thank you for your cooperation.

Yours faithfully

Sboniso Mngadi

……

S.W. Mngadi (Mr.)

Email: sbonisosw305@gmail.com

Cell: 071 999 6438 **My**

supervisor is:

Dr. P. Mthembu who is located at the School of Education, Pietermaritzburg Campus of the University of KwaZulu-Natal.

Contact details: e-mail: Mthembup@ukzn.ac.za.

Phone number: 031 260 8177 or 033 260 6095

For additional information, you may also contact the UKZN Research Office through:

(HSSREC Research Office)

Tel: 031 260 4557 E-mail: Hssrec@ukzn.ac.za

DECLARATION OF CONSENT

I ……. (Full names of the school principal) have been informed about the study entitled: The title of my research study is: **Exploring principals' leadership roles in supporting ICT integration in teaching and learning in secondary schools.** The name of the researcher is: Sboniso Wilberforce Mngadi. I understand the purpose and procedures of the study. I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to. If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at 071 999 6438/sbonisosw305@gmail.com.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact: Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

I hereby provide consent to:
Audio-record my interview / focus group discussion YES / NO

_____

Signature of Principal…….

Date…….

School stamp

APPENDIX B: INTERVIEW SCHEDULE

INTERVIEW SCHEDULE

Exploring principals' leadership roles in supporting ICT integration in teaching and learning in secondary schools.

Introductory section

Kindly introduce yourself and tell me more about your experience in the teaching profession.

What is the mission of the school?

What are the principals' understanding of their leadership role in supporting ICT integration in teaching and learning?

1. In your opinion what is your understanding of principals' leadership roles in the school?
2. How can you define ICT integration in teaching and learning?
3. In your experience, what would be your comment in leading ICT integration in your school?
4. Why do you think there is a trend or necessary to integrate ICT in South African schools?
5. To what extent has ICT integration impacted your school performance?
6. Why do you think principal leadership is important in leading ICT integration in your school?
7. How do you think technology can be incorporated in teaching and learning?
8. What resources available that are used for ICT integration in your school?
9. How are the available resources distributed in the school?
10. Is there any written documentation that regulate the use of ICT resources? Please elaborate further.
11. How do you ensure that teachers adhere to these regulations?

How do principals' leadership understand to be the strategies that enhance ICT integration in the process of teaching and learning?

1. Who initiated the idea of ICT integration in your school?
2. What factors led to the initiation of ICT integration?
3. What were initial objectives that you aimed to achieve in the beginning?
4. Have you managed to achieve all the predetermined objective? If not, what are the diminishing factors that serve as hindrances from you achieving what you wanted to achieve in the initial stage?
5. Are there any leadership practices and strategies that you use to enhance ICT integration in your school? Please elaborate.
    - ✦ How do you ensure that resources are utilised productively?

- ✦ Except for the support from the department, have you received any developmental support from other learning institutions such universities or so?

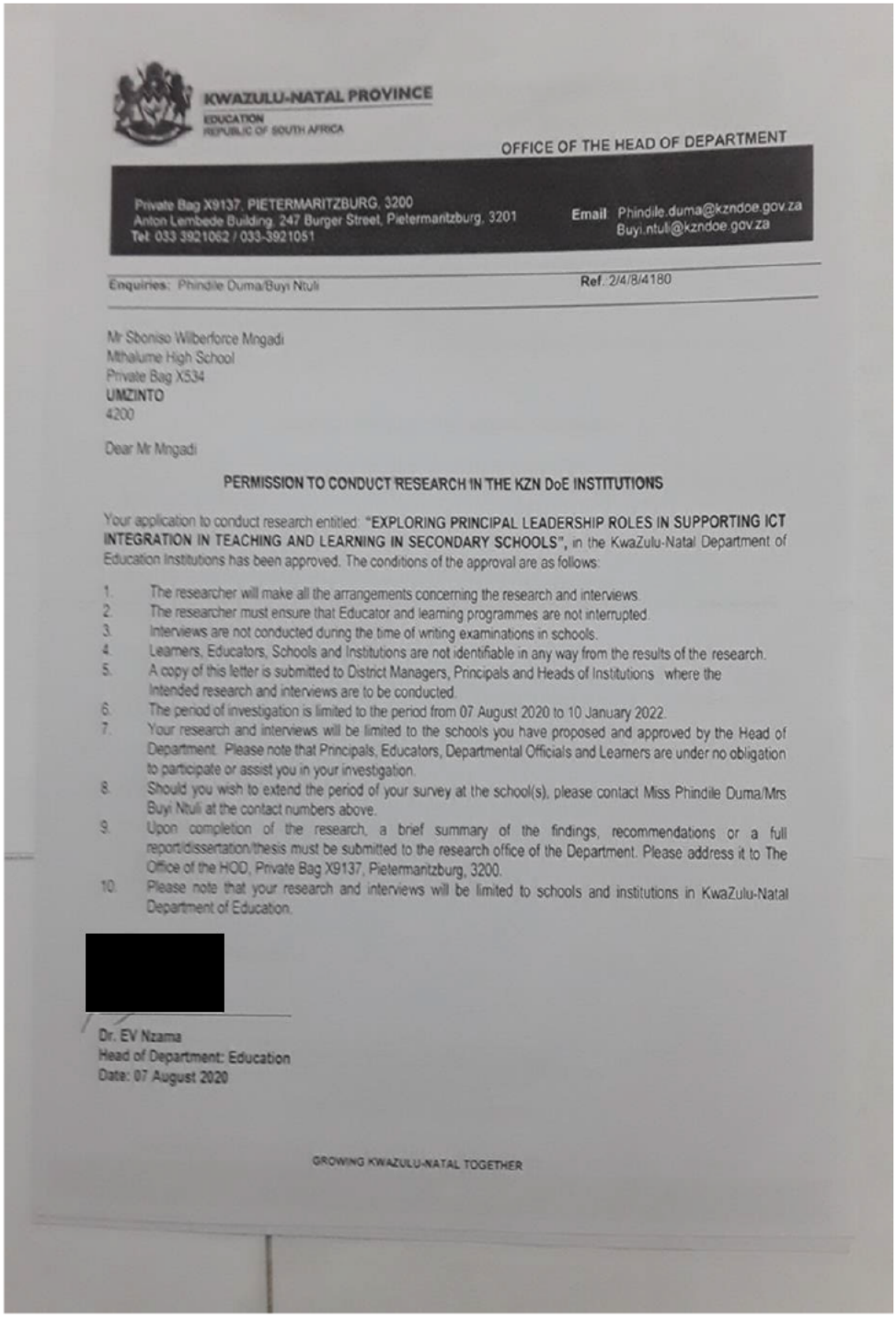
6. What systems do you have in place in ensuring effective use of technology in the process of teaching and learning?

   - ✦ How do you ensure that teachers are well equipped in integrating ICT in teaching and learning?
7. To what extent has ICT integration affected school budget?
8. Who do you regard as stakeholders in your school?
9. How do these stakeholders contribute to both learner's and the school's performance?
10. Please share your experience in working with the stakeholders of the school in leading the school.
11. The most of decision-making in the Department of education are taken using a topdown approach. Do you agree with this stamen? Support your stance.
    - ✦ What effect does this approach has on your leadership as far as leading ICT integration is concerned?
    - ✦ How do you bring the balance between the decisions taken withing the school and the ones that are taken by the departments which may have influence in the way you lead ICT integration in your school?

How can the experiences of principals regarding their leadership role in supporting ICT integration in schools be explained?

1. Tell me more about your experiences in leading ICT integration in your school?
2. What would be your comment on both teachers' and learners' response to the use of technology in teaching and learning?
3. Please comment on the comparison between the traditional approaches of teaching and the new approach that incorporates technology in teaching and learning.
4. Leading instructional core (teaching and learning) is the key role of the principal of the school. Do you agree with this statement? Please support your stance.
5. Stemming from your experience, what are some of the factors which you would consider to be beyond your control as far as leading ICT integration is concerned?
6. In your own view, what advice would you give to other principals who are leading ICT integration in their schools?
7. As many reforms take place in the education system, to what extent do you think ICT integration has contributed to enhancing the quality of teaching and learning?
8. With all your experience in leading ICT integration in teaching and learning, where do you see your school in few years to come?
9. Are there any external factors that have an impact in your leadership in leading ICT integration? Please share.
10. What support do you get from the Department of Education in supporting your leadership as far as ICT integration is concerned?

APPENDIX C: GATEKEEPER'S LETTER



KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

OFFICE OF THE HEAD OF DEPARTMENT

Private Bag X9137, PIETERMARITZBURG, 3200
Anton Lembede Building, 247 Burger Street, Pietermaritzburg, 3201
Tel: 033 3921062 / 033-3921051

Email: Phindile.duma@kzndoe.gov.za
Buyi.ntuli@kzndoe.gov.za

Enquiries: Phindile Duma/Buyi Ntuli

Ref: 2/4/8/4180

Mr Sboniso Wilberforce Mngadi
Mthalume High School
Private Bag X534
UMZINTO
4200

Dear Mr Mngadi

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **"EXPLORING PRINCIPAL LEADERSHIP ROLES IN SUPPORTING ICT INTEGRATION IN TEACHING AND LEARNING IN SECONDARY SCHOOLS"**, in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

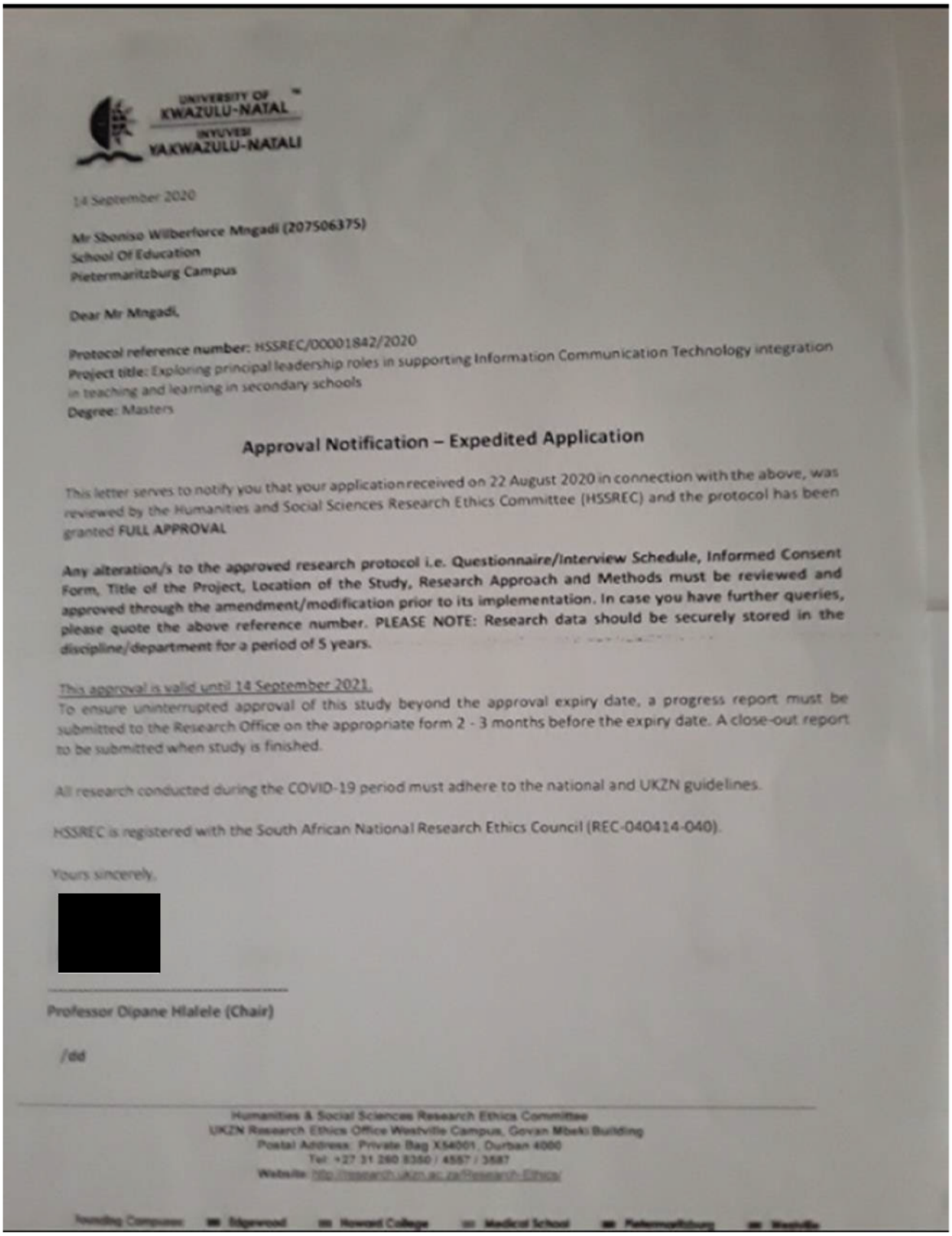
1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 07 August 2020 to 10 January 2022.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Phindile Duma/Mrs Buyi Ntuli at the contact numbers above.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.

[redacted]

Dr. EV Nzama
Head of Department: Education
Date: 07 August 2020

GROWING KWAZULU-NATAL TOGETHER

APPENDIX D: ETHICAL CLEARANCE CERTIFICATE



UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

14 September 2020

Mr Sboniso Wilberforce Mngadi (207506375)
School Of Education
Pietermaritzburg Campus

Dear Mr Mngadi,

Protocol reference number: HSSREC/00001842/2020
Project title: Exploring principal leadership roles in supporting Information Communication Technology integration in teaching and learning in secondary schools
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 22 August 2020 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 14 September 2021.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

All research conducted during the COVID-19 period must adhere to the national and UKZN guidelines.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,

[redacted]

Professor Dipane Hlalele (Chair)

/dd

Humanities & Social Sciences Research Ethics Committee
UKZN Research Ethics Office Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Tel: +27 31 260 8350 / 4557 / 3587
Website: http://research.ukzn.ac.za/Research-Ethics/

Founding Campuses: Edgewood, Howard College, Medical School, Pietermaritzburg, Westville

APPENDIX E: TURNITIN CERTIFICATE