

Exploring the Digital Readiness of Gauteng Public School Educators during COVID-19.

Itumeleng Phorosi

**A research report submitted to the Faculty of Commerce, Law and
Management, University of the Witwatersrand, in partial fulfilment of the
requirements for the degree of Master of Management in the field of
Digital Business**

Supervisor: Ayanda Magida

28 February 2022

ACKNOWLEDGEMENTS

I wish to express my gratitude to my supervisor, Ayanda Magida for her guidance while I completed this research. I know I wasn't the easiest student to work with, but she helped me get through.

All the research participants who I had to hunt down to make sure that I completed all my interviews on time. Their valuable insights and passion for education are what helped me get the right answers for this study.

My family and friends for their unwavering support and constant encouragement, especially through 2021 which was one of the worst and toughest years of my life.

My mom, my forever rockstar!!!

And finally, to God the Almighty for being with me every step of the way even when I felt like giving up.

KE A LEBOGA.

ABSTRACT

The COVID-19 pandemic presented a new normal for the world in more ways than one. As many aspects of our lives were disrupted, so too was education and the way in which education was delivered. Schools were forced to implement a digital means of teaching and learning, to ensure that the curriculum for the year was not interrupted as far as possible. This required educators to use tools and platforms they might not have been familiar with, and this could present issues when trying to teach learners.

This phenomenological research aimed to explore the digital readiness of educators by exploring the factors that promote or inhibit the use of technology in classrooms. Particularly in public schools located in the Gauteng Province of South Africa. The participants were high school educators, with 8 semi-structured interviews being conducted online, using Microsoft Zoom and Google Meets.

The findings suggest that several factors were present that acted as barriers to the successful integration of technology in their classrooms. These factors are lack of access to resources, proper infrastructure, training, and support. The digital competencies and skills possessed also emerged as a determinant of the readiness to use technology in the classroom. This tells us that educators were not entirely prepared, and their digital readiness was not at optimal level for them to continue efficiently and effectively teaching their learners during Covid-19.

KEYWORDS

e-Learning, digital readiness, educators, ICT, teaching, online learning, learners

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	2
ABSTRACT	3
KEYWORDS.....	4
LIST OF ACRONYMS	9
CHAPTER 1. INTRODUCTION.....	10
1.1 PURPOSE OF THE STUDY	10
1.2 BACKGROUND OF THE STUDY	10
1.3 RESEARCH PROBLEM	12
1.4 RESEARCH QUESTIONS.....	13
1.5 SIGNIFICANCE OF THE STUDY	13
1.6 DELIMITATIONS OF THE STUDY.....	14
1.7 DEFINITION OF TERMS	15
1.8 ASSUMPTIONS	15
1.9 CHAPTER OUTLINE.....	16
CHAPTER 2. LITERATURE REVIEW	17
2.1 INTRODUCTION.	17
2.2 BACKGROUND DISCUSSION	18
2.3 HOW DID EDUCATORS' ATTITUDES AND PERCEPTIONS TO THE USE OF ICT FOR TEACHING CHANGE THEIR ONLINE TEACHING EXPERIENCE?	19
2.3.1 PROPOSITION 1.....	21

2.4	WHICH FACTORS INFLUENCED THE EDUCATORS' EXPERIENCE OF USING ICT IN THE CLASSROOM FOR TEACHING?	21
2.4.1	ACCESS TO RESOURCES.....	22
2.4.2	TRAINING	22
2.4.3	INFRASTRUCTURE	23
2.4.4	SUPPORT.....	24
2.4.5	PROPOSITION 2.....	25
2.5	WHAT DIGITAL CAPABILITIES AND TRAINING DID THE EDUCATORS RECEIVE, IF ANY, BEFORE THE COVID-19 PANDEMIC TO PREPARE THEM FOR THE EXPERIENCE OF TEACHING ONLINE?.....	25
2.5.1	PROPOSITION 3.....	26
2.6	ANALYTICAL FRAMEWORK.....	27
2.7	CONCLUSION OF LITERATURE REVIEW.....	29
2.7.1	PROPOSITION 1.....	29
2.7.2	PROPOSITION 2.....	30
2.7.3	PROPOSITION 3.....	30
CHAPTER 3. RESEARCH METHODOLOGY.....		31
3.1	RESEARCH APPROACH	31
3.2	RESEARCH DESIGN	31
3.3	DATA COLLECTION METHODS	32
3.4	POPULATION AND SAMPLE.....	32
3.4.1	POPULATION	32
3.4.2	SAMPLE AND SAMPLING METHOD	32
3.5	THE RESEARCH INSTRUMENTS	33
3.6	PROCEDURE FOR DATA COLLECTION.....	33
3.7	DATA ANALYSIS AND INTERPRETATION	34
3.8	LIMITATIONS OF THE STUDY.....	34
3.9	TRANSFERABILITY AND DEPENDABILITY	35
3.9.1	TRANSFERABILITY	35
3.9.2	CREDIBILITY	35
3.9.3	DEPENDABILITY	36

3.10	DEMOGRAPHIC PROFILE OF PARTICIPANTS	36
3.11	ETHICAL CONSIDERATIONS.....	36

CHAPTER 4. PRESENTATION OF FINDINGS 38

4.1	INTRODUCTION	38
4.2	RESULTS PERTAINING TO PROPOSITION 1	39
4.2.1	FEELINGS TOWARDS ONLINE TEACHING	39
4.2.2	BENEFITS TO ONLINE LEARNING.....	41
4.3	RESULTS PERTAINING TO PROPOSITION 2	43
4.3.1	ACCESS TO RESOURCES.....	43
4.3.2	TRAINING BEFORE LOCKDOWN	45
4.3.3	INTERNET CONNECTIVITY	46
4.3.4	TECHNICAL PROBLEMS	47
4.3.5	SUPPORT GIVEN	48
4.4	RESULTS PERTAINING TO PROPOSITION 3	50
4.4.1	TRAINING WHILE IN UNIVERSITY/COLLEGE & FURTHER DEVELOPMENT.....	50
4.5	SUMMARY OF THE RESULTS/FINDINGS	52

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS .53

5.1	INTRODUCTION	53
5.2	DEMOGRAPHIC PROFILE OF PARTICIPANTS	53
5.3	DISCUSSION PERTAINING TO PROPOSITION 1.....	53
5.4	DISCUSSION PERTAINING TO PROPOSITION 2.....	55
5.4.1	ACCESS TO RESOURCES.....	55
5.4.2	TRAINING.....	56
5.4.3	INFRASTRUCTURE	57
5.4.4	SUPPORT.....	57
5.5	DISCUSSION PERTAINING TO PROPOSITION 3.....	58
5.6	CONCLUSION	59

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS 60

6.1	INTRODUCTION	60
-----	--------------------	----

6.2	CONCLUSIONS REGARDING RESEARCH QUESTION 1	60
6.3	CONCLUSIONS REGARDING RESEARCH QUESTION 2	61
6.4	CONCLUSIONS REGARDING RESEARCH QUESTION 3	65
6.5	RECOMMENDATIONS	65
6.6	SUGGESTIONS FOR FURTHER RESEARCH	67
REFERENCES		68
APPENDIX A: PARTICIPANT INFORMATION SHEET		73
APPENDIX B: CONSENT FORM		74
APPENDIX C: INSTRUMENT		76

LIST OF ACRONYMS

4IR – Fourth Industrial Revolution

Covid-19 - Coronavirus 2 (SARS-CoV-2)

DBE – Department of Basic Education (after 2009)

DOE – Department of Education (before 2009)

ITC – Information and Communication Technology

SA – South Africa

TRI – Technology Readiness Index

CHAPTER 1. INTRODUCTION

1.1 Purpose of the study

This qualitative study sought to explore the level of educators' digital readiness in the basic education sector of schools to deliver teaching to learners using technology. This research aimed to understand the factors that affect educators' readiness to use these technologies introduced into schools to supplement the learning process and ensure learners do not fall behind in their curricula.

1.2 Background of the study

In recent years, technology integration in education has been a key focus, including in developing countries (Owen et al., 2020). While some technologies were introduced into schools prior to the Covid-19 pandemic, in some cases, technology was only introduced during the pandemic when schools were forced to shut down due to the lockdown regulations enforced in South Africa.

Coronavirus (Covid-19) is a virus that was first detected in 2019, in the city of Wuhan in China (Mhlanga & Moloi, 2020). The virus has had devastating effects across the globe, with over 3 million deaths recorded, according to official statistics. The World Health Organisation (WHO) officially declared the outbreak of Covid-19 a pandemic on 11 March 2020, because of the exponential rise in cases since the first case had been detected.

When declaring the pandemic, WHO encouraged all governments worldwide to act decisively in their response to the virus and ensure aggressive and urgent action is taken to prevent the spreading of the virus (Lebelo et al., 2020). In response to this call, governments enforced lockdown regulations to slow the rate of new infections. Under these lockdown regulations, people would have to stay home, non-essential businesses would be shut down and all schools closed for a period of time as determined by the relevant governments.

South Africa's first case of Covid-19 was detected and announced on 5 March 2020, and shortly thereafter, the President of the Republic of South Africa, Mr Cyril Ramaphosa announced that the country would be placed under strict lockdown for an initial period of 21 days (Monareng et al., 2020). During this time, schools, along with other non-essential sectors and industries, would be shut down and all citizens of the country would strictly be confined to their place of residence. This excluded all workers who work for essential services such as all health professionals (Sifunda et al., 2021).

The closure of schools to reduce the spread of the virus affected schools and learning around the world, also affecting schools in SA. In most cases, this shutdown of schools led to a halt in learning (Mhlanga & Moloi, 2020). Studies believe that there was a disruption to a total of 80% of students worldwide (Jelinska & Paradowski, 2021), with countries being affected differently according to their access to resources.

Many schools in the country turned to online or blended learning to continue with the learning process and mitigate the disruption caused by the lockdown condition imposed by the government. Various online learning tools and methods would be implemented in order to facilitate this new way of learning. There were already efforts made by the government, albeit in certain provinces only, to further intensify the use of online learning prior to the pandemic and this trend is likely to continue post pandemic (Mhlanga & Moloi, 2020).

Educators at the forefront of managing this transition and the subsequent use of technology for learning should ideally have the capabilities required to ensure they are ready for this new way of teaching to their students. A number of various factors can impact this. These factors include the age of the educators, access to resources needed, lack of training on these technologies, as well as a lack of time to prepare for the integration of ICT into the classroom (Agyei & Voogt, 2010). Furthermore, these factors may cause a negative perception of the educators to use ICT in the classroom and may impact the successful integration of ICT.

It is important for these factors to be identified and understood so that the DBE can implement policies and implement programmes that will lead to the

successful implementation and integration of ICT in SA classrooms which will benefit both learners and educators for years beyond the pandemic.

1.3 Research problem

This research explored how, and if, educators were adequately prepared to respond to these changes by assessing their competence and preparedness in using technologies introduced and the factors that played a role in their digital readiness. Educators have been mentioned as playing a significant role in the success of the implementation of technology in education and how they view and respond to this technology as having an affect on the technology's future within education (Magliaro & Ezeife, 2007).

This study focused on how educators' readiness was impacted by the fact that South Africa is a developing country that may present factors or barriers that may not be experienced in developed countries. One of the main hurdles identified that developing countries often have to deal with when integrating technology into classrooms, is the limited access to technology and infrastructure, and, in some cases a stable supply of electricity (Bosman et al., 2020). Despite the factors that may be against them, educators should be equipping themselves with the necessary skills and knowledge to keep up with teaching in the 21st century or face being replaced by the same technology being used (Hafifah & Sulistyo, 2020).

This research assessed the educators' digital readiness in schools that are part of the SA basic education sector. The research looked at the factors that affect the readiness of these educators and how these factors act as motivating factors to use technology in the delivery of education or if these factors are barriers to the successful delivery of education using technology. These factors were assessed in the context of South Africa being recognized as a developing country historically disadvantaged in functioning within the digital era.

1.4 Research questions

This research will aim to answer the following questions:

1. How did educators' attitudes and perceptions of the use of ICT change their experience of online teaching?
2. Which factors influenced the educators' experience of using ICT in the classroom for teaching?
3. What digital capabilities and training did the educators receive?, if any, before the Covid-19 pandemic to prepare them for the experience of teaching online?
 - 3.1 How did the amount of training receive impact the educator's experience of teaching online?

1.5 Significance of the study

The Fourth Industrial Revolution (4IR) represents a new era for many industries worldwide, and the innovation that ICT can bring about is central to this (Moloi & Mhlanga, 2021). With the ambitions that the South African government has for 4IR in our country, it is becoming increasingly important for citizens to be enabled with skills, knowledge and infrastructure that will complement these plans (Mwapwele et al., 2019).

Many countries worldwide have made significant strides in 4IR, including in education (Tabira & Otieno, 2017). And while the integration of technology in classrooms is seen as an essential aspect of learning in more developed nations, some significant issues and barriers have been identified in developing countries that affect the successful integration of technology in classrooms (Owen et al., 2020).

Through the then Department of Education, a draft white paper was published in 2003, which set out the plans for transforming learning and teaching using ICT (DOE, 2003). In this white paper, the need to integrate ICT into schools and the learning process was recognized as important to advance the quality of teaching.

In addition, the inclusion of ICT would also improve the management and administrative capabilities of schools around the country (DOE, 2003).

Despite this draft white paper, technology adoption in the education sector has been slow. Covid-19 presented an opportunity for further advancement and progress in transforming the education sector (Monareng et al., 2020). With these advancements being made, it will become even more important for educators to have the necessary skills and knowledge to succeed in this transformation in education. This research will seek to uncover where the gap in educators' skills and knowledge can predominantly be found and the factors that facilitate these gaps in their digital competence and literacy.

By addressing the factors that impact an educator's digital readiness, there can be a move towards improving the quality of education and learning in South Africa through the continued use of technology to deliver learning to students. This sort of research will contribute to the knowledge of, and further highlight, the experiences of educators in a developing country such as South Africa and how policies and plans should be implemented that will enable us to catch up to more developed countries in terms of technological advancements made, especially in education.

1.6 Delimitations of the study

- a) This research will focus on the basic education sector, comprising of high school educators
- b) The research will exclude the educators in private and independent schools.
- c) The research will be assessing the digital readiness of the individual educators and not as a collective per school
- d) The research will only focus on educators in public schools within the province of Gauteng

1.7 Definition of terms

e-Learning – online learning which makes use of technology and the internet for the learning process, which may lead to positive characteristics such as time-saving and cost efficiencies (Mashau & Nyawo, 2021)

Digital readiness – when one is fully prepared to execute the desired action through the use of technology (Gfrerer et al., 2020)

Educator – someone who provides instruction to learners and directs the process of learning (Shah, 2020)

ICT – multiple digital technology resources and tools which can help with creating, communicating, storing and managing information (Shah et al., 2021)

Teaching – the act of imparting knowledge to students, which the students then receive, memorize and recite (Shah, 2020)

1.8 Assumptions

The assumption will be that schools did have continuity plan during the lockdown period to continue learning. This refers to the school taking learning online, with minimal disruption to the curriculum set for the year. Alternatively, a contingency plan was made to continue learning online, including acquiring ICT tools and infrastructure for the educators. Some schools may have initially been unable to continue teaching their students due to their lack of access to the tools necessary to establish online learning in the school effectively.

Should these assumptions not be true for the school in question, the educator's participation in the study may be affected as the questions rely on the fact that technology was used and how it was used during the lockdown period of the pandemic.

1.9 Chapter Outline

This report consists of six chapters which cover the following:

- Chapter one provides an overview of the study and background information. The research problem was stated as well as an outline of the research questions.
- Chapter two delves deeper into the research topic and what literature tells us about this topic, and the research questions
- Chapter three focuses on how the research was carried out, including collection and analysis of data.
- Chapter four presents the findings from the data that was collected
- Chapter five provides an analysis and discussion of the findings based on the literature reviewed in chapter two
- Chapter six presents the conclusions made, recommendations, limitations of this study, and providing suggestions for further research that can be carried out.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction.

This literature review focuses on understanding of the digital readiness of educators to deliver teaching using technology. This will be done by assessing the factors that affect their digital literacy readiness and competency of using specific technology and platforms for teaching.

These factors determine whether educators are prepared for online or blended learning methods and whether further interventions are necessary. This is done using the background of the Covid-19 pandemic, which necessitated online learning due to the lockdown regulations implemented in South Africa and across the world to curb the spread of the virus.

This literature review will start with a background discussion of the use of technology in education in South Africa, then unpacking each research question and the literature around it, with the propositions also stated per research question. The theoretical framework that underpins this research will also be discussed to understand how the study was carried out.

2.2 Background discussion

The use of technology has improved many aspects of society, including in education. Globally, there has been an increase in using technology to improve learning for students and the delivery thereof for teachers, including in developing countries (Owen et al., 2020). Improvements in technology have also contributed to a better quality of education and promoting innovation in this sector (Msiza et al., 2020). Around the world, many countries have and still continue to integrate technology into classrooms with varying results due to several factors present in those countries.

Several benefits may be enjoyed by learners and educators stemming from the integration of ICT into classrooms. When technology is used for teaching and learning, schools are given the opportunity and flexibility to provide innovative teaching and learning through technology-led activities (Al-Awidi & Aldhafeeri, 2017). For students, the use of technology has the ability to positively impact learning by motivating students to learn, help students develop critical thinking skills, improve research skills as well as providing these learners with much needed digital competencies that are in demand in the knowledge-based society we are living in (Oyedemi & Magano, 2018).

Technology can also improve overall access to education (Tabira & Otieno, 2017). In a country such as South Africa where inequality in education still persists, any solutions that aim to improve access to education that is not readily available to all in the country, are much needed (Rogan & Reynolds, 2016)

In South Africa, the government is interested in implementing eLearning in schools and is investing in what they call “classrooms of the future” (Msiza et al., 2020). As early as 2003, through the Department of Education (DOE), the government published a white paper that set out its plan to create new opportunities for learning using ICT (DOE, 2003). In this white paper, the government speaks of plans to ensure that all schools have access to high quality

communication services which will enable “lifelong learning and provide unlimited opportunities for personal growth and development to all (DOE, 2003, p. 3).”

Integrating ICT into learning can be a complex process, and it will require educators to be prepared to ensure that learning is more meaningful and fruitful (Hero, 2020). It is important to note that integrating ICT does not mean putting computers or laptops into a classroom to support teaching and learning, but is an approach where technology is used to exceed traditional teaching approaches and for learners to learn with and through the technology (Al-Awidi & Aldhafeeri, 2017). It is thus important that educators are adequately prepared for these changes which may also require a mindset shift.

Various challenges may be faced in the implementation of e-learning. These challenges may further be heightened due to the digital divide, which has seen developing countries unable to make the same strides in the effective integration of technology in education as developed countries (Hadullo et al., 2017). These include a shortage of facilities, lack of proper infrastructure, lack of electricity, and computer illiterate teachers (Msiza et al., 2020). More developed countries have an advantage over their developing counterparts, and digital equity and inequity are receiving more attention from researchers with the increasing use of ICT in education (Khlaif et al., 2021).

2.3 How did educators’ attitudes and perceptions to the use of ICT for teaching change their online teaching experience?

A number of studies tell us that a major factor to the adoption of technology in the classroom is in fact the educators’ attitudes towards the use of ICT, with suggestions being made that studies should be focusing more on educators as the end user of the technology, and their perceptions (Kibirige, 2011).

According to Ardic (2021), self-confidence, beliefs about teaching and classroom routines, beliefs in change and a teacher's attitude towards technology are just

some examples of what they have called internal barriers to the use of technology in the classroom.

It is important that educators' motivation and perspectives, along with their competency, be assessed to engage more actively and enhance student learning (Almas et al., 2021). Educators' views technology and the use thereof in the classroom may determine the success of using technology for learning, leading to a more positive experience for the educator.

For the most part, along with parents and administrators, teachers believe that ICT can enhance learning and should be used by all teachers (Kryeziu et al., 2021). Despite these beliefs, several other factors may influence the perception and attitudes held by educators.

In some instances, it has been identified that to some educators, the use of technology is mainly to upload or download teaching resources, which is as far as their understanding or perception of e-learning extends (Almas et al., 2021). This would mean they do not see technology as a tool for teaching, but rather as a support tool in their teaching. This may be due to them not having the necessary literacy to understand the uses of educational technology and platforms fully and may require further training. In this case, the literature suggests that educators with a positive attitude to ICT are more likely to learn the necessary skills for the successful integration of technology in the classroom (Kibirige, 2011).

Attitude and perception can also be impacted by an educators' motivation towards using technology. According to Almas et al. (2021), motivation refers to what causes people to behave in a certain way. Literature has identified four basics of motivation that can be considered for engagement in e-learning: the reward structure, the organisational climate, the structure of the work and the leadership style (Almas et al., 2021). These factors motivate an educator to use technology for teaching and ultimately alter their attitude and perceptions of e-learning. Some educators have a negative opinion of using technology in the classroom because of the students' ability to use the ICT outside of its intended purpose of education and learning (ArdiÇ, 2021). Teachers believed that students

would misuse the technology, and the ICT would thus not contribute meaningfully to learning.

Ultimately, research has shown that the more positive the attitude and perceptions teachers hold to technology use, the more easily the teacher can adapt to integrating technology into the classroom (ArdiÇ, 2021). Similarly, the reverse can be said where educators with a negative attitude or perceptions to ICT will be less likely to want to integrate ITC into their classrooms, making the transition more difficult (Chikasha et al., 2013).

2.3.1 Proposition 1

Perceptions and attitudes to e-learning will be positive amongst educators leading to a positive teaching experience online. As many have been exposed to online learning during the lockdowns that have taken place since the pandemic began, these educators will have come to see the positive effects that e-learning has on teaching and learning. These educators will have had time to adapt to technology and have undergone the necessary training to implement online learning. There will be a sense of motivation to see the success of using technology in the classroom, which will be a positive and motivating factor that affects attitude and perceptions. Studies have shown that educators recognize the benefits that ICT has for learning and that these educators generally have a positive attitude towards the use of technology (Owen et al., 2020).

2.4 Which factors influenced the educators' experience of using ICT in the classroom for teaching?

Understanding the challenges educators face when teaching online is important as it may also help us understand their perceptions and attitudes towards the use of technology in the classroom. Literature has identified several factors that may affect an educator's technology preparedness, and their experience of using said technology. These factors are all external factors that are mostly affected or contributed to by the educator's environment. The factors to be considered in the research are discussed below.

2.4.1 Access to resources

Access to resources that enable the successful implementation of e-learning may contribute to the digital readiness of educators to e-learning. Literature has identified that the integration of ICT in basic education has been less than satisfactory, leaving provinces at different levels of integration of ICT (Ramoroka, 2019). Several schools do not have adequate ICT tools and resources, and this acts as a barrier to educators being able to adopt ICT in classrooms to teaching successfully. It is not uncommon to find in schools where computers are provided for the use of Computer Application Technology students only, leaving the rest of the school with no access to these resources (Chisango et al., 2019)

Lack of access to resources also extends to the learners who may not have the necessary tools to learn online successfully. When surveyed, in one study carried out amongst educators answered that only about 27% of their students have access to the internet, while only 9% had access to email (Vadachalam & Chimbo, 2017). Furthermore, previous studies have found that there are many learners who have their first introduction to computers and internet technology when they enter university (Oyedemi & Magano, 2018). This serves as a barrier to the successful integration of ICT into teaching and learning. Learners cannot participate in lessons due to the unavailability or inaccessibility to essential resources.

Ramoroka (2019) in his research identified the need for a “single, cohesive strategy” by the government to ensure that all areas of society receive ICT infrastructure and resources as needed. This can have implications for educators' readiness as they will be unable to prepare themselves for online learning, and thus learning may be disrupted should the country be forced into a hard lockdown period.

2.4.2 Training

Educators require training to ensure that they have the necessary skills and knowledge to teach online. The literature suggests that to improve the learning experience through technology, it is important that teachers are given training

prior to them starting service in the education sector and organising professional development programmes (Uslu, 2018). In SA, some provinces, such as the North west province, recognize that for blended learning to successfully be implemented, the first step is to focus on teachers' professional development ICT skills (Ramoroka, 2019).

Previous studies have proven that any ICT training received influences the teachers' skills and, ultimately, their attitude towards ICT (Hafifah & Sulistyo, 2020). Educators may have received some training while in university or college, or some may have received some training or skills from joining workshops. For the educators that may not have received training, especially those of an older age, this may lead some form of "technology anxiety" which has been suggested to occur to teachers who have not received any ICT training while in tertiary or college (Chikasha et al., 2013). This same literature suggests that this may leave educators worried or intimidated about using technology in their classrooms once they start working.

2.4.3 Infrastructure

Access to ICT infrastructure or lack thereof, can also be a big contributing factor to the digital readiness of educators in schools across the country. Studies have said that schools that have high access to good infrastructure have a better success rate of integrating ICT into learning (Chikasha et al., 2013)

There is an existing perception that good quality education is most accessible to privileged people in developing countries, such as SA (Tabira & Otieno, 2017). The same can be said for access to ICT in the country, where a digital divide is already evident. From this premise, more and more governments aim to decrease this gap, especially within education, which can also be seen as a means to create equal opportunities for everyone, despite social or economic differences.

The government has set out plans to enable and improve access to ICT infrastructure and connectivity across the country, as defined in the draft white paper on e-Education (DOE, 2003). The plan includes government initiatives and partnerships with the private sector to connect teachers and their learners in SA

schools. It is important for the government to continuously evaluate ICT infrastructure in the country so that improvements can be made to implement e-learning in our schools successfully.

2.4.4 Support

There is literature that has suggested that for educators to integrate ICT into the classroom successfully, they require technical support (Chikasha et al., 2013). Educators may be discouraged to use technology and the associated platforms if they do not have support to sort out any technical problems that may arise while teaching.

A lack of support from school principals, heads of department or other school leadership has also been identified as a barrier to the successful integration of ICT into schools (Chisango et al., 2019). These individuals when unsupportive of educators' efforts to integrate ICT into classrooms, may discourage some educators leaving them unmotivated to make the adoption of ICT successful in their schools.

Furthermore, according to the DBE, each public school falls under a specific district office (Education, 2013). Each district office acts as a link between the Education department office and the schools and ensures that learners access quality education (Education, 2013). The policy on the Organisation, Roles and Responsibilities of Education Districts further specifies that each school should be allocated a subject advisor who will act as a facilitator in the implementation of the curriculum as well as assist to improve the learning and teaching environment. Literature has suggested that these subject advisors should lead and support educators in integrating technology in classrooms in this digital age. Thus DBE has a crucial role in the success of the implementation of e-learning through the support and guidance given by district offices (Chigona, 2017).

2.4.5 Proposition 2

Different factors influence educators' level of digital readiness in educators. Lack of access to resources, lack of training, lack of CT infrastructure, and lack of technical support are factors that will influence the digital readiness of educators and their ability to integrate and utilize technology in teaching successfully. These issues will be further heightened due to the issues faced by developing countries in the integration of technology in education (Owen et al., 2020).

2.5 What digital capabilities and training did the educators receive, if any, before the Covid-19 pandemic to prepare them for the experience of teaching online?

Digital literacy and training are other factors to consider when assessing educators' digital readiness for the implementation of e-learning. Not only do the perceptions and attitudes of educators influence the use of technology by teachers, but the training received also influences them and how familiar they are with the use of ICT (Owen et al., 2020). The perceived ease of use of technology is a factor identified by literature as contributing to the successful integration of ICT in classrooms (Chikasha et al., 2013).

The government has recognized the need for ICT professional development for educators as part of their e-Education efforts, which were also aimed at bridging the digital divide in the country (DOE, 2003). The draft white paper mentions several initiatives such as development modules focusing on integrating ICT in schools and mentor-based teacher training. Although this policy has described the plans for teacher development in ICT usage, no practical plans are outlined for how this will be achieved.

2.5.1 *Proposition 3*

. Educators should be equipping themselves with the necessary skills and knowledge to keep up with teaching in the 21st century or they face being replaced by the very same technology (Hafifah & Sulisty, 2020). This can be achieved through a variety of means, such as short courses or other professional development programmes introduced either by their schools or by the DBE.

2.6 ANALYTICAL FRAMEWORK

The Technology Readiness Index (TRI) is a framework developed by A.Parasuruman in 2000 to help with the assessment of peoples propensity to adopt technology and use it (Mwapwele et al., 2019). This can be in the pursuit of achieving a set of specific goals for the individual (Odlum, 2016). This index has mostly been used in business marketing where researchers had to identify market segments that are more likely to adopt new technologies for sale (Badri et al., 2014).

Before this research was completed, some studies focused more on people's acceptance of technology and other factors. These factors include the ease of using the technology, the usefulness, the ease of using the technology and looking at some consumer-related factors such as sociodemographic (Odlum, 2016). The TRI, however, focuses on an individual's state of mind (Mwapwele et al., 2019). While also recognizing people's general attitude towards accepting a new technology (Blut & Wang, 2020).

The index comprises four factors, two of which are enabling, and the other are seen as inhibitors. These factors are:

- a) Optimism
- b) Innovativeness
- c) Discomfort: and
- d) Insecurity ((Daniel et al., 2017).

The first two factors are the enablers, while the last two factors are the inhibitors. Optimism refers to the presence of a positive mindset to the use of technology and that it can bring about efficacy for the user (Mwapwele et al., 2019; Odlum, 2016). Innovativeness refers to individuals keen on being the first with new technology, whether through use or acquiring information (Mwapwele et al., 2019). Literature has also described these people as new technology pioneers (Odlum, 2016).

Discomfort refers to a belief by the individual that they do not have control over the technology (Odlum, 2016). This may manifest differently, such as when

individuals display unease because they are unsure how a specific technology works (Mwapwele et al., 2019). Lastly, insecurity refers to the scepticism or distrust an individual may display to use new technology (Odlum, 2016). New technology can usually be a daunting experience for some people especially when an individual has not fully understood how the technology works.

Technology readiness and the assessment thereof was described as a good predictor of technology-related behaviour (Berndt, 2010). However, there has been some criticism of the framework that has been discussed in the literature. Firstly, many studies have referred to technology readiness according to the four constructs mentioned above, and each individual construct is considered a factor contributing to readiness (Blut & Wang, 2020). However, it remains unclear whether this approach is correct or whether it would also be appropriate to consider as a two-construction framework, grouping the constructs into enablers and inhibitors (Blut & Wang, 2020).

This index has previously been used in understanding the digital readiness of educators in Saudi Arabia in a study completed in 2014 (Badri et al., 2014). It was confirmed in this study that very little literature exists in educator technology readiness.

There has been criticism about the framework for the limited factors considered to determine readiness. A suggestion has been made that future research should include additional factors to assess readiness (Odlum, 2016). It has been suggested by the developer of the framework that the other factors that should be considered are demographics characteristics, education level, occupation and age, which can help better understand the assessment of technology readiness (Daniel et al., 2017). Furthermore, the same literature placed criticism on the index in its current form because it has not been tested in different environmental contexts, which would be able to give us a better understanding of how individuals from different countries, cultures, infrastructures, and technology levels are able to adopt technology successfully.

This research will add to the further knowledge required to enhance the TRI by including more factors than what the TRI in its original form prescribed. This is in line with the many calls that literature tells us have been made for the index to be further validated and extended in order to increase its generalizability (Badri et al., 2014). This study will include external factors such as access to resources and infrastructure. Digital literacy and training will also be included, which may help understand the barriers and enablers of technology adoption in the classroom.

2.7 Conclusion of Literature Review

This literature review aimed to look at the importance of integrating technology into teaching and how this can be impacted by the digital readiness of educators, which ultimately influences the educators experience of online teaching. The literature has reiterated the importance of educator digital readiness in the implementation and the success of e-learning in South Africa and has revealed the factors that may affect this. These factors are about the attitudes and perceptions that educators have towards using technology, external factors that are influenced by the environment around the educator and looking at the digital literacy and knowledge that educators have received.

2.7.1 *Proposition 1*

Perceptions and attitudes to e-learning will be positive amongst educators. As many have been exposed to online learning during the lockdowns that have taken place since the pandemic began, these educators will have come to see the positive effects that e-learning has on teaching and learning. These educators will have had time to adapt to technology and have undergone the necessary training to implement online learning. There will be a sense of motivation to see the success of using technology in the classroom, which will be a positive and motivating factor that affects attitude and perceptions. Studies have shown that

educators recognize the benefits that ICT has for learning and that these educators generally have a positive attitude towards the use of technology (Owen et al., 2020).

2.7.2 *Proposition 2*

Different factors that influence educators' level of digital readiness in educators. Lack of access to resources, lack of training, lack of ICT infrastructure, and lack of technical support are factors that will influence digital readiness of educators and their ability to integrate and utilize technology in teaching successfully. These issues will be further heightened due to the issues faced by developing countries in the integration of technology in education (Owen et al., 2020).

2.7.3 *Proposition 3*

Educators should be equipping themselves with the necessary skills and knowledge to keep up with teaching in the 21st century or they face being replaced by the very same technology (Hafifah & Sulisty, 2020). This can be achieved through a variety of means, such as short courses or other professional development programmes introduced either by their schools or by the DBE.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Research approach

The research approach details how the research was undertaken, from the planning and procedures to how data will be collected, analysed and interpreted (Creswell & Creswell, 2018). For this study, the qualitative methodology was used. A qualitative methodology is an approach that allows for the exploration and understanding that individuals associate with a particular problem (Creswell & Creswell, 2018).

This approach was selected because it allows for an exploratory approach to be applied and allows for a deeper dive into the opinions and perceptions of educators on the use of ICT in education and the factors that affect them. Multiple data sources, such as interviews and documents, can be used rather than just one source (Creswell & Creswell, 2018).

3.2 Research design

This study applied a phenomenology design concerned with learning about people's experiences (Williams, 2021). Phenomenology is a theory that originated in 20th century Europe and is a theory that can be used to explore areas or topics where there is not vast knowledge (Donalek, 2004). In the attempt to understand and get meaning of people's experiences, phenomenology uncovers a person's lived experience in everyday situations and determines what this experience means for the individual (Willig 2008; Creswell & Poth, 2016). This method has been described as being powerful for researchers to gain insights on people's actions and hopefully contribute to the development of new policies and theories (Williams, 2021).

At the end of the research study, the goal is an exhaustive description of the research topic, which shows an understanding of the phenomenon in question (Donalek, 2004). Furthermore, Donalek (2004) also states that readers of the research should be able to fully grasp what is at the centre of the study.

3.3 Data collection methods

In qualitative research, data may be collected in several different methods. For this study, the data collection method used was semi-structured interviews with participants. These interviews consisted of a range of open-ended questions, which allowed for better participation by educators, as opposed to pre-populated answers or options. The interviews enabled the researcher to better understand the subject being studied.. Participants were able to give their views and opinions from the questions asked (Creswell & Creswell, 2018). While the researcher was able to make the participants feel comfortable and build rapport , this is just one of the benefits of interviews (Twis et al., 2020). Semi-structured interviews also allowed further probing where clarity was required to answer the research questions.

3.4 Population and sample

3.4.1 *Population*

The population for this study is made up of educators in South Africa. The ages of these participants were between the ages of 24 and 59, which gave a varied spread of teachers, from those who are starting in their careers to those who are about to retire from the sector. This population consisted of both female and male educators.

3.4.2 *Sample and sampling method*

Purposive sampling was used to select the participants. This means participants were chosen according to defined characteristics that were determined for the research (Andrade, 2021). The sample consisted of educators currently in the basic education phase. This consists of teachers who are currently teaching grades 8 – 12 in a school from the Gauteng province of South Africa.

3.5 The research instruments

The research instrument is a set of questions that will guide the semi-structured interviews. There are 17 interview questions in total,. The questions aimed to uncover the lived experience of the educators, of working through the Covid-19 pandemic and using technology to deliver teaching to their students.

The interview was divided into five parts, starting with an introduction that was used to understand the participants' use of technology in the classroom. The following 3 sections of the interview were used to uncover and understand how the factors detailed in the analytical framework (optimism, innovativeness, discomfort, and insecurity) affected the readiness of the educators. An understanding of attitudes and perceptions of educators and their digital literacy was also explored in the interviews. Lastly was the closing section where the participants were asked to volunteer any further information they felt would be useful to the research, which may not have been asked in the previous questions.

3.6 Procedure for data collection

Social media platforms, such as LinkedIn, Facebook and Twitter were used to publish a call for participants that would be interested to participate. Once interest was established by an individual, further information in the form of Participants Information Sheet was forwarded and any questions and queries raised were responded to. The individuals who chose to participate were asked to fill in and sign the consent form which would serve as confirmation of their participation.

The interviews were conducted virtually using one of the available online platforms such as Microsoft Teams and Zoom. The interviews were carried out on a one-on-one basis, where the interviewees were taken through the list of questions and their answers recorded for analysis. These interviews were recorded for later transcription and analysis.

3.7 Data analysis and interpretation

Once the data was collected and all the interviews completed the data was prepared and organized to be analysed (Creswell & Creswell, 2018). This involved transcribing the recorded interviews and sorting through the notes taken throughout the interviews. The next step was to go through the data as transcribed (Creswell & Creswell, 2018). This helped in starting to make meaning of the interviews and start identifying the ideas and concepts coming out. After this, coding took place (Creswell & Creswell, 2018). This is the process where the data is grouped into categories represented by a label (Creswell & Creswell, 2018). Coding took place by employing software. The next step was to develop descriptions and themes of the data (Creswell & Creswell, 2018). These themes are where the main findings of the research were likely to emerge.

3.8 Limitations of the study.

- The sample group consisted of educators based in Gauteng, which limits the scope of the findings to one particular province in the country and might not be a good representative of the experience of educators in other provinces in the country
- The timing of the study may mean perceptions of the use of technology have already changed for the educators since their initial use of technology was enforced when the first lockdown occurred in March 2020. This has the potential to alter the research findings and skew the results as the educators have become more used to the use of technology at the time of interviewing.
- The end of the year is usually a very busy time for educators, with year-end assessments and exams and this negatively impacted the availability of willing participants for the research. This also had the potential to influence the quality of the answers given by educators should the timing of the interviews not be suitable for them.

3.9 Transferability and dependability

3.9.1 *Transferability*

Transferability refers to the ability of a research study to be replicated in another setting and this study will still be effective (Helen et al., 2011). To ensure transferability in this study, the context has been well defined, and that is that the research is based on the situation that educators found themselves in during the Covid-19 pandemic, which would force them to turn to online teaching methods to continue with teaching during lockdown. It is also important to provide “rich, thick, detailed descriptions should there be someone interested in transferability of the research to have a framework that is solid to work from (Creswell & Creswell, 2018).

This research may not easily be generalized because of this specific context, but it can be transferred to suit a context or setting that is not Covid-19 dependent.

3.9.2 *Credibility*

For research credibility to be achieved, the researcher should aim to use strategies such as data and method triangulation, peer debriefing or member checking (Moon et al., 2016). In this research, a combination of these methods can ensure the study's credibility. Peer debriefing involves sharing questions or findings with peers to get their perspectives on the research (Moon et al., 2016). This is achievable as the researcher will continuously share the research journey with close fellow students who are also busy with their own research or with peers who support it. Lastly, member checking can be achieved by sharing some of the research findings with some interview participants to determine if they mirror their lived experiences as assessed.

For this research, member checking was utilized where research findings were discussed with certain participants to get their opinion on whether the findings as analysed were correct.

3.9.3 Dependability

Dependability looks at the credibility and reliability of the research and seeks to establish whether another party would be able to replicate the research and the same findings would emerge (Moon et al., 2016). This research will be dependable because the research process has been documented in detail. The same approach has been followed during data collection and subsequent steps post collection of data, which was to ensure that the full research process is documented and can be assessed to establish if the correct research practices have been followed (Moon et al., 2016).

3.10 Demographic profile of participants

The participants were from both female and male genders. It should be noted that the participants' gender was only used for information purposes and had no bearing on the research study. The participants were from the ages 24 – 59, representing the age when a student teacher usually starts their professional career, and the latter is the age just before retiring from public service. Age has come up in literature as a possible factor that influences educators' digital readiness of educators so this characteristic will be important too for the research.

Participants will be from various socioeconomic backgrounds, as the study will be carried amongst educators from varying schools within the province of Gauteng. The location of the school and socioeconomic background of the location was a factor that came up as having a bearing on the study's findings.

3.11 Ethical considerations

The research only posed a minimal risk potential as the topic and questions to be answered were not of a sensitive or confidential nature. The research participants were given an information sheet prior to the interview which set out the premise of the research and the objectives of the interview. The participant was asked to sign a consent form, which could also be explained if further clarification was

required. The discussion only began once the participant had given full their consent and understanding of the participation.

The data collected was treated with care and stored safely, with access only by the researcher. It was reiterated that the information captured would not be shared with anyone outside of the research, e.g., the schools where the educators work or with government departments and would solely be for the research being undertaken. The participants' identities are strictly confidential, and no identities are used within the final report or any information that would easily identify them.

CHAPTER 4. PRESENTATION OF FINDINGS

4.1 Introduction

This chapter reports on the findings of the interviews conducted to explore the digital readiness of educators. The findings will be discussed according to the propositions brought forward in Chapter 3. The findings will be further dissected according to the interview questions related to each proposition.

The findings will highlight the experiences of the educators and the factors that enabled as well as hindered the successful implementation of technology in learning during the COVID-19 pandemic.

These findings were analysed from data collected through semi-structured interviews once saturation had been reached. Participants were asked a set of questions to uncover and understand the experience of educators using technology to teach their learners.

Educator	Age	Gender	Years in Service	Subjects taught
A	30	F	8	Computer Application Technology (CAT)
B	33	M	8	CAT; Information Technology (IT)
C	56	M	36	Technology; Life Orientation
D	33	M	4	English; Life Orientation
E	53	F	30	English
F	32	F	5	Drama, English
G	33	M	10	Technology
H	46	F	26	Sepedi, Life Orientation

Table 4.1: Demographic profile of participants

4.2 Results pertaining to Proposition 1

4.2.1 *Feelings towards online teaching*

Participants were unanimous in the positive sentiments shared about the possibilities and benefits the use of technology in the case of emergency remote learning has shown. The COVID-19 pandemic was a very new and unforeseen event in our country and the ability for schools to be able to adapt to remote

learning while the country was under lockdown was commended by participants, as this ensured that learners would not miss out on learning days.

One participant when speaking on their feelings and attitude towards technologies and the platforms that were used to facilitate online learning said the following:

"It's a brilliant, brilliant I don't know, concept or idea..."(Participant 8)

Another participant said:

"For me as a technology teacher, I'm a CAT teacher. So, I teach kids, Microsoft Word, and all of those things. I teach digital information literacy. For me, it was an easy transition. I had no problem with it. Yeah, so for me, this transition for me was easy, because it's something I've done at varsity..." (Participant 2)

However, some strong negative feelings were shared towards remote learning from the educators interviewed for a few reasons. One of the most mentioned reasons from participants was the need for physical interaction with their learners which is important to them. One participant said:

"With my complicated subject it made it more difficult actually. We need interaction, we need physical interaction and with the physical interaction you need to have the child to have a computer in front of them for them to understand what you are talking about." (Participant 5)

Another important reason for the need for physical interaction with learners, that came out from respondents is for them to be able to see whether learners are fully grasping the concepts they are being taught. On this issue, one participant said:

"I think in terms of grasping the concepts, it's not practical, it was not practical, the learners were actually having difficulty grasping new concepts, because some of them in a platform like that, some of them, you don't have the interpersonal connection to see, okay, this person clearly does not understand." (Participant 6)

Another participant also felt that her learners were not the type to work independently, saying:

“If you're next to them, if you see them, at least, you can follow up on what you did, and then check their books, but majority of them cannot work independently.”
(Participant 4)

Another reason that was brought forward that made remote learning difficult is due to the lack of access to the necessary resources by learners. Majority of the participants are from schools that are attended by learners from townships who may not have access to laptops, tablets, smartphones or data and Wi-Fi. This makes remote teaching difficult because some learners will miss lessons or not have access to the resources that educators send to them as part of their lessons.

One participant said the following about the problems they were faced with while teaching remotely and how this made their experience of teaching online more difficult:

“I mean, technology is awesome, you know how much it can do but because of lack of resources you just become frustrated. At some point I even told my head of department that I’m stopping this online, I don’t even want to call it online, but I’m stopping this online because it’s not going to work.” (Participant 1)

4.2.2 Benefits to online learning

The participants mentioned several benefits that they have enjoyed while using technology to teach their kids. Participants felt that the use of technology will greatly improve the learners’ skills and make them better geared for a 4IR future and equip them with skills that will be useful for university and the world of work. One participant said:

“It’s brilliant because it can go far, it can do so much, kids come back to me year in and year out after they matriculate and say “ma’am, thank you. I’m not studying IT; I’m not studying computer technology or whatever but thank you for instilling

with me the skill that is helping me with the current career they are busy with”
(Participant 2)

Similarly, another participant said this when speaking on the development benefits that technology affords schools children:

“Our kids would be more developed; our black kids especially would be more developed than what they are currently. They would know more. ” (Participant 5)

One participant mentioned as a benefit, the fact that learners are able to go back and refer to previous material that was taught, which has been recorded and this saves time for both educator and learner on extra classes or repeating material during class time.

“I think the biggest thing is that kids can always go back. With physical teaching, you can't go back, we have to teach it. We have to teach it between eight and four, you know, between two and four those extra classes when they come for help and all of those things, but with technology, it's available 24 hours you know, and that is what I love about technology that even that who didn't attend class or who was absent and I think that's what is going on, the kid was whose was absent from school and has got the resources can go back at one to 1am, go find the work can catch up.” (Participant 6)

Another participant also made mention that their students are also learning important research skills which helps them become critical thinkers.

The participant said of this:

“One of the skills kids are taught are reading skills. So being able to tell between reasonable articles” (Participant 7)

Not only was the technology used of benefit to the teaching and learning experience for teachers, but for some teachers, tasks that could be deemed long and tedious were made easier by the use of technology. One participant said the

following about one of the benefits enjoyed through the use of technology during Covid-19:

“But in terms of you know, Google had a thing for teachers where we're able to do assessments, and it assisted with the marking, it was quick, it was digital. If you set it up correctly, you know, there is very little you have to do in terms of marking, you just have to go through the results and give feedback.” (Participant 8)

The participants did feel, however, that these benefits could only be enjoyed if the school is well resourced as well as the learners being resourced with the right tools, which is something that is not always possible due to financial constraints of learners and the households they come from.

.“For some of them, it was easier because they did have money to buy data. And then to continue the lessons with WhatsApp. But I can say majority of them, the parents did try but only a few weren't able to have those, like I had lessons, I was sending them questions to answer. And then I would give them memoranda to mark for themselves. And throughout the lockdown. So, like I said, only a few learners whose parents cannot afford to buy data, unfortunately couldn't take part.” (Participant 6)

4.3 Results pertaining to Proposition 2

Different factors played a role in how educators were able to experience teaching using technology during COVID-19. These factors either enabled or prevented the successful integration of technology into classrooms.

4.3.1 Access to resources

Educators were enabled to continue teaching their students due to the resources that were available to them and to their students. A laptop came out as a basic tool given to educators to carry out their duties, from the moment they start working at their respective schools and this seemed to make the transition to

online learning, easier for some educators. A participant who had worked in both public and private schools had this to say about their access to laptops:

"In the private schools, we have always had laptops. And in the public, we've always had laptops. So that transition into laptops, that was easy." (Participant 3)

Another educator confirmed this notion by saying:

"So, we were given laptops. You, most teachers generally do get laptops within the first year of teaching at some point, depending on what you do. So, we did have the laptops." (Participant 2)

There was one exception where the participant mentioned the following:

"We have, each of the teachers that own those 2 labs which is me and my colleague we both have computers that work but we don't have laptops to take home." (Participant 1)

In schools that were well resourced, teachers may be equipped with both laptop and tablets, which would often come pre-loaded with lesson material. This would enable and better equip educators to continue with teaching remotely where teaching material is quickly available and ready to be sent to the learners.

For some participants, their schools were able to either subsidize or fully sponsor data which they would use for teaching online. In other cases, educators had to rely on their own Wi-Fi or ensure they would buy data to connect and be online, where the school and DBE was unable to provide these resources.

One of the participants said:

"And then we were given if you are struggling with data, and all of those, because of the how quick the transition had to be, happened for about two months on getting Wi Fi access, and all of those things to be able to work from home." (Participant 4)

In the schools where WhatsApp was used a method to send learning material, educators used their own cell phones for this method of teaching. This participant said of their experience:

“Own data, own phone, own everything, own time, everything. I mean even at home people were like go do your videos outside, but ya... There was no compensation or anything for that.” (Participant 1)

4.3.2 Training before lockdown

Schools offered some form of training either before the first lockdown was enforced, or during the time to ensure that educators had some form of training. One participant, from a very well-resourced school was the only participant whose school managed to give them training before the first hard lockdown was enforced. The educators were trained on different computer applications and digital platforms that would be used for learning. The school ensured that they would be able to transition to online learning with no interruptions immediately. This participant said the following:

“So then like the week before it happened, they started training us on Google Classroom, like immediately on Google classroom training. And everything was set up in 2 days” (Participant 7)

Majority of the participants had a different experience, with them not being able to immediately transition due to lack of resources, lack of training or a combination of both. Most participants also mentioned that they had to learn many of the processes involved with online teaching through their own efforts to learn. One such participant said:

“No. Especially our department its more of everybody for themselves you’ll see what to do. We actually trained people at work, we were the ones making sure like, there was the one teacher who she has a comorbidity so she couldn’t come to work. So, we had to get her webcam, we had to set her up, once we started coming back to school we had to... till this day she works from home, so she’s

got a webcam and a tv in the class and the kids are able to... se s able to teach her kids from home. There was no training done whatsoever.” (Participant 2)

Some district offices hosted workshops through which educators could learn about the different technologies and applications available for remote teaching. However, these workshops were only conducted well after the first lockdown had been implemented and schools were already teaching online.

4.3.3 Internet connectivity

Many of the schools that the participants are in all have Wi-Fi connections which allow both educators and learners to connect throughout the school day. Said by one participant in this:

“At school we’ve got Wi-Fi, that the only advantage of being at work, you are able to use the Wi-Fi. Its strong its good, it’s a good Wi-Fi and we’ve got technical support for it so if there are issues somebody is still able to come in and fix whatever that is that needs to be fixed.” (Participant 2)

One participant did mention that at their school however, the Wi-Fi is locked, and the password is not shared freely amongst staff. In the participants’ words:

“And as far as I can go, I don’t see the Wi Fi at school, it’s locked, and we do not have the passwords.” (Participant 3)

During the lockdown period, in order for them to continue with remote teaching, most of the participants were given routers preloaded with data, either from the school or from the district office.

“We were given these dongles, some of them are really challenging for others, I think I got all the good stuff”

However, this experience did not extend to all participants, with one saying:

“Nope. The only data you’ll ever get from the department is for attending a meeting online and they’ll give you about 2Gigs, and that’s it.”(Participant 8)

Similarly, was another participant who also did not receive data from their school and instead relied on their own fibre network at home. This participant said:

“Luckily for me, I have fibre. Okay. Yeah, so the school never didn't provide me with any data. I have fibre at home. So, it was easy for me.” (Participant 4)

From the schools which are not as well resourced, the Wi-Fi connection is often unstable and does not allow for many users to be online simultaneously..

4.3.4 Technical problems

There were network connectivity issues experienced from time to time, as well as other technical difficulties experienced by some of the educators. For the most part, data connectivity for working from home became an issue for some educators, with one educator saying:

“I think it was just like data issues. I think they gave us dongles without data. It was just it we had, we had challenges. They only got it right, like mid last year.” (Participant 5)

The well-resourced schools have a technician or team of technical specialists that can attend to any connectivity or technical issues that may arise at the schools. Any technical difficulties will be handled accordingly, with very little down time ensuring that learning is not interrupted. In some cases, the educators would have to trouble shoot some of the technical difficulties experienced as there are no technicians to assist with their issues.

For some educators, one problem that has come up, is the issue of safety at their respective schools. In the schools that are located in townships, theft and vandalism is a big issue which they are faced with. Smartboards are often vandalised or stolen, as well as laptops, computers from the labs and students' tablets stolen which will then have to be replace, with one participant saying:

“There are smart boards for grade 12s. And then they said, they would be installed also for grade elevens. And then those that were there before for grade 12s, they were vandalized, stolen.” (Participant 3)

The replacement is usually in the hands of the government to process, and this can often times do not occur due to lack of funds. Therefore, learning may be affected because there are no replacement devices being available to the school.

4.3.5 Support given

Support given to the participants came in varying forms. District offices arranged workshops to assist educators with some of the issues that they had faced during the lockdown, including teaching online. One participant however felt that these workshops were not in-depth, saying:

“I remember, there were workshops. I think during lockdown there and there. I think we already, we already went back to school, but then they're not in depth, that will help everyone.” (Participant 4)

However, these sessions were arranged continuously for schools, even prior to COVID-19, and educators are encouraged to attend these sessions to be taken through additional tools that will help in their daily duties. Depending on the needs of the educators, there was a feeling that the district office was not doing enough to support the educators. This was evident from one participant, who teaches a very technical subject, and felt that they did not receive the support they believed was beneficial to them.

In the case of one participant, their District Office was instrumental in supplying them an app through which they could send material to their learners. Of this, one participant said:

“Oh, yeah. in about May, the district had given us an app called D-six, District Six, I think is the full name. So, what we did on this app is that this is where we started sending the learners work. (Participant 5)

District offices in some cases were also involved in the supplying of tablets for learners, a process which was supposed to be completed at the beginning of every year, for those schools that do receive tablets for learners, but in the cases of the participants' schools, was not completed by the time that the first lockdown was announced, which caused serious delays in teaching.

The experience of support given by district offices was not shared by all participants, with one participant feeling that not enough was done by the district offices when they were needed the most. This participant said:

“In terms of support, you could say, in terms of from the district, they would constantly keep sending material which I look at the material and ask what you want us to do with this material if we cannot get this content across which made it a bit, not easy actually.” (Participant 8)

School management were influential in the experience of educators in emergency remote teaching. For most of the participants, the principal or head of schools were very supportive in ensuring that learning was not disrupted. These parties would ensure that educators were equipped with the necessary tools and resources and in some cases, taking matters in their own hands when the district offices were not assisting schools fast enough.

The participant in one case had this to say about their head of school:

“...you know, thank God, I'm not going to name the school, but our principal was pretty self-sufficient. She didn't know, she cared about the rules and regulations that they were giving us but if we needed training on something, if we needed anything that will help improve the improve the quality of product we put out into the public, she would do it.” (Participant 2)

However, this was possible because the school is very self-sufficient and doesn't rely solely on government funding to be sustainable. A hands-on principal or head of school or department who pushes their staff to be and do their best, created a positive environment for educators to transition to teaching online successfully. Another participant shared their experience of a supportive head of school, saying:

“So, from in terms of my school, our principal tried very hard, you know, he's the one who I think was pushing a lot of these systems because he was the one reminding people to attend training and do whatever it is that they have to. So, he was very forward and pushing for teachers to teach online.” (Participant 5)

4.4 Results pertaining to Proposition 3

4.4.1 *Training while in University/College & further development*

Many of the participants made mention of the fact that they have received no ICT training during their years of formal education studies. The older participants' computer skills possessed and used over the years have been gained through their own personal efforts to learn as well as learning on the job, also mentioning that there are some skills that have become rusty over the years.

This participant had this to say:

“There was no learning about computers when I was in education college. I have been teaching for over 30 years so one can imagine that this was, eeeeh, before the times when computers were popular and being used in schools” Participant 3

On the point of learning on the job, one participant had this to say:

“So, I didn't, I just learned when I actually got to this school, because in term one, and I think term four, we normally have someone from District come and train us and staff and show us additional tools.”(Participant 5)

This being more evident in the case of the participant whose school is under resourced and thus ICT is seldom made use of. The younger participants, who make up the majority of the participants, were fortunately introduced to computers and computer skills either during their high school or university years. Some of the younger participants also mentioned the fact they have had to assist some of their older colleagues in learning to better use technology tools and applications and have become the “technology champions” in their schools.

Two of the participants are currently CAT teachers and received extensive technology training as part of the studies to become CAT educators although this took place close to 10 years ago in both cases. One of the participants, not a CAT teacher, alluded the fact that CAT teachers would have received more training during their formal training years by saying:

"In terms of education wise, they don't prepare you at all for using technology unless you're learning to be a CAT teacher or so." (Participant 2)

The schools from which participants are from, are open to educators furthering their knowledge if it will be beneficial to the school and the educator's success within their role. One participant said:

"...if it's the betterment of improving the output of the product and making it better, they will give you the money 100%." (Participant 2)

In some cases, it can be a process, with one participant mentioning that a presentation of motivation will first need to be prepared. Similarly, another participant mentioned:

"Ya, they kind of do. But I mean you would have to, if I had to do that I would have to do the research first as to what training I want, make sure that I'm explaining to them why and like a whole presentation technically to explain why. Hmmmm you can, but it's a whole process. It's a whole process ya." (Participant 4)

Another participant gave an example of the educators from their school having attended UNISA courses before which were meant to help them further their skills and knowledge in, amongst other topics, technology.

In addition, there are workshops hosted by District offices which educators are encouraged to attend, in which educators will be taught how to better use the technology tools and applications available to them and how to be more efficient with these technologies.

According to one of the participants, the courses that they are able to go on are shorter course, and not necessarily courses for specializing in a specific field due to budget constraints. In the participant's words:

"I think the courses that we do get sent on, get your short courses that day long, afternoon long, but nothing long term hasn't been a budget to actually take people on long term courses, like, we want you to specialize in this field to go study this and so forth." (Participant 8)

Lastly, one of the expectations from the schools, as mentioned by one participant is that they will come back and share their knowledge with other educators in their school. This is to ensure that knowledge is shared amongst educators to ensure better experience for both educators and learners.+

4.5 Summary of the results/findings

The findings above point us to the various factors that exist that better enable or act as barriers to the digital readiness of educators. These factors can be internal factors such as the training and knowledge that educators possess on the different technologies that can be used for learning. Another internal factor is the perception or attitude that an educators holds to technology, with a positive attitude being more likely to positively influence an educator's willingness and readiness to use technology. Other barriers that exist are external barriers, which are usually out educators' control but can have a heavy impact on their readiness to integrate technology into teaching. Generally, educators are positive towards the use pf technology and the opportunities that technology can create for them and their learners, but they are aware of the various factors that can act unfavourably to the use of technology which have to be dealt with for technology to be used effectively and efficiently within the classroom.

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS

5.1 Introduction

This chapter will unpack the findings described in the previous chapter and seek to identify the differences and similarities raised by authors in previous literature.

5.2 Demographic profile of participants

The data was collected from educators of different ages, with the majority of them being under 35. All the educators have been in service for at least 4 years with the highest serving educator teaching for 36 years.

Although the study did not aim to distinguish on whether the gender of the educators was a factor that affected their readiness, it was noted. The age of the educator was used to determine when they would have received their pre-service training and whether there was any ICT education included in their educator training.

5.3 Discussion pertaining to Proposition 1

It can be seen from the findings in the previous chapter, that some of the issues raised in the literature review were not new to this study. This tells us that little has changed over the years since introducing of technology into classrooms prior to the pandemic.

The positive sentiments of the use of technology in the classroom shared by participants were not completely new and have been raised in literature previously. In Kryeziu, (2021), in a study that also looked at the attitudes and perceptions that teachers, as well as administrators and parents have on the use of technology for teaching, it was found that all three of these groups of

participants had positive attitudes towards technology and they felt teachers across all subjects should use it. They believed that technology could enhance the learning experience and has the power to raise a student's motivation and interest in a particular subject (Kryeziu, 2021).

Along with the positive sentiments shared, there were benefits that added to the motivation that educators had to use technology, with majority of the educators holding the belief that that technology has the power to change the lives of their students going forward. This is especially true for students from lesser advantaged backgrounds.

Despite the positive sentiments and benefits shared by participants, some findings showed that some teachers were not completely for the use of technology to teach their students for different reasons, as discussed in the previous chapter. One of these reasons is that teachers feel that they still need physical interaction with their students and that online teaching takes away from this aspect of teaching. This has been raised previously, with views being expressed by other teachers in previously concluded research that online learning proved to be overwhelming for students who were used to face-to-face teaching and guidance (Landa et al., 2021).

Another reason raised by the participants was that they felt that their students were not yet ready to fully use technology and the applications or programs being introduced. This was seen in in the findings by (Ardic, 2021), where some teachers felt that students should not use technological tools for several different reasons, including their lack of knowledge.

Another finding pointed to the risk of the misuse of technology, despite the technology being used in education to attract attention and raise motivation, which can have several negative effects. Participants believe that technology can be distracting when used in the classroom and can be responsible for the development of loneliness, is expensive, can be addictive, bears a risk, is easy to copy and reproduce and can even undermine the teacher (Kryeziu, 2021).

5.4 Discussion pertaining to Proposition 2

Several factors were identified as playing a role in educators' readiness to successfully use technology to teach learners. It has been said that in order to achieve successful integration of technology into learning, specific barriers should be identified in order for them to be overcome (Shah, 2021)

5.4.1 Access to resources

Globally, the digital divide still continues to grow despite the advancements in technology and infrastructure, and literature tells us that over half of the world's population still does not have access to ICT (Ramoroka, 2019). This was evident in the findings as discussed in the previous chapter, where some schools suffered from a lack of resources for both the school and its learners.

However, the problem seems to be more prevalent with learners, where schools may have some resources to work with, such as smart boards in classrooms, laptops for teachers however, the learners do not have access to personal computer devices from which to work when at home. This may be due to various reasons such as the cost of the technologies required for the learners to use, as was seen in a study completed in Malaysia (Owen et al., 2020). However, it was found that many learners do have access to smartphones, which is the situation that was found in this study and was one of the reasons that the messaging platform WhatsApp was a popular platform amongst teachers to send learning material to learners.

While it is important to consider educators and their access to resources, it is equally important to consider the learners that they are teaching. If the learners are unable to access technology to enable them to have online lessons, the introduction of ICT in schools would be futile. This issue also highlights the inequalities that exist between rural and urban areas, where students from rural areas may be enrolled in schools in urban areas where amenities such as computer labs and Wi-Fi connectivity are available while at school but are sadly not available to them when they go back home due to lack of infrastructure. Previous studies have shown that there is a problem in regard to the gross

inequalities in educational outcomes for learners from different socio-economic backgrounds (Landa et al., 2021)

It is very clear that a well thought out and cohesive strategy is required to ensure that all areas of society and the economy will benefit from the distribution of ICT by the government (Ramoroka, 2019).

5.4.2 Training

Teacher training and upskilling should be a priority in these times to ensure that they are able to deliver the curriculum effectively. A previous study found that provinces such as the North West Province had opted to prioritize teacher's professional development of ICT skills as a first step towards the integration of ICT in the classroom (Ramoroka, 2019). This training and development is essential to ensure educators understand how ICT and teaching intersect which has been highlighted as a need (Larkin et al., 2012)

In this study, it was found that most educators did not receive training at the beginning of the pandemic which would enable them to teach online. Minority of schools did manage to put together training for their staff before they would start teaching online. The lack of training contributed to the general lack of readiness and preparedness for online teaching that has been identified in other literature.

An issue identified in previous studies, is of technology platforms being available in schools but educators not using them (Landa et al., 2021). Some educators barely use the technologies available to them, only opting to use them for administrative purposes. This could be due to a lack of training on these specific platforms or a lack of understanding of the purpose of the platforms.

5.4.3 Infrastructure

A lack of infrastructure is another factor that can frustrate efforts to implement ICT within schooling successfully. In a study done in Pakistan, a developing country similar to South Africa, it was found that many schools were facing a lack of physical and technical infrastructure which support the integration of ICT (Shah et al., 2021). This is similar to the findings in this study, in which some schools did not have access to infrastructure which hampered their ability to successfully teach online during the pandemic. With the right infrastructure being built and available in all areas of the country, the material required for teaching and learning will be delivered electronically to all areas within the country, including rural and remote areas.

In other cases, infrastructure and resources have been broken or stolen and have not been fixed or replaced, often due to a lack of funds either at the school or the government.

Along with infrastructure, having a support or technical team is equally important to assist in maintaining of the infrastructure. It was seen that schools in the more affluent areas usually have access to technical teams on site who are able to deal with any problems timeously and ensure that there are no disruptions to teaching. A previous study, conducted in the developing country Malaysia also identified the availability of support teams as a challenge in the successful implementation of online learning (Owen et al., 2020).

5.4.4 Support

A good support system, starting from school management to government departments is essential for online learning success. Educators interviewed received various levels of support throughout the lockdown period. In some cases, the support received, especially from governmental structures was insufficient. District office officials were found to not be supportive and in some cases, remained unavailable during the most crucial times for schools.

Previous literature has found that the government's ICT policy is misguided in that they place too much emphasis on the provision of hardware and infrastructure rather than a holistic overview of the preconditions, including the support necessary, for the successful integration of technology in the classroom. Governmental support is very necessary to ensure that policies are correctly implemented, and that schools and educators receive the assistance to make these programmes successful and beneficial to all is (Ramoroka, 2019).

District offices provided support in the form of training sessions on the use of various ICT platforms and tools to enable an easier transition to online teaching. These sessions were voluntary for some educators they weren't majorly beneficial because they did not go in depth on topics, instead offering overviews. Supply of specific tools was also managed at district office level, and this was also in some cases not managed efficiently as by the time lockdown was imposed, some schools and students had still not received the required tools for teaching and learning.

From the above factors discussed, one is able to conclude that access to resources, training received , infrastructure as well as support received are factors that affect the digital readiness of educators. The less access to each of the factors mentioned that educators have for executing teaching online, the more likely that the experience will be negative for them. Inversely, with adequate or an increase in access to resources, training, good infrastructure, and support that they have, the more positive the experience will be for these educators, in successfully adopting and implementing the use of ICT in teaching.

5.5 Discussion pertaining to Proposition 3

The older educators received little to no training during their formal education years. Many of them had to learn on the job or through their own efforts to learn. This is outside of training that may have been provided by DBE during the pandemic, in order to bring educators onboard with the systems and platforms provided for online learning.

Educators were in some cases enabled and encouraged to consider further education or training which would assist them in their understanding of the different technologies that were being used for teaching. Educators should be encouraged to further their skills or knowledge where they made be found to be lacking. The Draft White Paper on e-Education also prioritizes the training of educators at various levels of ICT proficiency as part of the implementation strategy of their plan to transform teaching and learning with the use of ICT in public school. In Pakistan, in conjunction with the United Nations Educational, Scientific and Cultural Organization (UNESCO), reviews were made that the successful implementation of ICT in the classroom depends on the training educators receive at all levels (Shah et al., 2021). This review also led to changes being made in the training of teachers and the provision of resources to departments and institutions involved in teacher training and education (Shah et al., 2021).

5.6 Conclusion

This chapter aimed to discuss the research findings against literature previously reviewed. This study established that educators realise the benefits associated with technology and its use in the classroom, both for teaching and learning as well as future benefits for their learners. However, a number of factors that act as barriers to the successful integration of technology in classrooms, and this ultimately affects the readiness of educators to integrate technology successfully into learning. This study further exposes the big challenge of learner's access to ICT which could potentially be a big barrier in the implementation of online learning in many schools across the country, these resources are essential in learners being able to receive learning material from their educator as well to take part in learning through online classrooms. Furthermore, there is a need for educators to receive adequate training and development to ensure that they are adequately prepared to integrate and use ITC and the related platforms in their classrooms.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

In this chapter, conclusions to each research questions will be provided including an answer to each question, based on the findings as described in the previous chapters. Recommendations will also be provided which will seek to advise stakeholders on how digital readiness of educators can be improved. Lastly, recommendations will be given for future research that could be carried out to better understand other factors contributing to the integration of ICT into schools.

6.2 Conclusions regarding research question 1

From the findings we can see that although educators had positive attitudes and shared positive sentiments about technology and the benefits that technology can have for teaching and learning, educators' readiness to teach using technology successfully was affected by other factors that were beyond their control. Optimism to the use of technology is one of the factors identified in the Technology Readiness Index. The more an individual is optimistic about something, the more willing to participate in or learn something new. Similarly, we can say that the experience of educators is affected by the level of optimism and attitude displayed. The more positive the educators, the more willing to adopt the use of technology they were to adopt the technology.

The educators spoke of the many benefits they understand technology to bring to the classroom as well as the benefits the technology can have for their students. Because of the benefits, educators were more willing to use technology to continue teaching their learners in order to enjoy these benefits. These benefits also extended to their learners, which motivates the educators even further as they want the best for their learners.

Despite the positive sentiments and attitudes about technology shared, there were some reservations stemming from the educators' feelings that not all their learners may be ready for online learning for various reasons. Some educators are of the opinion that their learners are not yet at the level to be taught online as they are used to being "spoon fed" while learning and may not cope in a situation where they are learning without an educator nearby.

These negative sentiments did affect the willingness of educators to use technology, with some educators being unmotivated to use technology because of the impracticality of its use for their subjects. However, they still had to continue with online learning despite the difficult circumstances.

The findings in this study conclude that although educators were optimistic of the role that technology plays within education, they are wary of their learner's access to technology, how they will be using technology and how teaching changes in a full-time online teaching setting. This proves that we still have quite a long way to go in the successful integration of ICT in schools.

6.3 Conclusions regarding research question 2

There were 4 factors tested that could have varying effects on the readiness of educators to using technology in the classroom. In including a test on these factors, this study aimed to expand the factors tested in the Technology Readiness Index.

Access to resources is something that not only affects educators' readiness for online teaching but also the learners themselves. Access to resources is a phenomenon that can be widely seen in developing countries such as South Africa. From the findings of this study, it was evident that educators did have access to some resources that would enable them to continue with teaching their learners. At a minimum, all teachers were equipped with a laptop with which to carry out their duties. Majority of teachers used these laptops to carry on with their duties which were performed remotely. However, in many instances this was not possible simply due to the learners' lack of access to resources, or access to connectivity.

Despite the efforts made by the government, with various initiatives and policies, to equip schools with the necessary tools and infrastructure for ICT, there is still a number of things that need to be done to achieve connectivity for all. In the e-Education white paper, they detailed plans to make sure that access to resources is addressed and that there are enough resources available for schools to carry out teaching and learning online. This draft white paper was published over 10 years ago, which tells us that there more needs to be done by the country's government of the country in addressing the many issues faced by educators and their learners in accessing the necessary resources for teaching and learning.

For educators to continue with teaching and learning using technology during lockdown, it was important that they receive the necessary training on the tools and platforms to be used. In this study, it was mostly found that there was very little to no time for all educators to receive adequate training due to the rapid transition to online learning.

As was the case with majority of the teachers interviewed for this study, it was found that training could only take place after they had started with emergency remote teaching and learning. Educators were then forced to learn on the job or rely on each other for assistance with how to teach their learning online successfully. This would certainly affect the experience that educators had in teaching online. Without adequate training, some teachers would be unable to properly teach their students and could experience loss of teaching time due to their inability to use the technology and platforms introduced.

Not only was it found that there was no training before online teaching was implemented, but it was also found that there were some educators that also did not use all the ICT tools and resources available to them prior to lockdown, as tools to assist in their teaching. This tells us that some teachers were inadequately trained or had little understanding, of how different ICT tools are used even prior to the lockdown. This would negatively influence educators and their ease of experience in using ICT to teach their students during the lockdown.

Training is important for the educators as it allows them to use all the ICT tools and resources available fully and effectively, for teaching. Without the right training, educators may be discouraged, which can negatively impact their experience of teaching online.

All educator training and learning facilities or schools should ensure that they integrate ICT learning in educator programmes for new teachers to gain the knowledge before they formally enter teaching spaces. As custodians of public schools in South Africa, the government should also ensure that policies are in place that will encourage and support continuous ICT learning for educators.

A lack of infrastructure plays a pivotal role in the ability of schools to successfully integrate ICT in schools in order for South Africa to be able to compete in the global digital economy. Lack of infrastructure in this study, was a major factor that affected not only the educators but also the learners in the schools in which they taught. Although teachers may have been enabled to continue teaching their learners online, they might not have always been able to reach their students, who for example, may not have had access to internet connectivity in their homes. Educators expressed that their schools do have adequate access to internet connectivity, and that student will have access to the internet while at school, this is not the case when learners are not on school premises.

Along with connectivity to the internet, the issue can also be raised around the affordability of data in order for educators and learners to access the internet. Some educators are subsidised by their respective schools with data to use to carry out their duties, however this is not the case for all educators. This can definitely be cause for concern for educators in a country where data prices are relatively high compared to other countries.

There needs to be more effort from the government in addressing the issues that concern technology infrastructure in this country as it affects almost all spheres of life, including technology. From what has emerged from this study, without the necessary infrastructure, educators cannot successfully carry on teaching their learners, which has the ability to disrupt the curriculum.

Lack of technical support is something that had been identified by government as limiting the use of ICT in schools. From this study, it can be concluded that this problem still persists for schools which inhibits the ability of educators to prepare for online teaching adequately. The biggest supporter of the implementation of ICT in public schools would be the government of South Africa, through the DBE. All public schools in the country are allocated to a district office whose mandate is to ensure that all learners have access to education of a high quality

Educators may feel that they are not adequately prepared for online teaching without the necessary support. This support does not only have to come from the district office but can also be in the form of the support that educators receive or have received from school management.

Educators in this study expressed how a supportive principal ensured that they were well equipped with all the tools required to ensure that learning continued during the lockdown, in cases where no support or support was delayed from the district office. This type of proactive support positively influences the digital readiness of educators in integrating ICT into teaching and learning. Offering a support system which is readily available and reliable to ensure a smooth transition for both educators and learners,

From the above, it can be concluded that the digital readiness of educators depends on several factors and how these factors provide a conducive environment for teachers to integrate ICT into teaching successfully. These factors may be seen as external factors, outside the control of the educators, which can completely derail educators' efforts to continue with the curriculum and lesson plans in times of lockdown, such as what was seen during the Covid-19 pandemic.

6.4 Conclusions regarding research question 3

From this study, one can see the importance of educators receiving training on the use of ICT for online learning and for the general use of ICT within education, as early as possible.

It was revealed that many of the educators received very little or no pre-service training on the use of technology in the classroom. This had an effect on educators who have had to rely on their own teaching of these new technologies or to rely on their fellow educators to assist where their knowledge was lacking. This can negatively impact on educators' readiness to teach online, as they are not prepared in times when quick transitions are needed, such as the case when the first lockdown was enforced in SA.

Most importantly, this study has confirmed that accredited courses and professional staff development are necessary for the achievement of training all staff for the successful integration of ICT into learning

Clear policy and programmes are required to ensure educators are effectively skilled and trained to integrate technology in public schools successfully. With the ever-changing technology and platforms that are available, it becomes even more necessary for educators to continue to develop to ensure that they are using the education technology to the best of its and their ability

6.5 Recommendations

.The government of South Africa had upon publication of the draft white paper on e-Education made a commitment to ICT in education by addressing issues identified such as educator training in ICT integration, infrastructure and connectivity, distribution of ICT within schools as well as the ability of learners and educators to adequately use this ICT (Education, 2003). This is imperative in the pursuit of the government in bridging the digital divide and ensuring that South Africa does not fall behind in the information revolution. Our government is the

key role player in the success of the transformation of teaching and learning to include ICT and should consider the following recommendations when planning:

1. Access to resources is a huge factor that affects the digital readiness of educators and the successful integration of ICT into schools. This issue extends learners' access have to resources to continue learning in situations where contact learning is no longer possible. What is necessary here is a well-coordinated and concerted effort from Government to supply all schools with the necessary resources for technology to be integrated into schools.
2. Government also needs to ensure that the right infrastructure is available in all parts of the country. This includes access to electricity and telecommunications services which are important for the use of ICT and the connection thereof. In this study it was evident that many learners were unable to connect to the internet due to lack of connectivity where they are located or due to costs. There is also the issue of connectivity to electricity which may also be prevalent in more disadvantaged areas in several parts of the country. A lack of connectivity can greatly disadvantage learners who miss out on lessons and can cause them to fall behind in the curriculum.
3. Some revision is required on the education programmes for educator training. Majority of the educators revealed that their knowledge of ICT was from learning on the job and/or other training that was provided during the Covid-19 pandemic.

The goal of South Africa's 2004 White Paper on e-Education was for every learner in the country to be ICT capable by 2013, and for teachers to use ICT to enhance teaching and learning. (van Greunen et al., 2021). From the experience that educators had during Covid-19 lockdowns, which occurred 7 years after the Government's target of 2013 speaks volumes of the slow pace of change in our country and how we are at risk of falling behind in participating in the global ICT economy.

6.6 Suggestions for further research

Further research can be done on the following areas of interest stemming from this study:

- The same study could be carried out on a larger scale to ascertain whether this experience is the same for teachers in all parts of the country
- A study into the learnings from DBE on the response that they had to the lockdown regulations and the transition to online learning
- The policy recommendations that have been made from the learnings made during 2020-2021 when schools were largely using blended learning or the rotational system of learning in schools
- A study into the digital readiness of learners which looks at the learner's ability or inability to be taught online.

REFERENCES

- Agyei, D. D., & Voogt, J. (2010). ICT use in the teaching of mathematics: Implications for professional development of pre-service teachers in Ghana. *Education and Information Technologies*, 16(4), 423-439. <https://doi.org/10.1007/s10639-010-9141-9>
- Al-Awidi, H., & Aldhafeeri, F. (2017). Teachers' Readiness To Implement Digital Curriculum in Kuwaiti Schools. *Journal of Information Technology Education: Research*, 16, 105-126. <http://www.informingscience.org/Publications/3685>
- Almas, M., Machumu, H., & Chang, Z. (2021). Instructors' Perspectives, Motivational Factors and Competence in the use of an E-Learning System in a Tanzanian University. 17(2), 76-95.
- Andrade, C. (2021). The Inconvenient Truth About Convenience and Purposive Samples. 43(1), 86-88.
- ArdiÇ, M. A. (2021). Opinions and Attitudes of Secondary School Mathematics Teachers Towards Technology. *Participatory Educational Research*, 8(3), 136-155. <https://doi.org/10.17275/per.21.58.8.3>
- Badri, M., Al Rashedi, A., Yang, G., Mohaidat, J., & Al Hammadi, A. (2014). Technology Readiness of School Teachers. *Journal of Information Technology Education: Research*, 13. <http://www.jite.org/documents/Vol13/JITEv13ResearchP257-275Badri0616.pdf>
- Berndt, S. G. S. D. J. P. (2010). Readiness for banking technologies in developing countries.pdf>. *Southern African Business Review*, 14(3), 47-76.
- Blut, M., & Wang, C. (2020). Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage. 48(4), 649-669.
- Bosman, I. d. V., Bossu, C., & Heck, T. (2020). Personal account of remote teaching for tertiary education in a South African context. *Education for Information*, 36(3), 333-337. <https://doi.org/10.3233/efi-200006>
- Chigona, A. (2017). Western Cape Subject Advisors' Perception of Their Preparedness for Connected Classrooms. 15(5), 444-454.
- Chikasha, S., Ntuli, M., Sundarjee, R., & Chikasha, J. (2013). ICT integration in teaching: An uncomfortable zone for teachers: A case of schools in Johannesburg. *Education as Change*, 18(1), 137-150. <https://doi.org/10.1080/16823206.2013.847013>
- Chisango, G., Marongwe, N., Mtsi, N., & Matyedi, T. E. (2019). Teachers' Perceptions of Adopting Information and Communication Technologies in Teaching and Learning at Rural Secondary Schools in Eastern Cape,

- South Africa. *Africa Education Review*, 17(2), 1-19.
<https://doi.org/10.1080/18146627.2018.1491317>
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications Inc.
- Daniel, P., Bianca Costa, A., Sabrina, N., & Carlos Ricardo, R. (2017). The Influence of Technology Readiness Index in Entrepreneurial Orientation: A Study with Brazilian Entrepreneurs in the United States of America. 5(1), 66-76.
- DOE. (2003). *Draft white paper on e-education : transforming learning and teaching through information and communication technologies (ICTs) / Department of Education*.
- Donalek, J. G. (2004). Phenomenology as a Qualitative Research Method [Article]. *Urologic Nursing*, 24(6), 516-517. <http://0-search.ebscohost.com/innopac.wits.ac.za/login.aspx?direct=true&db=asn&AN=15509620&site=ehost-live&scope=site>
- Education, D. o. (2003). Draft White Paper on e-Education.
- Education, D. o. B. (2013). *Policy on the Organisation, Roles and Responsibilities of Education Districts*. Government Gazzette
- Gfrerer, A., Hutter, K., Füller, J., & Ströhle, T. (2020). Ready or Not: Managers' and Employees' Different Perceptions of Digital Readiness. *California Management Review*, 63(2), 23-48.
<https://doi.org/10.1177/0008125620977487>
- Hadullo, K., Oboko, R., & Omwenga, E. (2017). A model for evaluating e-learning systems quality in higher education in developing countries. 13(2), 186-204.
- Hafifah, G. N., & Sulisty, G. H. (2020). Teachers' ICT Literacy and ICT Integration in ELT in the Indonesian Higher Education Setting. 21(3), 186-198.
- Helen, B., Muriah, U., Mark, D., Helen, B., Muriah, U., & Mark, D. (2011). How do we know when research from one setting can be useful in another? A review of external validity, applicability and transferability frameworks. 16(4), 238.
- Hero, J. L. (2020). Teachers' Preparedness and Acceptance of Information and Communications Technology (ICT) Integration and Its Effect on Their ICT Integration Practices. 1, 59-76.
- Jelinska, M., & Paradowski, M. B. (2021). Teachers' Engagement in and Coping with Emergency Remote Instruction During COVID-19-Induced School Closures: A Multinational Contextual Perspective. *Online Learning*, 25(1).
<https://doi.org/10.24059/olj.v25i1.2492>

- Khlaif, Z. N., Salha, S., Fareed, S., & Rashed, H. (2021). The Hidden Shadow of Coronavirus on Education in Developing Countries. *25*(1), 269-285.
- Kibirige, L. (2011). In-service science teachers' attitude towards ICT. *SAJHE*, *25*(8), 1513-1525.
- Kryeziu, S. A., Avdiu, T. A., & Arsim Avdiu. (2021). Examining the Teachers, Administrators and Parents' View on Drawbacks of Technology Use in Education. *İlköğretim Online*, *20*(2).
<https://doi.org/10.17051/ilkonline.2021.02.26>
- Landa, N., Zhou, S., & Marongwe, N. (2021). Education in emergencies: Lessons from COVID-19 in South Africa. *Int Rev Educ*, 1-17.
<https://doi.org/10.1007/s11159-021-09903-z>
- Larkin, K., Jamieson-Proctor, R., & Finger, J. (2012). TPACK and Pre-Service Teacher Mathematics Education. *Computers in the Schools*, *29*, 207-226.
<https://doi.org/10.1080/07380569.2012.651424>
- Lebelo, R. S., Moloi, K. C., & Jaffer, S. (2020). CORONA VIRUS PANDEMIC AND CHANGE TO ONLINE LEARNING IN ONE SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION: AN ACTION RESEARCH. *34*(2), 51-74.
- Magliaro, J., & Ezeife, A. N. (2007). Preservice Teachers' Preparedness to Integrate Computer Technology into the Curriculum. *33*(3).
- Mashau, P., & Nyawo, J. (2021). The Use of an Online Learning Platform: A Step Towards E-Learning. *South African Journal of Higher Education*, *35*(2).
<https://doi.org/10.20853/35-2-3985>
- Mhlanga, D., & Moloi, T. (2020). COVID-19 and the Digital Transformation of Education: What Are We Learning on 4IR in South Africa? *Education Sciences*, *10*(7). <https://doi.org/10.3390/educsci10070180>
- Moloi, T., & Mhlanga, D. (2021). Key Features Of The Fourth Industrial Revolution In SA's Basic Education System. *Journal of Management Information and Decision Sciences*, *24*(5).
- Monareng, J., Ramraj, A. B., & Mashao, P. (2020). The Rise in Online Learning in SA Due To The Coronavirus Pandemic. *Gender & Behaviour*, *18*(4).
- Moon, K., Brewer, T. D., Januchowski-Hartley, S. R., Adams, V. M., & Blackman, D. A. (2016). A guideline to improve qualitative social science publishing in ecology and conservation journals. *Ecology and Society*, *21*(3).
<https://doi.org/10.5751/es-08663-210317>
- Msiza, G. M., Malatji, K. S., & Mphahlele, L. K. (2020). Implementation of an e-Learning Project in Tshwane South

District: Towards a Paperless Classroom in South African Secondary

- Schools. *Electronic Journal of e-Learning*, 18(4).
<https://doi.org/10.34190/ejel.20.18.4.003>
- Mwapwele, S. D., Marais, M., Dlamini, S., & Van Biljon, J. (2019). Teachers' ICT Adoption in South African Rural Schools: A Study of Technology Readiness and Implications for the South Africa Connect Broadband Policy. *The African Journal of Information and Communication*(24), 1-21.
<https://doi.org/10.23962/10539/28658>
- Odlum, M. (2016). Technology Readiness of Early Career Nurse Trainees: Utilization of the Technology Readiness Index (TRI). 225, 314.
- Owen, S., White, G., Palekahelu, D. T., Sumakul, D. T. Y. G., & Sekiyono, E. (2020). INTEGRATING ONLINE LEARNING IN SCHOOLS: ISSUES AND WAYS FORWARD FOR DEVELOPING COUNTRIES. 19, 571-614.
- Oyedemi, T., & Magano, S. (2018). The Digitally Disadvantaged: Access to Digital Communication Technologies Among First Year Students at a Rural South African University. *African Education Review*, 15(1), 175-191.
<https://doi.org/10.1080/18146627.2017.1264866>
- Ramoroka, T. (2019). Spatial Disparities and Local Governance for Implementation of Blended Learning in SA. *INTERNATIONAL JOURNAL OF SOCIAL SCIENCES AND HUMANITY STUDIES*, 11(1).
- Rogan, M., & Reynolds, J. (2016). Schooling inequality, higher education and the labour market: Evidence from a graduate tracer study in the Eastern Cape, South Africa. *Development Southern Africa*, 33(3), 343-360.
<https://doi.org/10.1080/0376835x.2016.1153454>
- Shah, M. A.-u.-H., Khalid, M., Raheem, M. A., & Zahid, M. (2021). Teachers Readiness to Use of ICT in Classrooms and Academic Performance. 20(2), 435-442.
- Shah, R. K. (2020). Concepts of Learner-Centred Teaching. 8(3), 45-60.
- Sifunda, S., Mokhele, T., Manyapelo, T., Dukhi, N., Sewpaul, R., Parker, W. A., Parker, S., Naidoo, I., Jooste, S., Ramlagan, S., Gaida, R., Mabaso, M., Zuma, K., & Reddy, P. (2021). Preparedness for self-isolation or quarantine and lockdown in South Africa: results from a rapid online survey. *BMC Public Health*, 21(1), 580. <https://doi.org/10.1186/s12889-021-10628-9>
- Tabira, Y., & Otieno, F. (2017). Integration and implementation of sustainable ICT-based education in developing countries: low-cost, en masse methodology in Kenya. 12(2), 221-234.
- Twis, M. K., Miller, V. J., Cronley, C., & Fields, N. (2020). Collecting qualitative data through mobile applications: A multiple case study report. 38(1), 38-53.

- Uslu, Ö. (2018). Factors Associated with Technology Integration to Improve Instructional Abilities: A Path Model. *43*(4), 31-51.
- Vadachalam, N., & Chimbo, B. (2017). Using Information and Communication Technologies to teach and learn mathematics in South African schools: A snapshot view of its impact. *Africa Education Review*, *14*(1), 212-234. <https://doi.org/10.1080/18146627.2016.1224597>
- van Greunen, D., Kativu, K., Veldsman, A., & Botha, J. (2021). *Enhancing ICT readiness of schools in South Africa*.
- Williams, H. (2021). The Meaning of "Phenomenology": Qualitative and Philosophical Phenomenological Research [Article]. *Qualitative Report*, *26*(2), 366-385. <https://doi.org/10.46743/2160-3715/2021.4587>

APPENDIX A: Participant Information Sheet

Masters Research Report: Digital Readiness of Educators during Covid-19

Dear Sir/Madam

You have been invited to take part in this research study. Before you decide on whether or not to take part in the study, you need to read the below information, which will explain to you what the research is about and what your involvement will entail. Kindly read the information carefully.

Background and Overview of the Study

Itumeleng Phorosi is conducting the study in partial fulfilment of the requirements for a Master of management in the field of Digital Business at Wits Business School.

This study explores the level of the digital readiness of educators in the basic education sector of schools and explores the level of educators' digital readiness in the basic education sector of schools to deliver teaching to learners using technology. This research will aim to understand the factors that affect educators' readiness to use these technologies introduced into schools to supplement the learning process.

Some of these technologies were introduced into schools prior to the Covid-19 pandemic, while in some cases, technology was only introduced during the pandemic when schools were forced to shut down due to the lockdown regulations enforced in South Africa.

This research will examine how and if educators were adequately prepared to respond to these changes by assessing their competence and preparedness in using technologies introduced and the factors that played a role in their digital readiness.

Deciding whether to participate

The decision to take part in this research is entirely voluntary. Should you wish to participate in the study, you will be asked to sign the consent form that confirms your participation. You are allowed to withdraw from the research at any time without giving a reason. There is no risk involved in participating in this interview; we just ask that you please take some time out of your busy schedule for the interview.

Please note, there is no monetary benefit to participating in this study.

Confidentiality

All the information collected throughout the interview will be kept strictly confidential. Any identifying information will be removed from the data when the research findings are presented in the final report to be submitted and will not be included in any other publications. All data collected in the course of the research will be stored securely in electronic form. It may be used for further research and analysis

Contact for Further Information

If you require any further information regarding this study, please feel free to contact my supervisor or me. Details are:

Researcher: Itumeleng Phorosi (305652@students.wiits.ac.za)

Supervisor: Ayanda Magida (Ayanda.Magida@wits.ac.za)

Thank you.

APPENDIX B: Consent Form

Masters Research Report: Digital readiness of educators during Covid-19.

Please tick the box to answer

	Yes	No
1. I confirm that I have read the information sheet provided, understand the study, and have asked any questions necessary for clarity.		
2. I understand that my participation is voluntary, and I will not receive any monetary benefit from my participation.		
3. I understand that the researcher will not identify me by name in any reports using information obtained from this interview and that my confidentiality as a participant in this study will remain secure.		
4. I agree with the interview being recorded.		

Research participant

..... (signature)

..... (name)

..... (date)

APPENDIX C: Instrument

Semi-structured interview guide:

Demographic questions

1. Please state your age and gender.
2. Can you tell me more about your current role and how long you have been in teaching?

Introduction

3. In what way did your school use technology to continue teaching your students during lockdown?
4. How did you feel about using technology to continue teaching your learners during the pandemic? Did it make teaching more or less difficult?

Probe: Optimism, Innovativeness, Discomfort, Insecurity, Attitudes, Perceptions,

5. What is your view on the technologies that were used to ensure that teaching continued? (Microsoft Teams, Zoom, Google classrooms, etc.)
6. How willing are you to try new technologies when they come out?
7. What are the benefits, if any, that you have seen of using technology for teaching for you and your students?
8. Did you experience any discomfort or difficulties when using technology for teaching? Please elaborate.

Probe: Resources, Infrastructure, Training, Support,

9. What technology do you or did you have access to that was used for teaching during lockdown?
10. How do you usually connect to the internet? Is the connection reliable?
 - a. Probe: home or work
11. Do you ever experience any network connectivity or other technical problems when using technology to teach? If yes, elaborate on how this is dealt with.
12. What training have you received about the technology you are using now and was this adequate for online teaching that you had to carry out?
13. Did you receive support from school management, government or district offices during the lockdown period to continue with the curriculum by teaching online?
14. In your view what are some of the challenges your school encountered in teaching online and during the pandemic

Digital literacy

15. What training, if any, did you receive on the use of technology within the classroom during your formal qualification studies? If yes, how long ago was this training?
16. What courses does your school offer, or can you apply for courses through other institutions to learn more about the technology you are using?

Closing

17. Is there anything else not covered that you would like to inform us about how educators are prepared or not prepared to use ICT in the classroom, even beyond Covid-19 and the lockdowns we have been facing?