

**TEACHERS' PERCEPTIONS ON ICT INTEGRATION IN THE  
CLASSROOM:**

**A CASE STUDY OF SECONDARY SCHOOLS IN THE  
POTGIETERSRUS CIRCUIT, LIMPOPO PROVINCE**

**by**

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## DECLARATION

I, M.M. Sethosa, Student Number: 46755926, declare that *TEACHERS' PERCEPTIONS ON ICT INTEGRATION IN THE CLASSROOM: A CASE STUDY OF SECONDARY SCHOOLS IN THE POTGIETERSRUS CIRCUIT, LIMPOPO PROVINCE* is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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M.M. SETHOSA

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DATE

## **DEDICATION**

This dissertation is dedicated to memory of my late father

**Dingaan Johannes Sethosa**

and to my mother

**Esther Mokgadi Sethosa**

*For being an aspiration and my number one supporter*

In addition, it is dedicated to my children

**Lefa and Khumo Sethosa**

*For being the light and joy of my life*

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## ACRONYMS

ACE	Advanced Certificate in Education
Bed	Bachelor of Education
CACE	Certificate of Adult and Continuing Education
CAI	Computer-Assisted-Instruction
CCK	Connectivism and Connectivist Knowledge
DCE	Digital Classroom Environment
DoE	Department of Education
DBE	Department of Basic Education
DTPS	Department of Telecommunication and Postal Services
E-Education	Electronic Education
E-Learning	Electronic Learning
ETDP SETA	Education, Training and Development Practices Sector Education and Training Authorities.
FET	Further Education and Training
GET	General Education and Training
HOD	Head of Department
ICASA	Independent Communications of South Africa
ICT	Information and Communication Technology
ELRA	Education Labour Relations Council
MOOC	Massive Open Online Course
NCS	National Curriculum Statement
NEPAD	New Partnership for African Development
NGO	Non-Governmental Organisation
NTA	National Teacher Award
PDA	Personal Digital Assistants

RSA	Republic of South Africa
PRIMR	Primary Math and Reading
RSS	Really Simple Syndication
PDA	Personal Digital Assistance
PLE	Personal Learning Environment
SMS	Short Message Service
SMT	School Management Team
TLI	Teacher Laptop Initiative
USA	United States of America
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISA	University of South Africa
USASA	Universal Services and Access Agency of South Africa
VLE	Virtual Learning Environment
WiFi	Wireless Fidelity
WITS	University of Witwatersrand
WWW	World Wide Web

## **ABSTRACT**

The impact of Information and Communication Technologies on all spheres of life, whether it is for educational, corporate, government or social purposes is undeniable. From an educational point of view, the South African Department of Basic Education acknowledged the impact that ICT has on teaching and learning in the classroom by introducing ICT in the education system. However, ICT integration in South African schools is still in its infancy especially in most rural schools.

The phenomenological, qualitative research study employed a case study as its research design, employing the connectivism theory as the theoretical framework. The theory that underpinned this study was the connectivism theory. The research was performed with a sample of six purposively selected teacher-participants. Semi-structured interviews and non-participant observation were the methods of data collection. The aim of conducting the semi-structured interviews was to determine the teachers' perception on the integration of ICT as a tool to enhance teaching and learning. The non-participant observation assisted in corroborating the data collected from the interviews. The research data collected were studied, analysed, explained and validated.

The findings indicated that the integration of ICT is still at its infancy and though the teachers viewed ICT as a valuable tool to enhance teaching and learning, they emphasised the enormous work that needs to be done by the Department of Basic Education in ensuring the full integration of ICT in the schools. Findings of the study highlighted the challenges that teacher's experience that hindered the proper integration of ICT in schools. The study recommends that the Department of Basic Education provides adequate ICT tools in all the public schools, ensures that the teachers receive proper ICT training, continuous support and the regular update and maintenance of ICT tools as well as the regulation of ICT policy as a guide to teaching and learning in the schools.

**KEY CONCEPTS:** Information and Communication Technology, Teachers' perceptions, Integration, Teachers, learners, Secondary schools.

## SETSOPOLWA

Seabe sa Ditheknolotši tša Tshedimošo le Dikgokagano go makala ka moka a bophelo, se ka be se le go thuto, go khamphani, go mmušo goba mabakeng a leago se ka se ganetšwe. Go ya ka maikutlo a tša thuto Kgoro ya Thuto ya Motheo ya Afrika Borwa e amogetše seabe seo Theknolotši ya Tshedimošo le Dikgokagano (ICT) e nago le sona go go ruta le go ithuta ka phapošing ya thuto ka go tsebagatša ya ICT ka lenaneong la thuto. Le ge go le bjale, kopanyo ya ICT ka dikolong tša Afrika Borwa e sa le mathomong kudukudu ka dikolong tše ntši tša magaeng.

Dinyakišišo tše tša maitemogelo le tša boleng di šomišitše dinyakišišo tša seemo bjalo ka tlhamo ya tšona ya go dira dinyakišišo, ka go šomiša teori ya thuto ya kgokagano ka inthanete bjalo ka tlhako ya teori. Teori yeo e thekgilego dinyakišišo tše e bile teori ya thuto ya kgokagano ka inthanete. Teori ye e phethagaditšwe ka sampole ya barutiši ba tshela bao ba kgethilwego go kgatha tema ka maikemišetšo. Dipotšišo tša dipoledišano tšeo di bego di nyaka gore baarabi ba fahlele ka mabaka le temogo ka bao ba sa kgathego tema di ile tša šomišwa bjalo ka mekgwa ya go kgoboketša tshedimošo. Maikemišetšo a go diriša dipotšišo tša dipoledišano tšeo di bego di nyaka gore baarabi ba fahlele ka mabaka ebile go tseba maikutlo a barutiši mabapi le kopanyo ya ICT bjalo ka setlabelo sa go thuša go ruta le go ithuta. Temogo ka bao ba sa kgathego tema go thušitše go kopanya tshedimošo yeo e kgobokeditšwego ka dipoledišanong. Tshedimošo ya dinyakišišo yeo e kgobokeditšwego e ile ya lekodišišwa, ya sekasekwa, ya hlalošwa le go tiišeletšwa.

Dikutollo di laeditše gore kopanyo ya ICT ka dikolong e sa thoma gomme le ge e le gore barutiši ba bona ICT bjalo ka setlabelo se bohlokwa sa go thuša go ruta le go ithuta, ba gateletše taba ya mošomo o montši wo o swanetšego go dirwa ke Kgoro ya Thuto ya Motheo go netefatša gore go ba le kopanyo ka botlalo ya ICT ka dikolong. Dikutollo tša dinyakišišo di laeditše dithohlo tšeo baithuti ba itemogelago tšona tšeo di šitišitšego kopanyo ya maleba ya ICT ka dikolong. Dinyakišišo di šišinya gore Kgoro ya Thuto ya Motheo e fane ka ditlabelo tša maleba tša ICT ka dikolong tša mmušo ka moka, e netefatše gore barutiši ba hwetša tlhahlo ya maleba ya ICT le thekgo ye e tšwelago pele, le gore ditlabelo tša ICT di fele di mpshafatšwa kgafetšakgafetša le go hlokomelwa. Godimo ga fao, gore melawana ya ICT bjalo ka tlhahlo ya go ruta le go ithuta ka dikolong e laolwe.



**MAREO A BOHLOKWA:** Theknolotši ya Tshedimošo le Dikgokagano, Maikutlo a barutiši, Kopanyo, Barutiši, Baithuti, Dikolo tše di Phagamego.

## OPSOMMING

Ons kan nie die invloed van Inligtings- en Kommunikasietegnologie (IKT) op alle terreine van die lewe – of dit vir opvoedkundige, korporatiewe, regerings- of sosiale gebruik is – ontken nie. Uit 'n opvoedkundige oogpunt, het die Suid-Afrikaanse Departement van Basiese Onderwys die invloed van IKT op onderrig en leer in die klaskamer erken deur IKT in die onderwysstelsel bekend te stel. IKT-integrasie in Suid-Afrikaanse skole is steeds in sy beginfase, veral in landelike skole.

Hierdie fenomenologiese, kwalitatiewe navorsingstudie het 'n gevallestudie as navorsingsontwerp en die konnektivisme teorie as teoretiese raamwerk gebruik. Die teorie wat die studie onderskryf het, was die konnektivisme teorie. Die navorsing is met 'n steekproefneming van ses doelbewus gekose onderwyserdeelnemers uitgevoer. Semigestruktureerde onderhoude en nie-deelnemerwaarneming is gebruik om data te versamel. Die doel van die semigestruktureerde onderhoude was om die onderwysers se persepsies te bepaal oor die integrasie van IKT as hulpmiddel om onderrig en leer te bevorder. Die nie-deelnemerwaarneming het gehelp om die data uit die onderhoude te bevestig. Die navorsingsdata wat versamel is, is bestudeer, ontleed, verduidelik en geldig verklaar.

Die bevindings het aangedui dat die integrasie van IKT nog in sy beginfase is en alhoewel die onderwysers IKT as 'n waardevolle hulpmiddel beskou om onderrig en leer te bevorder, het hulle die groot hoeveelheid werk wat die Departement van Basiese Onderwys nog moet doen om volledige integrasie van IKT in skole te verseker, beklemtoon. Die studie se bevinding het die onderwysers se uitdagings wat die behoorlike integrasie van IKT in skole verhinder, uitgelig. Die studie beveel aan dat die Departement van Basiese Onderwys genoegsame IKT-hulpmiddels in alle openbare skole voorsien, verseker dat die onderwyser behoorlike IKT-opleiding en deurlopende ondersteuning ontvang, en dat IKT-hulpmiddels gereeld opgradeer en onderhou word. Verder, dat die IKT-beleid as 'n riglyn vir onderrig en leer in skole gereguleer moet word.

**SLEUTELKONSEPTE:** Inligtings- en Kommunikasietegnologie, Onderwysers se persepsies, Integrasie, Onderwysers, Leerders, Sekondêre skole.

## TABLE OF CONTENTS

<b>DECLARATION</b> .....	<b>i</b>
<b>DEDICATION</b> .....	<b>ii</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>iii</b>
<b>ACRONYMS</b> .....	<b>iv</b>
<b>ABSTRACT</b> .....	<b>vi</b>
<b>list of figures</b> .....	<b>xiv</b>
<b>list of tables</b> .....	<b>xiv</b>
<b>CHAPTER 1</b> .....	<b>1</b>
<b>ORIENTATION AND BACKGROUND</b> .....	<b>1</b>
1.1 INTRODUCTION .....	1
1.2 BACKGROUND OF THE STUDY .....	3
1.3 PROBLEM STATEMENT .....	5
1.4 RESEARCH QUESTIONS .....	6
1.5 RESEARCH AIMS.....	7
1.6 THEORETICAL FRAMEWORK.....	7
1.7 SIGNIFICANCE OF THE STUDY.....	7
1.8 RESEARCH METHODOLOGY .....	8
1.8.1 The Research Paradigm .....	8
1.8.2 The Research Approach .....	9
1.8.3 The Research Design.....	9
1.9 RESEARCH METHODS.....	9
1.9.1 Sampling of Participants.....	10
1.9.2 Data Collection.....	11
1.9.3 Data Analysis .....	12

1.10	TRUSTWORTHINESS.....	12
1.11	ETHICAL MEASURES.....	13
1.12	CLARIFICATION OF CONCEPTS.....	13
1.13	DIVISION OF CHAPTERS.....	15
1.14	CONCLUSION.....	16
<b>CHAPTER 2.....</b>		<b>18</b>
<b>LITERATURE REVIEW .....</b>		<b>18</b>
2.1	INTRODUCTION.....	18
2.2	THEORETICAL FRAMEWORK.....	19
2.2.1	Connectivist Theory.....	19
2.2.2	Theories prior to Connectivism.....	21
2.2.3	Teaching and Learning in a Connected World .....	26
2.2.4	Principles of Connectivist Theory .....	30
2.2.5	Critique on Connectivism .....	31
2.3	INFORMATION AND COMMUNICATION TECHNOLOGIES .....	32
2.3.1	Utilisation of the Digital Classroom.....	33
2.3.2	The Use of ICT around the Globe .....	34
2.3.3	Challenges that hinder the Effective Integration of ICT .....	37
2.3.4	The Potential of ICT as a Tool to Enhance Teaching and Learning	40
2.4	EDUCATION POLICIES ON ICT LOCALLY AND GLOBALLY .....	41
2.5	CONCLUSION .....	43
<b>CHAPTER 3.....</b>		<b>44</b>
<b>RESEARCH DESIGN AND METHODS.....</b>		<b>44</b>
3.1	INTRODUCTION .....	44
3.2	THE RATIONALE for empirical research.....	44

3.3	THE RESEARCH METHODOLOGY .....	45
3.3.1	The Research Paradigm.....	45
3.3.2	The Research Approach .....	46
3.3.3	The Research Design.....	47
3.3.4	Research Methods .....	48
3.4	TRUSTWORTHINESS .....	54
3.4.1	Credibility .....	55
3.4.2	Transferability.....	56
3.4.3	Dependability .....	56
3.4.4	Confirmability .....	56
3.5	ETHICAL MEASURES .....	57
3.6	CONCLUSION .....	58
<b>CHAPTER 4</b>	<b>.....</b>	<b>60</b>
<b>DATA ANALYSIS, FINDINGS AND DISCUSSION OF DATA</b>	<b>.....</b>	<b>60</b>
4.1	INTRODUCTION.....	60
4.2	RESEARCH FINDINGS .....	60
4.2.1	Profile of Participants .....	60
4.2.2	Discussion of Themes.....	62
4.2.5	Theme 5: Recommendations for the effective use of ICT .....	80
4.3	NON-PARTICIPANT OBSERVATION.....	83
4.5	SUMMARY OF FINDINGS .....	85
4.6	CONCLUSION .....	86
<b>CHAPTER 5</b>	<b>.....</b>	<b>88</b>
<b>SUMMARY, CONCLUSIONS AND RECOMMENDATIONS</b>	<b>.....</b>	<b>88</b>
5.1	INTRODUCTION.....	88

5.2	SUMMARY OF THE LITERATURE REVIEW.....	88
5.3	SUMMARY OF THE EMPIRICAL STUDY.....	90
5.3.1	Research Methodology .....	90
5.3.2	Findings based on the Empirical Research .....	92
5.4	SYNTHESIS OF THE RESEARCH FINDINGS .....	94
5.5	CONCLUSIONS IN RELATION TO THE RESEARCH QUESTIONS.....	96
5.6	LIMITATIONS.....	100
5.7	RECOMMENDATIONS .....	101
5.7.1	Recommendations for the Department of Basic Education .....	101
5.7.2	Recommendations for School leadership.....	102
5.7.3	Recommendations for Teachers .....	102
5.8	SUGGESTIONS FOR FURTHER RESEARCH.....	103
5.9	CONCLUSION .....	103
	<b>REFERENCES.....</b>	<b>105</b>
	<b>APPENDICES.....</b>	<b>120</b>
	Appendix A: Ethical Clearance Certificate .....	120
	Appendix B: Application to Conduct Research: Circuit Manager .....	122
	Appendix C: Approval to Conduct Research: Circuit Manager .....	123
	Appendix D: Letter of Consent to Participants (Teachers) .....	124
	Appendix E: Consent for Participation .....	125
	Appendix F: Teacher’s Interview Guide .....	126
	Appendix G: Participants Interview Transcripts .....	129
	Appendix H: Observation Checklist .....	137
	<u>Appendix I: Turnitin Report.....</u>	<u>138</u>
	Appendix J: Proof of Editing.....	139

## **LIST OF FIGURES**

Figure 1.1: The progression of the learning theories .....	21
Figure 2.2: Digital classroom learning environment.....	34

## **LIST OF TABLES**

Table 4.1: Details of the participants .....	61
Table 4.2: Themes and subthemes .....	62

# CHAPTER 1

## ORIENTATION AND BACKGROUND

### 1.1 INTRODUCTION

Teaching and learning in the 21st century has gone through tremendous changes in the past couple of years. One of those changes that have made its way into the South African educational system is the introduction of Information and Communication Technologies (ICT). Perron, Taylor, Glass and Margerum-Leys (2010:67) describe Information and Communication Technologies (ICT) are technologies used to convey, manipulate and store data by means of e-mail, SMS text messages, video chats and online social media which carry a range of information and communication functions. The integration of educational technologies is quite broad as it includes a variety of tools such as the television, cellular-phones, tablets, computers, interactive whiteboards and projectors in the digital classroom revolutionising teaching and learning in schools (Msila, 2015:1974). This change has made it much easier and faster for learners and teachers to acquire and share information from anywhere in the world through the integration of ICT. Furthermore, ICT has triggered changes not only in the educational system but also the socio-economic framework of people and nations worldwide (Matos, Simoes & Esposito, 2014).

The South African government introduced ICT in education with the purpose of providing quality education (DBE, 2004) and the aim of reconstructing the educational system. Other benefits relating to the integration of ICT include enhancing the applicability of the learning content provided for individual learners, to reinforce learning, compensating for language deficiency, increasing application possibilities as well as supplementing the spoken word (Kruger, 2010). In addition, ICTs can furnish teachers with devices to bolster adoption and make learning open, accessible and efficiently performed (Makura, 2014:43; UNESCO, 2012).

Access to information and communication in the modern digital world has been made easy and innovative; a teacher can communicate with learners through modern digital devices outside the classroom. This enhances the way in which teaching and learning takes place inside and outside the classroom. Teachers are the main drivers in ensuring effective and proper integration of ICT in the classrooms making their level



of knowledge and skills more efficient. However, the major problem is that some teachers continue to teach using the traditional method of teaching and learning to learners (who are mostly technologically savvy), whereas they should be preparing them for twenty-first century spheres and global structures that influence the learners. Singh and Chan (2014:875) argue that ICT has the potential to bring forth a powerful learning environment that transforms the whole teaching and learning process.

Efforts from the Education Department to introduce ICT in the South African educational system are for teachers and learners to be able to compete with other countries, which are considered to be knowledge societies. Anderson (2008:6) states that a knowledge society consists of an association of people with similar interests who try to make use of their combined knowledge. Members of a knowledge society do not have to reside in the same region but with the use of technology, it makes the sharing and access of information much more feasible. In order to achieve and maintain quality education means the method of teaching and learning must not remain stagnant but it should keep up with innovations and adapt to changes in order to align with other countries. Countries in Africa, as developing countries suffer similar challenges such as lack of sufficient ICT infrastructure, the digital divide and lack of proper teacher skills and knowledge in integrating ICT effectively in the classroom as compared to first world countries such as the United States of America (USA) and United Kingdom (UK), which are highly advanced in the availability of ICT tools and the integration (Beyers, 2016:332).

This study discussed the integration of the educational ICT policy developed to guide teaching and learning as well as preparing learners for their futures in the information age. The study further explores the perceptions teachers in the Potgietersrus circuit have towards the integration of ICT in the classroom, taking into consideration the setbacks or benefits experienced with having to integrate ICT. In addition, the study highlighted the recommendations that can be made in order to effectively integrate ICT in the classroom.

This chapter covered aspects that include: background of the study, research questions, research aims and objectives, research methodology, ethical measures, trustworthiness, clarification of concepts, division of chapters as well as the conclusion.

## 1.2 BACKGROUND OF THE STUDY

Through global acknowledgement, nations have come to realise the significant role that ICT has on the development of any nation (Adelabu & Adu, 2015:306). Acknowledgement of the effectiveness of ICT in education, has led the Department of Basic Education to form a partnership with certain private companies as well as non-government organisations (NGOs) with the purpose to reduce the digital divide between schools within the country (DBE, 2004). In 2004, the South African Department of Basic Education's approach to integrate ICT into teaching and learning was to publish the White Paper on e-Education with the intention to act as the official governing policy (RSA, 2004:17). The purpose of publishing the e-Education policy was to promote and create greater access to equal learning opportunities and provide personalised learning experiences (DBE, 2014). The strategic goal of the policy was to "ensure that every South African manager, teacher and learner in the general and further education and training bands, would be ICT capable" (RSA, 2004:17).

In 2007, the Department of Basic Education took further steps in ensuring that schools have access to ICT, where they developed the guideline that aims to improve the ICT knowledge, skills, values and attitudes needed by teachers to implement the National Curriculum Statement (NCS) effectively (DBE, 2014). Peters (2017) argues that it is crucial for teachers to possess appropriate ICT skills and knowledge, as ICT on its own will not spontaneously transform education in the ways required, but requires the commitment and dedication of teachers, policy makers and societal leaders.

In 2014, the Department of Basic Education collaborated with the Department of Telecommunication and Postal Services (DTPS), Independent Communications Authority of South Africa (ICASA), Universal Services and Access Agency of South Africa (USAASA) and Network Operations (DTPS, 2014). Each and every department played a role in ensuring that schools integrate ICT. ICASA has strengthened the monitoring of the compliance by developing guidelines on hardware and software, connectivity and training, as well as stakeholders' responsibility in terms of training, maintenance and payment of connectivity recurring cost. Network operators are to provide support and maintenance for the period of three months. After those three months, USAASA takes the responsibility. It was during that time where the DBE developed the framework for the ICT implementation in Education for the period 2016-

2020. The framework was developed with the intention to ensure that all South African schools, both in rural and urban areas have access to ICT by the year 2020. The vetting process, which scanned schools that qualified to receive connectivity, was applied. Certain factors such as availability of electricity and having strong rooms to secure mobile trolleys were taken into consideration in selecting schools for connectivity. However, the main concern was that most of the rural schools might not qualify due to problems with lack of electricity in those areas causing an increase in the digital divide between urban schools and rural schools (DBE, 2015).

A statistical survey conducted by the Department of Basic Education done in 2014, revealed that about 26% of South African teachers have basic ICT skills, while only 7% possess intermediate skills in the use of ICT. The majority of the teachers possessing those skills were from the Western Cape, Gauteng and the Free State (DBE, 2015). With the assistance of INTEL, training to 1783 teachers from schools in eight districts from all provinces was provided - excluding Gauteng and Western Cape as they were regarded as quite advanced and doing remarkable work (DBE, 2016:37). Therefore, this came as an issue that prompted the Department of Basic Education being queried on their strategic plan in ensuring that the remaining 74% of teachers received ICT training. As part of the effort to improve teachers' ICT skills and knowledge, a set of best practice presentations were made available to teachers and managers.

To accelerate the teacher's integration of ICT, the Department of Telecommunication partnered with Vodacom and established 149 teacher centres, of which 81 of them were fully connected and work was in progress to ensure that the rest were connected. Nine of the centres are situated in the Limpopo province (Ayemoba, 2013). The Department of Basic Education developed the National Teachers Awards (NTA) as an initiative to recognise teachers who were integrating ICT into teaching and learning (DBE, 2016:38).

This research study, investigating teachers' perceptions of integrating ICT in the classroom, focused on public secondary schools in the Potgietersrus circuit in the Limpopo province of South Africa. The teachers' perceptions in the Potgietersrus circuit evaluated the perceptions and views of teachers in the Potgietersrus circuit towards the integration of ICT in the educational system as well as considering their

personal views, experiences or fears on integrating ICT in their lessons. The circuit consists of nine secondary schools of which two schools are private schools and seven are public schools. The private schools are situated in the town of Mokopane, whereas the public schools are situated in townships and semi-rural part of Mokopane. This study focused on public schools for the reason that as a teacher at one of the public schools situated in the Potgietersrus circuit, I am aware of the challenges that teachers face with having to integrate ICT in the classroom. I was also selected for the ICT training programme sponsored by the Department of Basic Education (DBE), University of Witwatersrand (WITS) and Education, Training and Development Practices Sector Education and Training Authorities (ETDP-SETA). Being part of the training programme, I was able to get in-depth understanding of the perceptions that teachers have towards ICT and some challenges they experience with having to integrate ICT in the classroom.

### **1.3 PROBLEM STATEMENT**

The need for technology and teachers trained to use such technologies, are becoming increasingly important not only in South African classrooms, but in both the formal and non-formal educational settings all over the globe (Van den Berg, 2017:74). Given the pivotal role ICT- skilled teachers play in the creation of preparing learners to be active participants in the knowledge and information society, the setback is that not all teachers embraced the implementation of ICT in the schools. This common occurrence can be experienced by older teachers who are used to and comfortable with the traditional way of teaching, as they may feel inferior or develop negative perceptions of integrating recent technologies. Pegler, Kollwyn and Crinhton (2010:457) refer to older teachers as non-millennial teachers who are unenthusiastic to embrace Information and Communication Technologies in their practices. The traditional way of teaching has created some sense of comfort and having to move away from their comfort zone might create discomfort to some teachers. Even today, some teachers are reluctant to integrate ICT in order to improve learning, but merely use it to transmit subject content (Kritzinger, Looock & Walaza, 2014:12).

The lack of necessary skills and knowledge to effectively integrate ICT to enhance teaching and learning, forms part of the challenges that may hinder teachers' determination of implementing ICT. Even with the provision of tablets and computers

by the Limpopo Department of Education and non-government organisations, without the proper use of the ICT tools, it will not be as effective as it is supposed to be. If one lacks the necessary skills in something, it will not be easy to negotiate the first steps of integration in the teaching and learning process. The thought of learning something new can be frightening and the fear of failure is another problem. Unlike the new generation of teachers who have graduated from universities during the digital age, older teachers have not been exposed to the kind of technology found today. The ICT policy in education assists and acts as a guide to ICT integration in schools. However, many schools are not aware of ICT policies in education and the non-existence of a school-based policy to guide the school on how to effectively integrate ICT becomes a problem.

The availability of ICT tools has an impact on the attitude that teachers have towards the integration of ICT. Lack of the necessary ICT tools creates a problem in that this deficiency does not accommodate all the teachers and learners. Schools suffer from not having sufficient ICT tools leading to other teachers and learners not having an access.

#### **1.4 RESEARCH QUESTIONS**

With the above perspectives and discourse in mind, as well as understanding of the aim of this study, the following main research question was:

*What are the Potgietersrus circuit secondary school teachers' perceptions on the integration of ICT in the classroom?*

In responding to the above main research question, it was necessary to develop the following sub-questions:

- What are teachers' perceptions of ICT policies as a guide to teaching and learning?
- What are the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning?
- What challenges do teachers experience in the integration of ICT for teaching and learning?
- What recommendations can be made regarding the effective integration of ICT in teaching and learning?

## **1.5 RESEARCH AIMS**

Based on the main research question stated above, the aim of this research was to understand the perceptions of secondary school teachers from the Potgietersrus circuit in integrating ICT for teaching and learning.

The study further addressed the following objectives:

- To explore the perceptions of teachers with having to implement the ICT policy as a guide to teaching and learning.
- To determine the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning.
- To explore challenges that teachers experience in the integration of ICT for teaching and learning.
- To make recommendations regarding the effective integration of ICT in teaching and learning.

## **1.6 THEORETICAL FRAMEWORK**

The theory that underpinned this study is the connectivist learning theory. I found the theory to be appropriate for the study as it gives a better understanding of ICT integration with the purpose of enhancing teaching and learning as well as understanding the teacher's perceptions with regards to the integration of ICT in the classroom.

The connectivist theory introduced by Siemens (2004), stipulates that learning does not necessarily reside only in the classroom but from anywhere and through different channels. According to the connectivist theory which is a framework for understanding learning in the digital age, learners and teachers can learn and share knowledge and information through a social network that includes individual organisations, non-humans, learners, teachers from anywhere in the world. The theory is discussed further in Chapter 2 Section 2.2.1.

## **1.7 SIGNIFICANCE OF THE STUDY**

The purpose of this study was to examine, evaluate and analyse the teachers' perceptions towards ICT integration in the classroom for teaching and learning purposes. The study further explored perceptual factors that hinder or promote the use

of ICT in schools as well as the successes or setbacks that teacher's experienced to incorporate ICT in the school curriculum. The theory that underpinned this study is the connectivism theory by George Siemens.

The significance of the research problem is aimed at analysing the findings of the research study, generate conclusions and recommendations with the intention of ensuring effective and proper adoption of ICT in schools. It is with the hope that the research findings can be utilised in the professional development and technological support of teachers regarding ICT integration in South African schools

## **1.8 RESEARCH METHODOLOGY**

This study's methodology includes a discussion on the research paradigm, the research approach and the design, as discussed below.

### **1.8.1 The Research Paradigm**

The background of a study begins with curiosity or concern by the researcher to want to change or express certain issues or beliefs he/she has regarding the things that happen around them as well as the basic beliefs that guide action (Guba, 1990:17). A research paradigm inherently reflects the way in which the researcher views in which we live the world. Kivunja and Kiyuni (2017:26) describe a paradigm as a lens through which a researcher looks at the world, and the vital factor about paradigms is that they provides beliefs and dictates, which, for scholars in a particular discipline, influence on what should be studied, how it should be studied as well as the manner in which results of the study should be interpreted.

There are three main underlying paradigms applied in educational research, being the positivist, critical and interpretivist paradigms. The positivist paradigm involves an experimentation process that is used to explore observation in conjunction with answering questions, aimed at providing explanations and making predictions based on measurement results. Kivunji and Kuyini (2017:35) maintain that the critical paradigm seeks to address the political, social and economic issues, which lead to social oppression, conflict, struggle and power structures at whatever levels these might occur. Unlike other paradigms, the interpretive paradigm seeks to comprehend the world in which they live or work, with the goal of the research relying as much as possible on the participants' views of the situation. This study applied the interpretive

paradigm because it seeks to understand the perceptions of teachers regarding the integration of ICT in the classroom. A further discussion of the selected paradigm is presented in Chapter 3 Section 3.3.1.

### **1.8.2 The Research Approach**

The nature and focus of the study and the subsequent research questions suggest that the appropriate research approach used in this study is qualitative research approach. The qualitative research approach uses methods that define the phenomena in their complexity (Leedy and Ormrod, 2005:133). Applying the qualitative research approach assisted me in obtaining a better understanding of the views, opinions and perceptions of the participants. In addition, the qualitative research approach relies on the participants in gathering data through interviews and observations.

### **1.8.3 The Research Design**

I implemented a phenomenological case study, which seeks to investigate a phenomenon within its real-life context when the boundaries between phenomenon and context are clearly evident and in which multiple sources of evidence are used (Yin, 1984:23). I was able to determine in advance what evidence to gather and what analysis techniques to use with data to answer the research questions (Nieuwenhuis, 2007: 76). In light of this, a phenomenological case study was deemed appropriate for this study, reason being that it investigated the phenomena from the perspective of the people experiencing the phenomena, while a case study implies investigating an aspect in an in-depth manner. The case of this study is to get deeper understanding on the dynamics of how teachers perceive the integration of ICT from an educational setting. Hancock and Algozzine (2006:11) further state that a case study gives the researcher in-depth understanding of the situation and meaning of those involved, and is further discussed in Chapter 3 Section 3.3.3.

## **1.9 RESEARCH METHODS**

The research methodology gives an essential description of the entire research strategy and tactics (Terre Blanche & Durrheim, 2006). It further assists with the authentication of the study. The study aimed to reveal detailed information of how the



participants were selected, how data were collected and analysed and these aspects are discussed in the subsequent sections.

### **1.9.1 Sampling of Participants**

The selection of participants in the study assisted me with achieving the research objective. Sampling in qualitative research is a term used for the selection of participants. The Merriam-Webster Dictionary defines sampling as “a population selection process or technique with the purpose of determining characteristics or parameters of the whole population”. However, the definition of Gentles, Charles, Ploeg and McKibbin (2015:1772) differs from the popular definition of the Merriam-Webster Dictionary, as they define sampling in qualitative research in its broadest sense as the selection of specific data sources from which data are collected to address the research objectives.

For the purpose of selecting participants for this study, I applied the purposive sampling and non-probability sampling, as I was already aware of the required characteristics that the selected participants had to possess for the specific research study. Chilisa and Preece (2005:170) describe purposive sampling as “being selected from a group of participants”. A researcher implementing purposive sampling by virtue of knowledge or experience gathered from other people decides what needs to be known (Etikan, Musa & Alkassim, 2016:2).

The selected participants were secondary school teachers from the Potgietersrus circuit who are affected or aware of the research study. I primarily focused on teachers from different age groups, years of teaching experience as well as teaching different subject streams. I applied convenience sampling in my judgement for the selection of accessible teachers based on the site of the school and the time scheduled for the interview.

I selected three public schools from the Potgietersrus circuit, I also took into consideration that the schools had been part of and were aware of the EDTP-SETA and WITS ICT training programme. From each of the schools, two participants were selected. Considering the selection of participants teaching different subject streams assisted me in getting a better understanding of how effective or ineffective the

integration of ICT has impacted on specific subject content. Further elaboration on the selection of participants is discussed in Chapter 3 Section 3.3.4.1.

### **1.9.2 Data Collection**

During of data collection process, I had to be strategic and carefully plan the method that will be used for gathering data. Qualitative researchers have four methods they can use for collecting data: observations, in-depth interviews, analysis of documentation and cultural visual audio material (Nieuwenhuis, 2007:81). As researcher of the study, I could choose more than one method of data collection, causing more reliability and accuracy. This gives way to triangulation, which means that the researcher uses data from a variety of sources applying a variety of methods (Bryman & Bell, 2011:397). Bryman and Bell (2003:1142) agree that in doing so, the researcher gains reliable knowledge due to the variety of approaches utilised.

To ensure the reliability and accuracy of the study, I implemented the use of semi-structured interviews (see Chapter 3 Section 3.3.4.3) and non-participant observation (see Chapter 3 Section 3.3.4.4). Nieuwenhuis (2007:87) describes an interview as a “two-way communication between the interviewer and the participant during which the latter is asked questions with the aim of collecting ideas, views, beliefs and behaviours of the participant”. With non-participant observation, the researcher becomes a complete observer looking from a distance (called the etic or outsider perspective) (Nieuwenhuis, 2007:85).

The first method I used was the semi-structured interviews, where participants answered a set of semi-structured questions. McIntosh and Morse (2015:1) emphasise that semi-structured questions are numerically quantified and transformed during which all participants are asked similar questions in the same order. The semi-structured questions were pre-determined questions that participants answered based on the study. The interviews where audio recorded and transcribed.

During non-participant observation, I intended to explore the conduciveness of the classrooms or computer rooms installed with ICT tools. Finding out how conducive these classrooms and computer rooms were, assisted me in finding out how much the schools still lacked with regards to ICT tools. Furthermore, the non-participant

observation assisted me in evaluating whether the available ICT tools were being effectively integrated.

### **1.9.3 Data Analysis**

Qualitative data analysis is a process of the description, classification and interconnection of phenomena with the researcher's concepts (Awdziej, 2015). I applied a thematic approach by summarising what had been heard and seen in terms of common words, phrases, themes or patterns that assisted in interpreting and understanding the phenomenon under investigation and in drawing conclusions.

The purpose of analysing data assisted me in minimising the data obtained to a more substantial effective source of data. Coding was used in order to assist in identifying the data. Coding is a process where meaningful analytical units are provided through transcribed data (Maree, 2010:105) and the use of coding prevented a mix-up of data.

The data analysis was done through coding, categorisation and thematic analysis (McMillan & Schumacher, 2010:370-377). Additional elaboration on data analysis is discussed in Chapter 3 Section 3.3.4.7.

## **1.10 TRUSTWORTHINESS**

Lincoln and Guba, 1985 (in Johnson & Turner, 2003:300) state that trustworthiness pertains to the way in which the enquirer can convince the readers that the discoveries in the review and the exploration are of a high calibre. To achieve this, the qualitative study has to establish trustworthiness by striving for rigour so as to ensure that the results are worth paying attention to. Thomas and Magilvy (2011:115) describe rigour in qualitative terms as the best way to establish trust or confidence in the findings or results of a research study.

Lincoln and Guba, 1985 (in Shenton 2004:64) identified four components of trustworthiness that are relevant to the qualitative research. The four components consist of credibility (truth), transferability (applicability), dependability (consistency) and confirmability (neutrality). The trustworthiness model and its four components are explored and discussed further in Chapter 3 Section 3.4. Silverman (2004:283) stipulates that there are two essential ideas to remember while doing research, which are validity and reliability as the objectivity and credibility of the research study.

## 1.11 ETHICAL MEASURES

Research involves collaborative work through cooperation and coordination amongst different individuals, leading to the promotion of ethical measures such as trust, fairness, mutual respect and accountability (Resnik, 2013:2). According to Bryman and Bell (2007:71), a researcher has to consider certain ethical measures when doing research such as the safety and dignity of participants. Participants should be aware of the aims and objectives of research, and full consent by the participants should be provided prior to the study.

Prior to the start of the research process, I obtained ethical clearance from the College of Education at the University of South Africa (UNISA) to conduct research at the selected schools). In addition, I applied for and received permission from the circuit manager in the Potgietersrus circuit to access the schools as well as school principals in order to interview the teachers.

Before the interview and observation, I explained to the teacher-participants the aim and objectives of the study which were also detailed in a letter of consent to participants. An in-depth discussion of ethical considerations is conducted in Chapter 3 Section 3.5.

## 1.12 CLARIFICATION OF CONCEPTS

It is important to clarify the conceptual definitions of the key terms used within the context of this study.

**Information and Communication Technologies (ICT)** are used to convey, manipulate and store data by electronic means such as e-mail, SMS text message, video chats and online social media. Furthermore, ICT includes different computing devices such as laptop, desktops and smart phones that can carry a wide range of communication and information functions (Perron *et al.*, 2010:67). Information and Communication Technologies enhances the quality of teaching and learning through modern and innovative teaching strategies. It serves as a tool of promoting communication with the teacher and learner outside the classroom. The use of ICT in education opens up a new world of communication and knowledge not only in South African classrooms but worldwide. The integration of ICT in education involves the use of computers, the internet, photocopy machines and printers.

**A teacher** shares what they know with whoever they are teaching, referred to as learners. The purpose of the teacher is to share knowledge already obtained with other people. A teacher does not need a classroom setting to teach, but teaching can take place in any way or anywhere. Booyse and Du Plessis (2013:39) believe that there is an interactive relationship between a learner and a teacher, adding that the interaction is a means of knowledge building and encompasses foundational learning, sub-skills and socio-cognitive dynamics. The interaction involves making a collective inquiry into a topic and coming to a deeper understanding through interactive questioning, dialogue and the continuous improvement of ideas. The expectation of a teacher in the study is to have informative knowledge and skills in integrating ICT in the teaching and learning process.

**Teaching** is a process in which a teacher shares information with learners with the aim of satisfying the need of the learners to learn as well as assisting them to become active members in society. Teaching refers to a human undertaking with the intention of helping other people learn (Du Plessis, Conley, & Du Plessis, 2007:3). Integration of ICT in teaching is an active practice which helps learners become effective role players in the digital global market and information society.

**Learning** is a process where the learner constructs his/her own knowledge and understanding of the world, based on the information received through reflection of experience, rather than the absorption of information passed on. Learning occurs as a form of individual's exercise through discussion and information (Leidner & Jarvenpaa, 1995:268). According to Alexander (1996:89), learning builds on prior knowledge and involves enriching, building on, and changing existing understanding, where "one's knowledge is a scaffold that supports the construction of all future learning". Information around us changes each and every day, the way we learn and the sources we use in order to learn does not remain stagnant either. Learning in itself is a life-long process; in reality one never stops learning. ICT supports life-long learning by facilitating new ways of obtaining "knowledge on demand" or "just in time" learning (Voogt & Knezek, 2008:20).

**E-learning** can be described as a tool used to enhance people's potential through technology-aided interaction (Beyers & Hlala, 2015:165). The accessibility of Internet connection enables learners to access information through e-learning from anywhere

in the world. The availability of ICT in schools opens a way to support e-learning. E-learning communication amongst learners and the teacher is not only limited to the classroom.

## **Teachers' perceptions**

### **Teachers' perceptions on integrating ICT**

#### **1.13 DIVISION OF CHAPTERS**

This study is divided into five chapters, each with a specific focus. The chapters are outlined below:

**CHAPTER 1** presented at the background and overview of the study. The researcher briefly explained what was to be expected from the study and the motivation behind the study. The research problem that motivated the study and which acted as a guide to the whole study was discussed. The chapter gave a guideline of the aim and objectives which this study intended to achieve. The research questions that I wanted to answer were stated in the chapter. In the chapter, the reader was given a brief outline of the research methodology which included the research paradigm, research approach and research design. By using the semi-structured interviews and observation, the data collection techniques were outlined. The methodological norms were identified and an insight into the ethical measures that were implemented in this research, were touched on. The final section comprised concept clarification to ensure that the key terms used in the study were clarified.

**CHAPTER 2** addresses the theoretical framework underlying the study. In an attempt to find out what other scholars have revealed regarding the research problem, the chapter contains a review of related literature and research related to the problem being investigated. The literature review is based on what has already been discovered regarding the perception that teachers have towards ICT integration, taking into consideration the gaps that exist within the literature. The chapter highlights the ways of teaching and learning in the information age. The connectivism learning theory which I had chosen with regards to understanding how effectively learners learn with the integration of ICT, is presented and its principles are evaluated as well as critiques

of the theory. The chapter concludes with educational policies on ICT which exist in South Africa and internationally.

**CHAPTER 3** explores various sections that describe the rationale for gathering, storing and analysing data underpinned by the research paradigm. The qualitative approach is identified as the best method to collect rich data with the purpose of effectively answering the research question. The research design is discussed and then the chapter further explores the population and sampling used in the study and the process utilised in selecting a sample. The chapter looks at how data are collected by means of semi-structured interviews and non-participant observations. Finally, issues of trustworthiness are discussed and the chapter ends with a discussion on ethical measures used in the study.

**CHAPTER 4** begins with the introduction which delineated the major sections to be included in the chapter. The chapter provides results of data analysis and findings of the study in such a way that it could be sorted according to themes or conceivable phenomenon. The discussed data collected include three schools selected in which all are public secondary schools. The six participants selected from the schools consisted of two teachers respectively from each individual school. The chapter reveals and summarises the findings derived from the responses of the teacher-participants.

**CHAPTER 5** focuses on the overall summary of the study, which includes the introduction, literature, summary of empirical study, synthesising of the research findings as well as conclusions in relation to the research questions. The chapter also highlights limitations, recommendations and suggestions for further research by the Limpopo Department of Education in providing adequate support and skills in effectively integrating ICT to enhance teaching and learning.

## **1.14 CONCLUSION**

This chapter covered the introduction and historical background of the study. The researcher briefly highlighted what was discussed in the overall study. The research questions that guided the study were addressed in the chapter followed by the aims and objectives the study intends to achieve. The chapter further looked at the research

methodology implemented, also the collection of data and the methods used for analysing data.

The next chapter reviews literature in a detailed manner. The chapter discusses in detail what other researchers have found out with regards to the similar study on the perception of secondary school teachers on the integration of ICT in teaching and learning.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 INTRODUCTION

The preceding chapter provided background to the study, where the researcher highlighted pivotal factors behind the motivation of the study. The literature in this chapter serves the purpose of finding out what other scholars have found in relation to the problem in which the researcher is interested in and what body of knowledge is available (Leedy & Ormrod, 2005:66). According to Johnson and Christensen (2004:61) the literature review provides an understanding of the past and present state of knowledge on the research topic.

Neuman (2006:111) and McMillan and Schumacher (2006:7) offer valid reasons for a researcher conducting a literature review that will relate to the study as well as provide guidance that the researcher can follow and apply to his/her own study. Randolph (2009:2) elaborates that the purpose of writing a literature review is to provide a framework for relating new findings to previous findings. It is through the review of the new findings with the previous findings that the researcher is able to discover the research gaps that exist within the literature.

Engaging in a literature review assisted in building a body of knowledge on the research topic. This was necessary as it allowed me to gain insights into the integration of ICT from an educational context, taking into account the potential and challenges experienced with having to integrate ICT as a tool to enhance teaching and learning. Accordingly, the literature disciplined and kept this study within the context and boundaries associated with the integration of ICT. This study explored a theoretical framework, related studies on the use of ICT supporting teaching and learning and the relevant literature on ICT policies.

This chapter firstly evaluates the theoretical framework that underpinned this study as synthesised, analysed and evaluated by other researchers. This chapter further discusses the utilisation of the digital classroom, considering the different ICT tools that can be utilised to enhance teaching and learning inside the classroom. The chapter explored the use of ICT around the globe taking into account the steps and efforts by these countries in having to integrate ICT in their educational systems,

particularly at secondary level. This chapter also evaluates challenges experienced by teachers that may hinder the effective integration of ICT. Furthermore, the chapter highlights the potential of ICT to change the way teaching and learning takes place. The education policies regulated in South Africa and internationally are also explored.

## **2.2 THEORETICAL FRAMEWORK**

This theoretical framework provides an exploration into the theory chosen for this study. Creswell (2003:32) explains that theoretical reviews incorporate theory relevant to the study and methodological reviews focusing on the strengths and weaknesses of method sections in research relevant to the study. The theoretical review aims at building foundation, demonstrating how a study advances knowledge, to conceptualise the study, to assess research design and instrumentation as well as to provide a reference point for the interpretation of the findings (Merriam & Simpson 2000:10). The theory of learning aims to assist the researcher in getting a better understanding of how people learn (Harasim, 2012:4). The theory that is employed and discussed is the connectivist theory, which is discussed below.

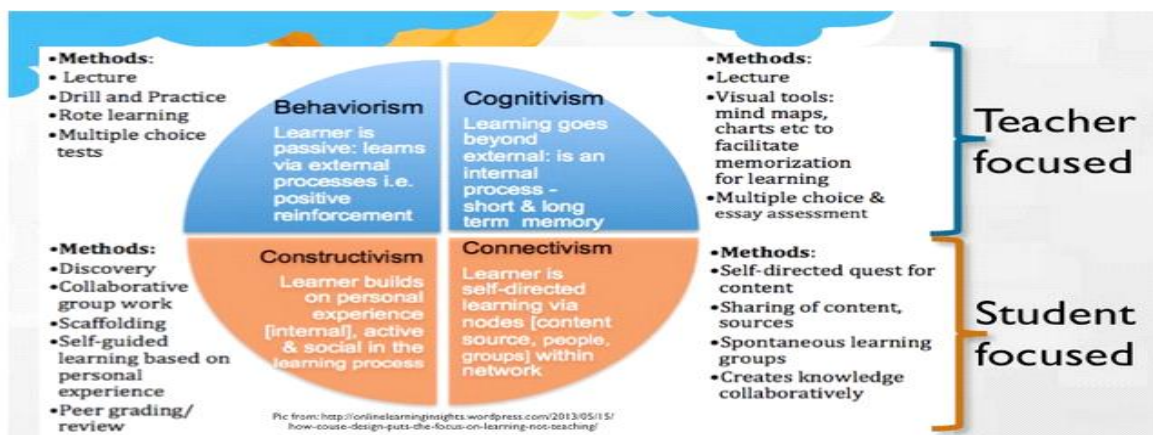
### **2.2.1 Connectivist Theory**

George Siemens (2006) who is the founder of the connectivist theory, describes the connectivist learning theory as a framework which views learning as a network phenomenon influenced by technology and socialisation. Connectivism is the starting point for learning which occurs when knowledge is actuated by learners' connectivity to and particularly in a learning community (Goldie, 2016:41). According to the connectivist model, the learning community is referred to as a node which emerges from the connection points found on a network and may also incorporate organisations, libraries, websites, journals, databases or any other sources of information. Siemens defines a network as connections between entities or nodes which can be individuals, groups, systems, fields, ideas or communities with a set of broad guiding statements (Bell, 2010:529). The implementation of ICT can be used not only for social networking but for learning purposes which may include conceiving or sharing of information with others within our social network or individuals from anywhere in the world. The network to which learners can connect, may be small and local or vast and global (Goldie, 2016:41).

The main focus of the connectivist theory is to understand the effective way of learning through social interactions between nodes in a technologically enhanced environment. With the rapid increase of internet usage in both developed and developing countries, information exchange becomes more convenient. Kop and Hill (2008:1) mention that the relevance of the theory is based on its “socio-technological nature” in which teachers and learners form networks of learning communities and platforms. The research study intends to explore the strategies that can be applied in order to positively influence the perceptions of teachers towards the integration of ICT as a tool to enhance teaching and learning. The connectivist theory underpins this study as it explores ways in which teachers can integrate ICT as a way to ensure that learners become active participants in the information society, as well changing the way in which teaching and learning takes place in the classroom.

Other learning theories exist in the literature and connectivism should not be seen in isolation. Three major theories have influenced the birth of the connectivist theory and should be seen as a building block to one another (Van Den Berg, 2017:75). The theories are behaviourist, cognitivist and constructivist and even though these theories were developed in the age where ICT was not highly influential in the educational system, one cannot mention connectivist theory without the theories of behaviourism, cognitivism and the constructivism.

The progression of the theories and the characters that differentiate them is illustrated in the adapted illustration below:



(adapted from Donachy & Donachy, 2014)

## **Figure 2.1: The progression of the learning theories**

### **2.2.2 Theories prior to Connectivism**

This section seeks to explain the theories developed prior to connectivism. Though having different pedagogical beliefs, they however have contributed to the revolutionary development of connectivism.

#### **2.2.2.1 *The behaviourist learning theory***

Behaviourism was first established by Ivan Pavlov in the 19<sup>th</sup> century and focuses on what is observable: how people behave and on how to elicit a change in particular (Harasim, 2012:10). The behaviourists believe that effective learning happens through repetition of assessment until the learner reaches a favourable outcome or understanding. Al Dahdouh, Osorio and Cares (2015:14) mention that behaviourism conceives knowledge as a physical object the learner should get and learning as a process of transferring facts to the learner's head through mechanisms of rewards and punishment. Usually referred to as the "Skill and Drill" method of learning based on the belief of learning through repetition and drilling, behaviourists acknowledge that there is existence of internal mental operations and events. They also emphasise the belief that the results of learning emanate from external, observable environmental events (Feldman & McPhee, 2008:41; Schunk, 2008:16 &). A learner, from the behaviourist perspective, achieves learning by being able to imitate what has been taught without their contribution of opinions or views.

In Figure 2.1, Donachy and Donachy (2014) indicate that a behaviourist teacher plays more of a dominant and leadership role during the process of teaching and learning, transferring information to the learner through modes such as dispensing, communicating, conveying and mapping. The teacher also has the responsibility of creating an environment which will help learners to learn. The behaviourist believes that the environment in which learners are placed plays a vital role in their level of learning. The behaviourists make use of technologies consist of carefully sequential learning content units, often referred to as frames (Newby, Stepich, Lehman & Russell, 2006:28-29). One of those instructional computer programmes includes the computer-assisted-instruction (CAI) developed during the 1970s, which includes tutorials, drilling

and practice, games, simulation and problem-solving programmes (Newby *et al.*, 2006:28-30).

Even with the development of other theories, there are some school teachers that still find this theory very useful in speeding up the process of transferring knowledge (AIDahdouh *et al.*, 2015:14). However, Feldman and McPhee (2008:70-71) have critiqued the application of the behaviourist theory as they believe that the behaviourism does not adequately explain the full range of human learning based on the fact that behaviourism limits the potential to learn about simple stimulus-response relationships, external environments and other behavioural principles. Another critique is based on the belief that a behaviourist teacher is viewed as the leader in the classroom, who fails to engage learners not only in lessons but as well as learning involving real-life situations. Furthermore, limited participation of learners leads to learning that lacks higher-order thinking skills (Feldman & McPhee, 2008: 70-71). The behaviourist theory fails to consider the variations amongst learners, with behaviourists assuming that all learners learn identically (Arghode, Brieger & McLean, 2017: 600).

### **2.2.2.2 The cognitivist learning theory**

During the 1950s growing dissatisfaction of behaviourist theory developed due to the theory's inability to adequately explain complex learning behaviours, which contributed to the development of the cognitivist theory by Jean Piaget (1983). The cognitivist theory describes knowledge acquisition (learning) as a mental activity that entails internal coding and structuring of information by an active learner (Ertmar & Newby, 1993:58). The cognitivist theory is very different from behaviourism, as it focuses on the mental processes on opening the 'black box' of the mind to get a better understanding how people learn (Van den Berg, 2017:77).

Though the cognitivist theory does not entirely disregard behaviourist principles, it explains learning and knowledge differently from the behaviourist theory. The behaviourists describe knowledge only in terms of external observable behaviours whilst cognitivists view knowledge in terms of unobservable representations of the world transmitted to the mind and held there in dynamic mental networks (Feldman & McPhee, 2008:48-49; Jonassen, 1991:8-10). The cognitivist learner is allowed to engage in learning and a cognitivist teacher facilitates learning by providing a variety

of experiences (Piaget, 1983). Cognitivists believe that when it comes to learning, all children go through the same sequence of development; however, they do so at different rates (Donachy & Donachy, 2014). According to Piaget (1983), learners use what he describes to be 'schemas' as the building blocks of knowledge. He defines schema as the different sensory motor map that the learners use to construct, interpret and understand their world resulting in their knowledge development.

It is vital that a cognitivist teacher plans for lessons and assessments considering the difference in the unique individual development of learners rather than on the normal standard of same age peers. According to Piaget (1983), the content of instruction needs to be consistent with the development level of the learner, which includes encouraging teachers to organise and sequence new information (learning content) in some explicit way that establishes order in the information as this will assist learners in making sense of the new information and to encode it. Secondly, the teacher can link unknown information to existing knowledge to make information more meaningful. Lastly, using memory aids such as highlighting, imagery, metaphors and analogies can assist learners in attending to crucial information, encoding that information into a memorable form and retrieving that information when needed. Feldman and McPhee (2008:52) suggest that the cognitivist view naturally leads to the use of computers as an extension of the human mental modelling system. Cognitivists believe that using technological models such as mind/concept software, simulation and graphics software guides learners with the overwhelming volume of Web information, word processor as well as the multimedia software that can assist in enhancing learners' cognitive processing of new information (Newby *et. al.*, 2006:32-34).

The benefit of the cognitivist theory is that learners are encouraged to explore instructional materials as well as becoming active creators of their own knowledge (Masethe, Masethe & Odunaike, 2017:4). However, some scholars have addressed limitations with regard to the cognitivist theory in explaining how the learning process takes place. Feldman and McPhee (2008:72-73) mention that Piaget's explanation of the rules on how the mind works does not necessarily provide the flexibility needed to address individual differences such as differences in learning needs and preferences in processing information. Its other limitation is that the theory emphasises that a learner achieves learning when a task is accomplished but fails to consider that it may not be the most suitable way for the learner (Masethe *et al.*, 2017:4). The cognitivist

theory stipulates that to achieve effective learning, the teacher will link information that is known to what is unknown and taught; the critique in this scenario is that this method may seem challenging for novice teachers as they do not have sufficient experience to know what information the learners possess (Feldman & McPhee, 2008:72-73).

### **2.2.2.3 *The constructivist theory***

Constructivism was developed due to the behaviourists' disregard for the mental activities and the reaction to the manner in which behaviourists described learning (Ertmar & Newby, 2013:56). The constructivist theory defines learning as a process of construction with its goal of instruction being to support that production instead of trying to transmit knowledge (Brown, 2006:115; Duffy & Cunningham, 2008:2; Von Glasersfeld, 2014:9; Vygotsky, 1978:84).

Constructivism stipulates that learners have to take control in their own learning. Constructivism is divided into cognitive and the social constructivism. Cognitive constructivism was derived from the Piagetian theory (1977, 1970) which emphasises that learners' construction of knowledge is stimulated by internal cognitive conflict as learners strive to resolve mental disequilibrium. The cognitive constructivists emphasise that learners may be authors of their own knowledge, advancing their cognitive structures by revising and creating new understandings out of existing ones (Cobb, 1994; Moshman, 1982). Nevertheless, the cognitive structure of the learner does not rely solely on intrinsic motivation but on individual or socially mediated discovery-oriented learning activities (Donachy & Donachy, 2014).

The social constructivist views the origin of knowledge construction as being the social interaction of people, interactions that involve sharing, comparing and debating amongst learners and mentors (Brown, Collins & Duguid, 1989; Rogoff, 1990). The social interactive perspective of the social constructivism is a direct reflection of Vygotsky's (1978) socio-cultural theory of learning. Vygotsky's socio-cultural theory highlights the supportive guidance of mentors as they enable the apprentice learner to achieve successfully more complex skills, understanding and ultimately independent competence. The social constructivist adds that there can be no sensible definition of knowledge that ignores the social context. The social context framework in terms of open communication in the classroom between a learner and a teacher has to prioritise the learner's social values, standards, morals, language and culture

by the learner uses to acquire understanding of the world (Vygotsky, 1978). The social constructivist captures the most general perspective, the cognitive constructivist emphasises the importance of social exchange for cognitive growth (Applefield, Huber & Moallem, 2001:8). Applefield *et al.* (2001:9) further mention that cognition is a collaborative process and that modern constructivist thought provides the theoretical basis for cooperative learning, projects or problem-based learning and other discovery-oriented instruction approaches, all of which appeal to the social nature of learning. Social constructivists assume that a learner's intellectual capacity increases when exposed to social interaction between peers.

According to Shelly, Gunter and Gunter (2010:379), the constructivist teacher focuses on assisting learners in becoming knowledge constructors who will have the ability to recognise, explore, and reflect on their views and those of other learners as well as the ability to solve problems. Altuna and Lareki (2015:5) describe the constructivist teachers' role in practice; have the ability to create a classroom environment that leads to interesting and exciting questions. This implies that a teacher has to be aware of the unique learning capabilities of his/her learners and develop a strategy that will cater to the learners individually.

Through an online learning environment learners are able to share, discuss and disseminate data (Rae, Roberts & Taylor, 2006:521). Due to the vast amount of information available on the internet, the teacher has to facilitate information that is viewed as being relevant. In consideration of the extensive number of learners who are technologically skilled as well as intrigued by the opportunities that technology offers, constructivists believe that the use of ICT in constructive teaching and learning elevated the teacher's enthusiasm and assertiveness as well as ability to capture the attention and interest of the learners (Cavas, Cavas, Karaoglan & Kisla, 2009:21).

Many educational thinkers believe that the constructivist theory serves as the appropriate theory for the learning environment from now to the future (Akpan & Beard, 2016:393). However, there are scholars such as George Siemens who have pointed out some of the limitations regarding the constructivism theory. Siemens as the founder of the connectivism theory criticises the behaviourist, cognitivist and constructivist theories based on their central beliefs of learning that occurs inside a person; he stipulates that even though the social constructivist views learning as a



socially-enacted process, it fails to describe how learning happens within an organisation (Siemens, 2004:2). As illustrated in Figure 2.1, the connectivism theory believes that in a learner independent classroom, learners have self-directed quest for content; they are able to share contents or resources from anywhere; through the ICT learners can create spontaneous learning groups and the independence helps learners to create their own knowledge collaboratively. Furthermore, Siemens (2008:1) emphasises that existing learning theories have failed to meet the needs of the 21<sup>st</sup> century learner. The constructivist theory has been criticised for being a philosophy of knowledge rather than a theory of learning (Feldman & McPhee, 2008:73). Brown (2006:115) concurs that the constructivism is a theory that emphasises knowledge rather than a theory of learning. The constructivist theory includes known principles from previous theories and does not necessarily make any contribution to the literature besides explaining the process of learning (Brown, 2006:115).

### **2.2.3 Teaching and Learning in a Connected World**

Living in a digital world gives way to the continued progress of ICT as well as change in the way it is used (Aris & Orcos, 2015:14). This revolutionary change has a significant impact on the way teaching and learning takes place at primary schools, secondary schools as well as universities or higher and further education institutions around the world. There has been escalation in the use of ICT in all realms of life, from the workplace to the sports field, in schools and on a personal or social level (Mdlongwa, 2012:1). In addition, teachers and learners in the developing world are no longer solely dependent on physical media such as printed textbooks which are often outdated, but with today's technology, access to experts, professionals and leaders in their fields of interest around the world are highly possible (Dibaba & Babu, 2015:11).

Even though South Africa was considered to be the first African nation to implement ICT in their curriculum, it is realistic to mention that keeping up with the latest gadgets and their maintenances does require financial capabilities in which developed countries have had the advantage compared to developing countries, which often did not have the same capabilities (Shiohia, Keevy & Gibbs, 2018:1). Due to financial constraints, the governments of developing countries prioritise most of the financial spending of the education budget mainly on the rehabilitation and maintenance of

school buildings and teachers' salaries (Salam, Zeng, Pathan, Latif & Shaheen, 2018: 258). In addition, the majority of ICT gadgets require regular software updates and proper maintenance from technicians who are well equipped and have the necessary skills to maintain them. Albion and Tondeur (2018:4) mentioned that new technologies require different skill sets and the rate of change in ICT is sufficiently rapid, considering that attempts to compare very specific skills over time may be futile if they have been made less relevant by changes in ICT. This proves that there is continuous change in ICT and relevant skills are required to keep up with the change. As ICT improves and develops, so should the knowledge and skills. On the contrary, even though some countries are more advanced with ICT gadgets and skills than others, this still serves to prove that ICT plays a vital role in most countries around the globe.

Common instructional technologies found in schools include computers, tablets, smart-phones, overhead projectors, interactive whiteboards and laptops. The availability of the ICT infrastructure in South African schools varies from each individual school. The main purpose of integrating ICT tools in teaching and learning is to prepare learners to become lifelong learners in the information age. The use of ICT tools in the classroom makes teaching and learning more innovative; however, the effective integration of ICT does not rely solely on how teachers integrate ICT in the classroom but applies reciprocally to the learners.

The majority of countries are making a move away from the traditional method of teaching, which revolves around the classroom where the teacher plays the dominant role and learners have to be passive participants (Agbele, Oyelade & Oluwatuyi, 2020:56). The traditional method of teaching is basically teacher-centred. There are teachers who use ICT to support traditional learning methods, for instance, through the retrieval of information in which students are passive learners of knowledge instead of being active producers enabling them to take part in the learning process (Naqvi, 2018:32). Harasim (2012:2) reports that teachers using ICT in making traditional didactic teaching much easier and more convenient, are missing out on opportunities to introduce better, different or more advanced ways of learning. The concern by some scholars is that the rapid increase in the use of ICT in education can lead to the virtual role of a teacher in the classroom to deteriorate (Harasim, 2012:2).

The new generation of learners are considered as the Net Generation due to being raised in the culture of the internet and the web as integral to social networking and learning (Harasim, 2012:2). Communication methods such as SMS and WhatsApp are not only used for social networking but as a tool by teachers to share subject content with their learners and learners, in turn, acquire educational information faster and more conveniently. The exchange and sharing of information using the World Wide Web (WWW) by teachers and learners from anywhere in the country or worldwide, relating to certain subject matter, unites the world in becoming an information society. With the usage of the internet increasing at a rapid rate, so has the possibility of what one can do on the World Wide Web. This has not always been the case. During the 1990s, the internet was a network of information sources where users either sought specific information by searching, surfing or clicking from link to link across connected web pages. During those times, it was always possible for an individual with technical skills, and space to publish and share their own creative works and ideas (Bell, 2011:99). The Web 1.0 limited the manner in what one could besides surfing, searching and sorting of information.

The development of the Web 2.0 opened a gateway to numerous things that one could do over the internet. Bessenyei (2008:7) states that with Web 2.0, the areas and tools of interactivity have become unlimited. Bessenyei (2008:7) reveals that through a framework of blogs, forums, wikis, chats, newsgroups and networks, common information and exchange is able to develop. Hence, with Web 2.0, the reality of the information society becomes a possibility. Learners are considered the download or net generation, and they are able to create and exchange contents in a cooperative way within the networks of contemporary groups. According to Goldie (2016:41), Web 2.0 enables learners to create a personal learning environment (PLE) which allows for the production as well as the consumption of learning resources. It is through Web 2.0 that learners are able to comment or post their own personal thoughts on information found on the internet. In other words, Web 2.0 serves as a collaborative way of learning where communication is multi-directional and where knowledge may be socially constructed (Hossain & Quinn, 2012:13).

The connectivist theory that underpins this study stipulates that networking amongst teachers and learners can expand the level of information sharing as well as the acquisition of knowledge. The theory specifies that the starting point of learning occurs

when knowledge is actuated by learners connecting to and participating in a learning community (Goldie, 2016:41). A network, according to the connectivism theory, is comprised of nodes. Nodes may include individuals, learners, teachers or organisations from anywhere in the world willing to share or receive knowledge. Downes (2006, 2012) mentions that networks are considered successful based on the specific characteristics they possess, which include diversity relating to the widest possible spectrum of points of view, autonomy of participants within a network, the openness of the network which allows different perspectives to be entered into the system and finally, connectivity in which nodes are able to connect with one another. I have used the connectivist theory as it serves as a framework which outlines the importance of openness amongst teachers, learners and peers from anywhere in the world through the integration of information and communication technologies with the purpose of sharing and acquiring information. The main focus of the connectivist learning theory is to understand the effective way of learning through social interactions between nodes in a technologically-enhanced environment. With the rapid increase of internet usage in both developed and developing countries, information exchange becomes more convenient.

In an attempt to apply the connectivist theory in practice, Downes and Siemens (2008) established their first Massive Open Online Courses (MOOC) in 2008 called *Connectivism and Connectivist Knowledge* (CCK08) which attracted over 2000 worldwide participants (Goldie, 2016:42). At the time, the course was part of the programme leading to the Certificate of Adult and Continuing Education (CACE) through the Learning Technologies Centre and Extended Education at the University of Manitoba, where it was first enrolled (Downes, 2008:1).

All course content was available through Really Simple Syndication (RSS) feeds and learners could participate with their choice of tools. However, most MOOCs are not necessarily open as they are only available to those who sign up and others have to be paid for in order to be enrolled (Goldie, 2016:42). With that in mind, Downes (2008) coined the terms cMOOC and xMOOC to differentiate between the two types, where the c represents the connectivist nature of the MOOC and the x as extensions of university courses. According to Goldie (2016:43), MOOCs are usually organised around pre-recorded video lectures, which are posted on the platform, although interactive elements including quizzes and discussion forums are often included. The

connectivism theory stipulates that knowledge is an on-going process which changes frequently, meaning that knowledge does not remain stagnant. Through social interaction, people learn from each other. What is important is that learners become reliable and in charge of the own learning. The CCK08 teachers took on the role of facilitator or were totally absent from the learning process.

#### **2.2.4 Principles of Connectivist Theory**

In relation to other learning theories, the connectivism is a theory for the digital age which seeks to explain the process in which learning takes place in an ICT enhanced environment. From a connectivist context, learning and knowledge rest in a variety of opinions, meaning that the autonomy of participants of a network will heighten the level of different views and opinions. Bartolome and Steffens (2015:96) define learning from a connectivist perspective as a process of connecting specialised people, organisations, libraries, websites and data bases, which are referred to as nodes or information sources. Furthermore, knowledge and learning does not reside in one location, but rather it is a confluence of information arising out of multiple individuals seeking inquiry related to a common interest and providing feedback to one another (Kop & Hill, 2008:4) The other principle in which the connectivism believes with regards learning is that learning may reside in non-human appliances which may be stored and manipulated by individuals.

To facilitate continual learning, it is important that connections between members of a network are nurtured and maintained. Information changes with time never remaining stagnant, in which case it is vital that the interaction between members of a network is maintained. The information that is available on the internet can be overwhelming in a sense that there is just abundance of data; however, it is important that the members of a network develop the core skill of being able to see connections between fields, ideas and concepts. Furthermore, the essence of acquiring knowledge does not rely solely on how much we acquire but using the knowledge conceived to create new knowledge (Bolisani & Bratiani, 2018:19). The aim of connectivist learning is to ensure that the nodes are able to obtain accurate and up-to-date knowledge, with the currency of the information available playing a pivotal role. Decision making is a learning process in itself, the knowledge that one shares, may not be positively accepted by others as one's views and ideas may trigger other ideas.

### **2.2.5 Critique on Connectivism**

Siemens (2004) and Downes (2008) regard connectivism as a theory for the digital age, and even though they disregard other learning theories, they still view connectivism as a successor to behaviourism, cognitivism and constructivism. However, there are certain scholars who differ with Siemens and Downes regarding connectivism being labelled as a learning theory; they believe it lacks certain attributes as a theory. In this regard, Bell (2011:104) believes that connectivism can be described more as a phenomenon which creates a shift in the way teaching and learning in the classroom takes place in a digitally-enhanced environment rather than being a theory. On the other hand, Verhagen (2006:1) views connectivism at the level of pedagogy and curriculum rather than a theory as it focuses mostly on what people need to learn and the skills they should develop in order to learn effectively.

The connectivist learning theory believes that knowledge may reside in non-human appliances and be manipulated by individuals. However, the connectivist belief that knowledge can be stored in non-human appliances has received criticism from other scholars (Goldie, 2016:43). Furthermore, Goldie (2016:43) stipulates that despite advances in fields such as machine learning, the belief that knowledge can reside in non-human appliances has proven to be a highly contentious concept.

Kerr (2007b) identifies the purpose for the development of a new theory as a process which builds on older theories without discarding them, the reason being that new developments have occurred which the older theories no longer explain. Vygotsky's formulation of social constructivism, which analysed the relationship between internal and external knowledge, was accounted for long before the explanation was provided by connectivism, even with Clark's active cognition providing explanations prior to connectivism (Kerr, 2007). Verhagen (2006) criticises connectivism as a new theory, primarily because no new principles can be added that are not already present in other existing learning theories. The connectivist theory stipulates that knowledge resides in a distributed manner across all networks assuming that all learners are furnished with the kind of technology to connect, communicate and share information in a learning environment. However, this assumption contradicts the situations faced in a majority of rural schools and environments; due to the fact not only is internet access a major problem but also availability of the technology in the schools.

Despite the criticism of connectivism as a learning theory, there are grounds for considering connectivism as a learning theory and that situates connectivism at a pedagogical level. Firstly, taking into consideration that there are some principles that connectivism may have drawn from prior learning theories, the connectivism draws its strength through the use of web-based activity. From a teaching and learning point of view, its learners are creators and re-creators of their own learning, taking into account the ever-changing technological methods of learning. A teacher's perspective, whether as a facilitator, local or online tutor, may provide guidance and support to learners through validating information and critically engaging them in the course content (Kop, 2008). Despite the lack in certain substantial observations, reasonable explanations and evidence, connectivism has the potential to being considered a learning theory, as it describes how learning may take place through social interaction which is also included in the social constructivism theory. However, it also takes into consideration ways in which ever-changing technology can be integrated to achieve effective learning and teaching.

The next section discussed below explores numerous ways in which ICT can be used as a tool to enhance teaching and learning across the globe. The section addresses the utilisation of the digital classroom, the use of ICT around the world, challenges that hinder the effective integration of ICT as well as the potential of ICT as a tool to enhance teaching and learning.

### **2.3 INFORMATION AND COMMUNICATION TECHNOLOGIES**

As previously discussed, ICT refers to visual, audio, printed or written means that enable fast access to information, reaching and forming of information from anywhere in the world (Cavas, Kisla & Twining, 2004). With different types of ICTs that exist, I feel that it is crucial to explore and highlight the ICT tools that are used in a digitally enhanced classroom. The following section provides an in-depth discussion of the information and communication technologies used in and outside the classroom which constitutes what is referred to as the digital classroom with reference to secondary school education.

### **2.3.1 Utilisation of the Digital Classroom**

A digital classroom is a collaborative space which is technologically-enhanced, where teachers, learners, peers and technology can co-exist in harmony and be fully supported through the systematic and strategic use of ICTs (Das, 2017:1). The purpose of the digital classroom is not to overtake the role of the teacher in the classroom but to make teaching and learning easier as well as meeting the needs of a technologically-savvy generation and expanding digital access to those who are not up to speed with the latest technology. ICTs integrated for teaching and learning include a wide range of digital tools and gadgets used in the classroom and all form part of the digital classroom.

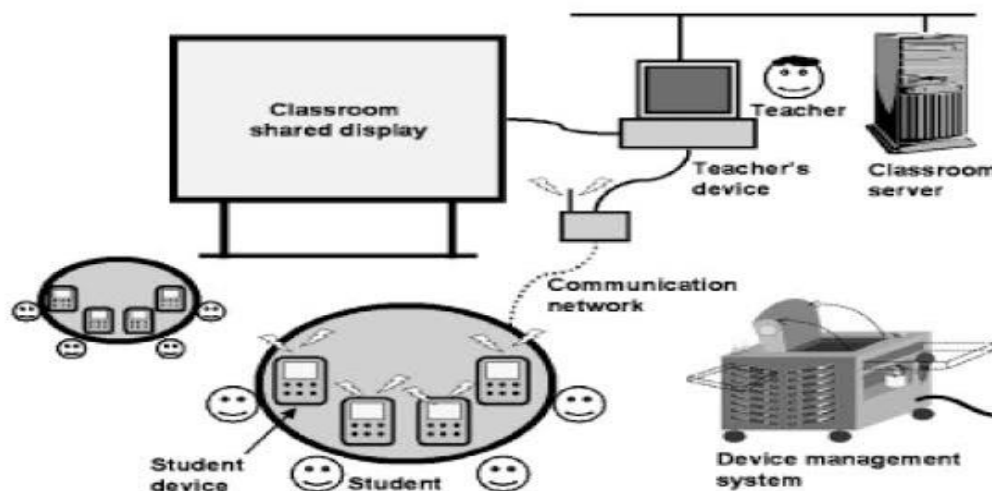
A digital classroom environment (DCE) is unlike any other classroom, the reason being that it is a classroom equipped with ICT and other educational technologies. Ideally, in a digital classroom each and every learner has access to a computer or tablet with internet and is exposed to other types of digital equipment. According to Ozerbas and Erdogan (2015:203), a classroom that is enriched with technology aims to increase the quality and success of education, shifting away from the norm of simple computer labs. Devices used for applications can vary from mobile phones and personal digital assistants (PDA) to computers and electronic dictionaries (Liang *et al.*, 2005:181). The ICTs used in a digital classroom enable the transmission of curricular content in a playful, interactive and innovative manner (Lopez-Perez, Ramirez-Correa & Grandon, 2019:166).

The digital classroom consists of various blended learning approaches which include a combination of face-to-face and online instruction, online learning (e-learning) platforms, systems and tools (Das, 2017:2). Another example of a digital classroom is the “Flipped Classroom” which is referred to as a learning model where learners receive instruction online but apply their newly acquired knowledge in the classroom with their peers (Das, 2017:1; Pacansky-Brock, 2013). With the flipping of a classroom and digitalisation of data, it creates a sound environment for students to construct meaning out of subject matter, collaborate with peers in pedagogy and engage in an active process connected to real-life.

Liang *et al.* (2005:189) have identified six main components which should be found in a digital classroom. These components include student devices, teacher devices,



communications network, class sharing screen, classroom servers and device management system. Liang *et al.* (2005:189) describe student devices as personal mobile information devices for each student, teacher devices as teacher's personal computer or shared host computer, communications network as a communication element, including face-to-face peer communication, the classroom server and the class shared display screen controlled by the teacher, which can be followed by a group or an individual.



(Liang *et al.*, 2005)

**Figure 2.2: Digital classroom learning environment**

The next section provides an overview of how ICTs in the educational system are used around the globe.

### 2.3.2 The Use of ICT around the Globe

This section discusses how ICT is being used in both developed and developing countries with the purpose of enhancing teaching and learning. This relates to the context of this study as it assists in exploring different ways in which ICT is utilised not just from the South African context but in different countries. I considered the comparison of Nigeria and Chile as a way to evaluate how other developing countries, particularly from different continents managed and dealt with the integration of ICT in their schools, which added value to the research study.

Both Nigeria and Chile are developing countries situated in different continents. The methods applied by their respective governments in ensuring that schools have effective access to ICTs are distinct but both countries have had their share of challenges in ensuring that ICTs are effectively integrated. Noor-UI-Amin (2013) agrees that the role and utilisation of ICT in supporting teaching and learning is growing in the twenty-first century across the globe. Countries that have introduced ICT in their educational systems realise that ICT has the potential to develop an educated and lifelong society aimed at demonstrating techniques for the future preparation of the information society (Dae, Yang & Hyeonjin, 2010:29). As mentioned earlier in Chapter 1 Section 1.1, African countries have embraced the change and potential changes that ICT tools could bring to the educational system, but many countries on the African continent have experienced similar setbacks when trying to fully integrating ICTs in their educational system. However, the setbacks faced by developing countries including those on the African continent, do not prevent these countries from coming up with ideas on how to integrate ICTs in their educational systems, following in the footsteps of countries that have been successful in integrating ICTs. In 2003, an African Summit of the World Economic Forum was held in Durban, with the intention to form a new partnership between South Africa and NEPAD (New Partnership for African Development). The purpose of the partnership was to launch an e-School initiative intended to equip all African high schools with ICT equipment including computers, communication equipment, scanners, digital cameras and copiers, among other things (Adomi & Kpangban, 2010:2). To date, there are schools in Africa that were able to obtain access to the tools intended by the e-Schools initiative, but the full integration of ICTs is still at its infancy in some schools around the continent.

One of the many countries on the African continent that took the initiative in introducing ICT in its educational system is Nigeria, with the realisation of increased demand for ICT literacy as well as the realisation by employees that computers and other ICT facilities can enhance efficacy (Adomi & Kpangban, 2010:2). In 2004, the Federal Republic of Nigeria recognised the prominent role of ICT tools in the modern world, and therefore decided to integrate ICT tools into their educational system. To actualise this goal, the government of Nigeria aimed to provide the basic infrastructure and training at primary school level (Adomi & Kpangban, 2010:3). However, in junior

secondary schools, computer education was made a pre-vocational elective, and in senior secondary schools, computer education was provided as a vocation elective (Adomi & Kpangban, 2010:3). This was not the first attempt by the Nigerian government to introduce ICT in its educational system. In 1988, the Nigerian government enacted a policy on computer education which was established with the aim of distributing computer education innovation first to all secondary schools and then primary schools (Agbetuyi & Oluwatayo, 2012:42). Unfortunately, the project did not take off beyond the distribution and installations of personal computers (Aduwa-Ogiegbaen & Iyamu, 2005; Okebukola, 1997).

Disappointingly schools in Nigeria are still dominated by the use of chalkboards and textbooks in classroom activities especially in secondary schools (Adomi & Kpangban, 2010:2). Ogundile *et al.* (2019: 63) maintain that the use of the traditional method of chalk-and-talk dominating Nigerian schools has led to students lagging dangerously behind in the trend of changes in the world. Ogundile *et al.* (2019:63) argues that much of the blame regarding ICT setbacks is placed on poor funding from government, outdated curriculum, official corruption, poor power supply, poor working conditions for the teachers, exploitation by private education owners, insecurity in some parts of Nigeria, brain drain and lack of laboratories for practical and cognitive problems. Ekwe, Enaohwo and Amaechi (2016:12) suggest that leadership is often an important factor in the successful integration of ICT into the schools' instructional practices and curriculum. Furthermore, noting that without effective and supportive leadership, changes in the teaching-learning process and widespread, effective use of technology in learning are not likely to occur. The collaborative effort by the Nigerian Ministry of Education and leadership within the schools in ensuring that ICT tools are made available and effectively utilised, can have a significant change in ICT problems experienced in Nigeria.

The Chilean Education Ministry has recognised that the significance of ICT does not rely solely on how much is provided in schools but mainly on providing teachers with the necessary knowledge and skills through training to be able to manage ICT in their teachings. With proper provision of technical support and teachers' improved knowledge and skills in implementing ICT, the quality of education can be improved (Blignaut, Hinostroza, Els & Brun, 2010:1553). The Chilean government had seen the benefits of ICT and an initiative known as *Enlances* was established with the aim of

ensuring that all learners and teachers in Chile are ICT capable. By 2005 more than 90% of the student population had potential access to ICT in their schools and more than 80% of the teachers have been trained on the administrative and pedagogical uses of ICT (Hinostroza, Labbe & Claro, 2005:246). Based on the success of *Enlances*, the Chilean government incorporate *Enlances* into their curricular and was no longer just regarded as a programme that assisted with the implementation of information technologies in schools. Though Hinostroza, Labbe, Brun and Matamala (2011:1360) has suggested that there has not been sufficient evidence of the significant change in the way content is being delivered utilising ICTs in the classroom, this has not restrained the Chilean government in continuing to sustain advances in technology infrastructure and in network access (Blignaut *et al.*, 2010:1553). They focused mainly on two aspects which firstly included the curriculum changes in various areas of pedagogy in order to incorporate the use of ICTs into the initial formation of teachers (Hinostroza, Hepp, Cox & Guzman, 2003) and secondly, included focus on offering teachers professional development, workshops and training (Hinostroza *et al.*, 2003).

The next section explores some of the challenges experienced within the school level by teachers in integrating ICT in the classroom for teaching and learning. I placed more emphasises on the challenges teachers experienced in rural areas of developing countries as it is believed that the majority of the crises is experienced in rural schools than urban schools. In this study, it was pivotal to examine the challenges experienced by teachers, specifically in rural areas as this brings forth challenges experienced in the schools that prevent the effective integration of ICT.

### **2.3.3 Challenges that hinder the Effective Integration of ICT**

Alkahtani (2017:33) accepts that ICT offers well-known benefits which include efficient ways to compose documents and to organise and store information. Furthermore, ICTs are believed to enhance work and education by delivering lessons with interesting and enjoyable real-world examples and stimulating visual and audio illustrations from an extremely wide range of sources. Despite the widespread reports of the benefits of ICTs transforming the teaching and learning and the manner of independent thinking, there are challenges experienced that hinder ICT integration in schools.

The major challenge faced especially in developing countries is balancing educational goals with economic realities (Chaamwe, 2017:218). The reality is that developing countries like South Africa, Kenya and Nigeria place greater priority of the national financial expenditure on socio-economic services. Though such developing countries have intentions and make efforts in providing all their schools with ICT, due to limited budget allocation of ICT provision, it might take a longer while for certain schools to obtain ICT tools than others. The shortage of ICT tools in certain schools can be a challenge, especially in rural schools causing a digital divide between urban and rural schools. In 2009, the South Africa education ministry developed the Teacher Laptop Initiative (TLI) managed by the Education Labour Relations Council (ELRC) which aimed to ensure that more than 350 000 government school teachers at that time possessed and used laptops by providing them with a monthly allowance which would cover the cost of purchase as well as the cost of connectivity. However, by 2014 the objective had not been fully achieved due to funding problems and the fact that 174 000 teachers of about 380 000 who were permanently employed nationally were either blacklisted or not credit worthy (Maluleka, 2011). Mathevula and Uwizeyimana (2014:1091) maintain that even if the objective were accomplished, there would be no guarantee that rural schools would reap the benefits of these laptops due to the lack of internet or prohibitive and exorbitant costs of data. The challenges related to poor ICT infrastructure include lack of electricity, lack of telecommunication infrastructure and inadequate storage facilities which militate the smooth introduction of ICT into rural schools and which still exist (Herselman, 2003: Kante & Savani, 2003). Research done in rural Zambia discovered that it is unlikely to find a computer lab in rural schools due to lack of ICT provision. In addition, there is a challenge of high pupil computer ratio, where learners share one computer leading to high wear and tear including short lifespan of the computers (Chaamwe, 2017:218). Furthermore, unreliable electricity is a challenge in the schools as most of the ICTs require electricity to function, and in many instances, electricity is not stable and constant which means that it is difficult to keep high-tech equipment such as computers functioning.

Lack of proper ICT training and support for teachers is a challenge that affects the majority of schools, particularly in developing countries. The concern is that even with the provision of ICT training for teachers, without continuous support for the trained teachers and evaluation on whether the specific teachers apply the ICT skills they

gained from the training, does not resolve the problem of not effectively integrating ICT. Integrating ICT in a manner that enhances teaching and learning cannot be achieved on its own but should be accompanied by ICT skilled teachers as well as adequate personnel that have the appropriate skills to provide technical support (Herselman, 2003; Kante & Savani, 2003; Jedeskog, 1999; Rae *et al.*, 2006; Ward, 2003). Dzansi and Amedzo (2014:347) state that once computers have been set up in schools, they need regular support and maintenance. Furthermore, the need for support staff to do regular software updates, repairs and maintenance cannot be overlooked as this specialised role cannot be left to the teachers alone. Dzansi and Amedzo (2017:347) suggest that there should be a formal support structure with full time personnel for all schools to respond to trouble-shooting calls and this can be created if the education department outsourced to enterprises in the ICT business or in-house within the educational system.

Another challenge faced in schools is teachers' attitude towards ICT. According to Msila (2015:1978), resistance in the acceptance of ICT in the classroom is primarily based on the fear of teachers losing influence over the values and directions of classroom activity. There are several reasons behind the teachers' negative attitude towards ICT and this is mostly found in teachers who are used to the traditional method of teaching and are reluctant to use any other method for teaching and learning. Most South Africa schools that have access to technology do not accurately use it due to lack of knowledge and satisfaction with their current teaching method (Mdlongwa, 2012:4-5). The use of technology is laden with technical difficulties and not having enough time to spend on the types of lessons best supported by technology (Agbatogun, 2013). Lack of confidence, anxiety and the fear of embarrassment in front of learners who are technologically more savvy than their teachers, form part of some of the reasons behind teachers' reluctance to integrate ICT in teaching and learning (Chigona & Chigona, 2010:3). Teachers who resist change are not rejecting the need for change but lack the necessary education in accepting the changes and are given insufficient long-term opportunities to make sense of the new technologies for themselves (Bingimlas, 2009:239).

Lack of ICT policy guidelines and knowledge of the policies are major challenges in effectively integrating ICT in education, especially in developing countries. Dale, Robertson and Shortis (2004) emphasise that the lack of policy guidelines to support

schools seems to depict a familiar policy implementation problem in the international arena. The South African policy makers have developed an ICT policy framework with the intention of providing guidelines in which ICT is to be integrated in the schools. However, there is an identifiable gap between what the policy legislation requires and what is actually happening in the school classroom. Furthermore, developing guidelines that do not necessarily consider unique situations of the schools in the country, places a huge mismatch between policy intent and classroom practices (Vandeyar, 2013:6). The e-Education policy places the primary responsibilities at school level on school management and administrators to promote ICT is a 'transformative tool' for education. Sadly, the reality is that a majority of the school leaders are oblivious to the existence of the e-Education policy and the goals of the e-Education policy are not known (Vandeyar, 2013:4).

The potential of ICT as a tool to enhance teaching and learning can only be experienced once the school leaders and teachers normalise the use of ICT in their respective schools. The next section explores possible benefits.

#### **2.3.4 The Potential of ICT as a Tool to Enhance Teaching and Learning**

UNESCO (2015) describes ICT as the most powerful tool that can be used in extending educational opportunities, further pointing out that knowledge transferred through the means of ICT tools has proven to be influential for both formal and non-formal education. According to Tarus, Gichoya and Muumbo (2015), ICT has the ability to transcend time and space in a manner that enables teaching and learning to be accessed at any time of the day without limitations. Burkhardt *et al.* (2003) highlight that ICT application broadens teachers' skills, confidence and enthusiasm, creating easy planning and content preparation. The benefit of ICT does not solely benefit teachers in the context of teaching, but it also benefits the learners. Lin, Zhang, Jung and Kim (2013) concur by explaining that through the use of ICT, learners and teachers can interact amongst each other and even learn from each other from anywhere around the globe as teaching and learning is not restricted to one area. The benefit of integrating ICT as a tool to enhance teaching and learning can be observed in the way it can be used to encourage and support real-life related problems for teaching and learning both in and outside the classroom (Makgato, 2012:1399).

The crucial role that ICT plays in education has encouraged policy makers in both developed and developing countries to amend the ICT policy in their educational systems (Blignaut *et al.*, 2010:1553). The ICT policies have certain rules and regulations that must be adhered to when introducing ICTs in teaching and learning, and therefore relevant educational policies are discussed next.

## **2.4 EDUCATION POLICIES ON ICT LOCALLY AND GLOBALLY**

Kozma (2008:1084) defines ICT educational policy as a “rationale, set of goals, and a vision for how education systems might (work) with the introduction of ICT and how students, teachers, parents and the general population might benefit from its use in schools”. An ICT policy governs and acts as a guideline for schools and institutions on how to effectively integrate ICT. Hawkrige (2006:59) discerned four rationales with the purpose of driving educational policies to ICT in education in African countries. Hawkrige (2006:59) explains that the aim of these rationales is to highlight the importance of the use of ICTs in African schools since schools are ideal places for preparing learners for life and for being effective members of the knowledge and information society. The first rationale is the social rationale which emphasises that all pupils should know, be aware of and be familiar with ICT to ensure that they become responsible and well-informed citizens. The vocational rationale indicates how ICTs are important in giving learners appropriate skills for future jobs including jobs that may not yet even exist. The pedagogical rationale is based on the capacity of ICT to enhance teaching and learning. Lastly, the catalytic rationale states that ICT is expected to bring or accelerate educational innovations. Originally six rationales were established; however, only the four mentioned rationales are recognised in the adoption of ICTs in teaching and learning. There are continuous contributions that the Hawkrige rationale has made to visible policies as well as to governments around the world (Albion & Tondeur, 2018:3).

The need to have an ICT policy in education in place is not only recognised in South Africa but around the globe. The South African Department of Basic Education (DBE) developed the ICT policy that sets out the framework for the implementation of a strategy that aims to expand the use of ICTs and improve the quality of teaching and learning in a manner that prepares South Africa to compete in the global economy. The significant role that ICT can play in the educational system motivated the South



African government to develop the e-Education policy (DBE, 2004) and the Teacher Training and Professional Development in ICT and Training (DBE, 2007). The South African government has a host of legislations that governs and mandates the delivery of education; it was during 2004 that the White Paper on e-Education was developed with the intention of transforming teaching and learning through ICT (RSA, 2004).

According to Blignaut *et al.* (2010:1553), the South African e-Education policy is governed by three phases. The first phase is to enhance system-wide and institutional readiness to use ICTs for teaching, learning and administration with the objective of providing an education and training system to support integration of ICT in schools. The second phase is the system-wide integration of ICTs, stipulating that managers and teachers should not only integrate ICT for effective teaching and learning but also in the curriculum and management. The last phase is the integration of ICT at all levels of the educational system including management, teaching and learning as well as administration as this entails that departments of education should use ICT in planning, managing, communication, monitoring and evaluating (Blignaut *et al.*, 2010:1553). The goal of the e-Education policy is to ensure that each and every South African manager, teacher and learner in the general (GET) and further education and training (FET) bands will be ICT capable, being able to use ICTs confidently and creatively as well as to set and achieve personal goals and finally to acquire the necessary skills and knowledge to be full participants in the global community (RSA, 2004). The Teacher Training and Professional Development in ICT and Training (DBE, 2007) policy identify ICT knowledge skills, values and attitudes required by teachers to implement the national curriculum effectively.

From a global context, countries such as the USA and Kenya have developed diverse policies and plans including ambitious frameworks and models, as well as following UNESCO declarations and goals to apply ICT in their education (Tairab, Huang, Chang & Zheng, 2016:313). The approach developed by UNESCO for ICT in education is to explore how ICT can be promoted, calling upon countries to develop their respective policies in support of its goals of ICT policy implementation (Tairab *et al.*, 2016:314). Developed countries such as the United States of America (USA) developed initiatives in line with the vision of UNESCO that aims to enable the power of technology to transform their education. For instance, the USA developed an ICT

policy that focuses on using the power of technology in both curriculum and assessment to improve overall education quality (Tairab *et al.*, 2016:317).

The majority of developing countries tend to suffer the same problems such as insufficient use of ICT policy as a guide to teaching and learning, lack of ICT tools, lack of educational resources and poor teacher professional development (Mdlongwa, 2012:4). Piper, Jepkemei, Kwayumba and Kibukho (2015:3) explain that the government of Kenya designed the Primary Math and Reading (PRIMR) initiative to capitalise on the nexus between educational outcomes and ICT in the context of a programme developed to improve the quality of literacy and numeracy outcomes for children in grades 1 and 2. Even with the challenges faced by developing countries in integrating ICT in their educational system, UNESCO has made an effort to assist these countries in improving their information management capacity which has culminated in UNESCO sending advisers, supporting seminars and workshops and ultimately, issuing special guidelines on the formulation of a national information policy in developing countries (Kozma, 2011).

The ICT policies in education of the USA, Kenya and South Africa have been analysed, not for the purpose of comparing the selected countries but to determine the basis of successes of implementing the ICT policy in education and setbacks experienced. With proper implementation of the e-Education policy, positive change can be of the highest possibility.

## **2.5 CONCLUSION**

In this chapter the connectivist theory was discussed as this study's theoretical framework, in which three theories prior to the connectivism theory were addressed based on the contributions made to the theory that underpins this study. This chapter reviewed the literature by taking a look at different ways in which ICT tools found in the digital classroom can be used in South Africa and around the globe. Challenges experienced in integrating ICT as well as the potential of ICT as a tool to enhance teaching and learning were evaluated.

The ICT policy in education and its guidance in developing and developed countries were also touched on briefly. The review of the literature shows that the ICT policy is the main source underpinning the use of ICT developments. ICT policy necessitates

proper preparation for all requirements for the effective incorporation of ICT into teaching and learning.

The methodology of the empirical research will be discussed in the next chapter.

## **CHAPTER 3**

### **RESEARCH DESIGN AND METHODS**

#### **3.1 INTRODUCTION**

The previous chapter dealt with the literature review of this study. The chapter covered not only the theoretical framework, but also critical aspects relating to effectively integrating ICT in the classroom for teaching and learning purposes.

This chapter gives an overview of how the empirical study was conducted to answer the research question: *What are the Potgietersrus circuit secondary school teachers' perceptions on the integration of ICT in the classroom?* It firstly outlines the research design and methods implemented in gathering information from selected participants. The rationale of collecting, storing and analysing data, the research design and the research paradigm are discussed. Secondly, the methods utilised on how participants were selected and how data were gathered is discussed. Thirdly, the chapter highlights the manner in which the data were analysed. Fourthly, the credibility, transferability, dependability and confirmability based on Lincoln and Guba (1985) criteria of trustworthiness are addressed. Lastly, the chapter presents the ethical measures ensured in the study.

#### **3.2 THE RATIONALE FOR EMPIRICAL RESEARCH**

The rationale for empirical research represents how the researcher developed an interest in conducting a particular topic and confirms the reason why the researcher believes that the study is worth conducting (Maree, 2010; Vithal & Jansen, 2004). The rationale of this study is on teachers' perceptions regarding the integration of ICT as a tool to enhance teaching and learning. This study, it is hoped, will help address some of the challenges that hamper the teachers' integration of ICT in the classroom for teaching and learning purposes. Teachers' ICT training on how to effectively integrate

ICT in the classroom for teaching and learning purposes will promote the teachers' professional development experience. Some teachers articulated that the challenges in their experience with integrating ICT were due to lack of continuous technical support and insufficient provision of ICT tools. Laaria (2013) agree that there are challenges pertaining to the integration of ICTs.

The purpose of investigation was to raise awareness of some of the factors that might hinder the effective integration of ICT as well as challenges that affect the teachers' perceptions of integrating ICT in the classroom for teaching and learning purposes. Recommendations by the teachers should assist in future ways of integrating ICT as a technology-enhanced classroom setting.

### **3.3 THE RESEARCH METHODOLOGY**

The research methodology is defined as the general approach the researcher takes in carrying out the research study (Leedy & Ormrod, 2005:14). In the subsequent sections, the research paradigm as well as the research approach and design are discussed.

#### **3.3.1 The Research Paradigm**

This study is nested in an interpretive paradigm as it aims at identifying the views and perceptions of secondary school teachers regarding ICT integration in the classroom for teaching and learning purposes in the Potgietersrus circuit. A paradigm is defined as a comprehensive belief system, world view, or framework that guides research and practice in a field (Williams, 2007:8). The research process is systematic in that defining the objective, managing the data and communicating the findings occur within established frameworks and in accordance with the existing guidelines (Williams, 2007:65). The research approaches are characterised by a specific ontology, epistemology and methodology (Terre Blanche *et al.*, 2006:586) which is further developed by the interpretivist paradigm which means that the perception of teachers regarding the nature of existence in terms of integrating ICT for teaching and learning purposes were real (ontology), and therefore, I had to interview the teachers by posing questions of how reality can be known through the face-to-face method with the intention to hear their views and opinions (Kivunja & Kuyini, 2017:27; Terre Blanche *et al.*, 2006:586;). As a researcher I assumed the position of the primary instrument in

an interpretive perspective, by understanding the context, collecting and analysing data, representing the audiences, standards of evaluation and ethics which emphasize the interpretive stance (Creswell, 2007:24).

Following from Chua (1986), Orlikowski and Baroudi (1991) suggested three paradigm categories based on the underlying research epistemology, which includes the positivist, interpretive and critical paradigm. The paradigms have their own distinct philosophical views on how the world is viewed, though their distinctions are not always so clear cut (Lee, 1989; Maree, 2010:57). Taylor and Madina (2011:2) recognise that the positivist paradigm mostly involves quantitative methodology, utilising experimental methods involving experimental (or treatment), control groups and administration of pre- and post-tests to measure gain scores. However, the critical theory gives the participant more authority and power on how they perceive the phenomena and are given the platform to express their opinions and views. The critical theory, sometimes referred to as the transformative paradigm, focuses mostly on societal circumstances and situates its research on social justice issues and seeks to address the political, social and economic issues, leading to oppression, conflict, struggle and power structure at whatever these levels might occur (Kivunja & Kivuni, 2017:35). The interpretivist paradigm on the other hand, enables the research to build rich local understanding of the life-worlds experiences of the participants (Taylor & Medina, 2011:4).

### **3.3.2 The Research Approach**

The fundamental purpose of this study was to investigate and explore the perceptions of secondary school teachers in the Potgietersrus circuit on the integration of ICT in the classroom for teaching and learning purposes, hence the study followed a qualitative interpretive approach. As previously mentioned, Creswell (2003) mentioned that five philosophical assumptions lead to a researcher's choice of the qualitative research approach.

The qualitative research approach gives the researcher the best opportunity to understand the innermost deliberation of the lived experiences of research participants (Alase, 2017:9). Furthermore, qualitative researchers believe that the world is made up of people with their own assumptions, intentions, values as well as ways of knowing reality by exploring the experiences of others regarding a specific phenomenon

(Maree, 2010:55). The gathering of information for the research study was done through interviews with secondary school teachers; it was through these interviews that I got acquainted with their views, perceptions, sentiments and values with regard to the phenomena (McMillan & Schumacher, 2006:316). I considered the qualitative research approach to be the appropriate approach for this study, as it aimed at finding out from the teachers themselves, based on their personal experiences with ICT integration in the classroom. The qualitative research approach places the researcher as the primary instrument for data collection and data analysis. Since understanding is the goal of this research, the human instrument, which is able to be immediately responsive and adaptive, would seem to be the ideal means of collecting and analysing data (Merriam, 2002:5; O'Reilly & Kiyimba, 2015). As a teacher within the Potgietersrus circuit and the prime instrument with regard to the collection and analysis of data (Terre Blanche *et al.*, 2006:274), it was vital that I did not let the facts influence me instead kept track of the collected information and to not lose focus because of bias or objectivity with regard to the outcomes of the research.

### **3.3.3 The Research Design**

Maree (2010:70) defines the research design as “a plan or strategy which moves from the underlying philosophical assumptions to specifying the selection of participants, the use of data gathering techniques and the data analysis to be done”. Creswell (2007:2) identified five designs to qualitative inquiry, which are phenomenology, ethnography, grounded theory, biography and the case study. Based on the nature of the study, a phenomenological case study is chosen to be the most appropriate approach of inquiry.

According to Bromley (1990:302) a case study is described as a “systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest”. A case study research consists of a detailed investigation, often with data collected over a period of time, within their context with the aim of providing an analysis of the context and processes which illuminate the theoretical issues being studied (Hartley, 2004). Case study research could fall under the positivist, interpretivist or critical paradigms. According to Maree (2010:75), the case study from an interpretivist perspective, strives towards a comprehensive (holistic)

understanding of how participants relate and interact with each other in a specific situation and how they make meaning of a phenomenon under study.

Yin (1984:46) distinguishes between the different types of case studies which are exploratory and explanatory case studies. This study focused on an exploratory case study, based on the nature of research investigation. Hancock and Algozzine (2006:33) stipulate that the exploratory designs seek to define research questions of a subsequent study or to determine the feasibility of research procedures; in addition, it intends to establish cause-and-effect relationships. The case study provides rich information on the way a certain situation or phenomena affect the people involved.

The phenomenological approach was seen to be appropriate for this study because I was interested in finding out about a specific phenomenon, which were the perceptions of secondary school teachers on the integration of ICT in the classroom. I did this by conducting interviews with six selected participants who may be regarded as the case for this study and representing their perceptions in Chapter 4 of this study.

### **3.3.4 Research Methods**

The primary focus of the research methodology is to describe the methods used in collecting data to achieve the study's aim. The selection of participants, the collection and analysis of data, pilot testing, semi-structured interviews and finally non-participant observation is discussed in the subsequent sections.

#### **3.3.4.1 Selection of Participants**

Sampling refers to a portion of a population or universe. Though many consider population to be people only, it is however classified as the total quality of things or cases which are the subject of one's research (Etikan *et al.*, 2016:1). There are two types of sampling methods that can be implemented in a research study, which are the probability sampling and the non-probability sampling. Etikan, *et.al.* (2016:1) define probability sampling as the "distinguishing characteristic that each unit in the population has a known non-zero chance of being included in the sample". Etikan and Bala (2017:216) felt that the probability sampling permits every single item from the universe or anyone from the population to have equal chance of presence in the sample. This means that there was no outlining of participants and all participants have an equal opportunity of being selected for the research.

The non-probability sampling on the other hand, is defined as a sampling procedure where there is not an option of probability that elements in the universe will have a chance to be included in the study (Etikan & Bala, 2017:215). It limits the number of participants to be considered in the research but taking into account those affected or aware of the research study.

I implemented purposive sampling, which is a non-probability sampling method. As mentioned in Chapter 1 (section 1.9.1) the selection of participants was based on their common attributes of engaging with ICTs in the school's environment. The level of knowledge and skills of the participants differed, so I took into consideration that some might have received ICT training during their time at tertiary level, whilst others might have received ICT training and workshops provided by the Department of Education. I took into account the level of knowledge, skill and training the participant has received not only on how ICT works but how to effectively integrate it into the school curriculum.

The Potgietersrus circuit consists of 23 schools in total of which nine are secondary schools and 14 being primary schools. I had chosen secondary schools within the circuit due to the paramount level of ICT integration in secondary schools. Though I had chosen secondary teachers as my participants, the aim of the research study was not only for the benefit of teachers on how to effectively integrate ICT but also to prepare learners to be active participants in the information society. In secondary schools, the use of ICT becomes crucial as most learners tend to be technologically intrigued and active, also preparing them for the working world or post-school education all within the 21<sup>st</sup> century ICT integrated environment. Combining the integration ICT as a tool to enhance teaching and learning with the school curriculum might have pivotal impact in the way teaching and learning is perceived in the classroom.

The selected participants were secondary school teachers from the Potgietersrus circuit who are affected or aware of the research study. Because my intention was to explore the perception of secondary school teachers on the integration of ICT in teaching and learning, I primarily focused on teachers from different age groups, years of teaching experience as well as teaching different subject streams. I applied convenience sampling in my judgement for the selection of accessible teachers based on the location of the school and the time scheduled for the interview. Etikan *et al.*



(2016:2) define convenience sampling which is also known as Haphazard or Accidental sampling as the type of non-probability or non-random sampling where members of the target population that meet the practical criteria, such as easy accessibility, availability at a given time, or the willingness to participate are included for the purpose of the study. Furthermore, I took into consideration the purpose of this study, the participants' common attributes of engaging with ICTs in the schools' environment. Participants are teachers who are fresh from higher education institutions as well as teachers who have been in the teaching field for more than 10 years. The reason for the different age groups of participants was that I wanted to get different views from different generations of teachers.

I selected three public schools from the Potgietersrus circuit, within the Mokopane area, and within close proximity to each other. I became knowledgeable about one school through attending an education workshop held at the school, whereas the other two schools are close to where I work. I also took into consideration that the schools had been part and are aware of the EDTP-SETA and WITS ICT training programme. Two participants were selected from each of the schools, considering the selection of participants teaching different subject streams assisted me in getting a better understanding of how effective or ineffective the integration of ICT has impacted on specific subject content. Teacher-participants were chosen based on the years of teaching experience within the educational system and taking note of the different subject stream and grades taught. Consideration of different subject streams gave light on determining whether there is a misconception that integration of ICT for teaching and learning is more fitting to some subject streams than others, in turn contributing to one of the factors that might hinder the effective integration of ICT.

The gender and race of the teachers did not have much of an effect on the research findings but considering the impact this might have on the study, I required an equal proportion of genders from each school. However, I did not consider that race was much of a priority, what was pivotal was getting the perceptions of the participants from any racial background.

#### **3.3.4.2 Data Collection**

Creswell (2007:118) states that data collection pertains to the correlation of activities aimed at gathering relevant information, which will assist in addressing the relevant

research questions. As mentioned in Chapter 1 Section 1.9.2, the data collection techniques employed for this study included the use of semi-structured interviews and observation. The implementation of an interview is crucial in a sense that I would be capturing the voices of the participants and I would be able to give meaning to their perceptions (Rabionet, 2011:563). The way in which a participant views or perceives the integration of ICT will differ individually and it is the responsibility of the researcher to explore.

### **3.3.4.3 *Semi-structured interviews***

An interview entails communication between the interviewer and participant, the interviewer asks the participant questions to collect data and to learn about the ideas, beliefs, views, opinions and behaviours of the participant (Maree, 2010:87). McIntosh and Morse (2015:1) explain that semi-structured interviews constitute the framework for the development of interview questions, which focus on the response of the participants. In relation to qualitative research, interviews as a data collection method refer to the way of asking questions related to the research problem.

For the interest of crystallisation of data, the main method that was used was interviews. Crystallisation provides complex and deeper understanding of the phenomenon, and credible in so far as those reading the data and analysis will be able to see the same emerging patterns and this adds to the trustworthiness of the research (Maree, 2010:81). Conducting an interview gives the researcher first-hand information straight from the participants' mouth. All conducted interviews were individual face-to-face interviews, as it was my assumption that the participants would feel relaxed and at ease to respond to the interview questions individually rather than in a group. Moreover, the significance for the division of participants was to obtain ultimate responses from the participants.

Based on the limited time the participants had during lessons and free time for interviews, I tried to avoid long and time-consuming questions. I was aware that a participant might not agree to an interview due to fear of being persecuted for their opinions and views, but explaining the purpose of the interview and maintenance of confidentiality in the study assisted in the participant being less reluctant to give the interview. Participants were informed that their participation was voluntary and that they could withdraw at any time should they wish to do so.

In qualitative research, the researcher strives to understand the perceptions and views participants have regarding a specific phenomenon and making use of semi-structured interviews assists in achieving that goal. To avoid the misconception by the researcher on what the participants have said during the interview, the use of probing was also included in the research. Probing and clarification questions assisted in getting a clear understanding of the participant's perceptions and views (Maree, 2010:88). I found that the clarification probing strategy was most efficient for the study, as it analyses the accuracy of the participants' understanding. This can be done through paraphrasing to confirm what the researcher heard is what is actually meant by the participant (Maree, 2010:89). It was also crucial that I paid attention to the participants' reactions, so that it is easy to identify the new lines of inquiry.

#### **3.3.4.4 *Non-participant observation***

The non-participant observation as a further data gathering technique aimed to validate findings through triangulation. Triangulation is critical in a sense that it requires the researcher to check the extent to which conclusions based on qualitative sources are supported by quantitative perspectives (McMillan & Schumacher, 2010). Therefore, the triangulation process reduces the risk of chance association and systematic bias (Maxwell, 1996:93).

According to Urquhart (2015:30) a non-participant observation refers to the non-participation of the researcher during the observation, and the researcher observes by not playing an active role during the observation. Maree (2010:84) indicates that by conducting an observation holds the possibility of providing an insider perspective of the participants' dynamics, behaviours and environment in different settings.

I used the non-participant observation as a tool to determine if the schools had adequate ICT tools as well as ascertaining whether the available tools were being utilised effectively. The non-participant observation gave me the advantage to conduct physical verification in order to confirm the claims of the participants.

#### **3.3.4.5 *The pilot study***

A pilot study is described as a mini version of a research or a trial run conducted in preparation of a full-scale study and may be conducted specifically to pre-test a research instrument (Dikko, 2016:551; Teijlingen, Hundley, Graham & Rennie, 2001).

According to Thabane *et al.* (2010:1), the goal of a pilot study is to assess the feasibility of the proposed study in order to avoid potentially disastrous consequences of embarking on a research study. Van Wijk and Harisson (2013) believe that pilot studies can add value and credibility to the entire research study.

In the context of this study, a pilot study was conducted with one teacher at the school where I work with the purpose to test the interview guide as well as determine whether the questions resulted in data that would answer the research question. On the completion of the pilot study, I found it necessary to revise certain questions as they had been vague and perplex. The questions, in consultation with my supervisor, were revised accordingly.

#### **3.3.4.6 The main study**

After arranging suitable times, convenient to the participants, the semi-structured face-to-face interviews were conducted after school on the selected schools' premises. As previously stated, two participants from each individual school with varying qualifications, equal proportion of gender and teaching experiences ranging from a year to three years were sampled. The duration of the interview process was three weeks, with each interview varying from 30 to 45 minutes. The length of the interview was mainly determined by the responses of the participants and their willingness to share information and offer their perceptions. A participant interview guide was utilised to ensure that the interview questions are asked in orderly manner (see Appendix F) although probing was done for clarification purposes and to develop a clear understanding of the participant's perceptions and views (Maree, 2010). All interviews, with permission from participants, were audio-recorded.

The non-participant observation was done at the school after the interview process. It was done after school hours so as not to disturb lessons and it gave me the opportunity to move around freely whilst observing the availability and placing of the ICT tools within the schools without interruptions of lessons.

Although not all the schools had computer labs, the non-participant observation assisted in determining the quantity of ICT available at the schools. A checklist was developed to determine on what was observed at the schools (see Appendix H).

### **3.3.4.7 Data analysis**

Once data is gathered, the next step of the process was to analyse the data collected. Following the qualitative approach in collecting data assists the researcher in getting a deeper understanding with regards to the participants' views, perceptions and opinions. The qualitative data analysis focuses on analysing the participant's perceptions, attitudes, understanding, knowledge, values, feelings and experiences with the main attempt to approximate their construction of the phenomenon (Maree, 2010:99). I found the inductive analysis of the qualitative research study useful as the information gathered was from trusted and relevant sources. Thomas (2006:238) defines inductive analysis as an approach that primarily uses detailed readings of raw data to derive concepts, themes or a model through interpretations made from the raw data by the researcher. Primarily, the raw data were obtained from the selected participants and upon the collection of data, the raw data were transcribed, organised, compared and analysed.

The goal of analysing qualitative data was to summarise what has been seen or heard in terms of common words, phrases, themes or patterns that would assist in understanding and interpreting that which is emerging (Maree, 2010:100). The data collected comprised of sound documented files that were converted into Microsoft Word documents and ready for coding. Neuman (2006:459) describes data coding as discovering "tags for assigning units of meaning during the study, whereas the codes are normally attached to chunks of varying size-words, phrases, sentences, or whole paragraphs connected to a specific setting". The coding of transcripts allowed major themes to emerge; moreover, the emerging themes were developed by studying the transcripts repeatedly and considering possible meanings as well as the manner in which they will fit with the developing themes (Thomas, 2006:239). It was pivotal not to assume or anticipate any response beforehand but instead I chose to keep an open mind with regard to the participants' response.

## **3.4 TRUSTWORTHINESS**

Each and every research approach employs different evaluation criteria to ensure the rigour of inquiry because different philosophical and methodological assumptions guide each approach (Anney, 2015:272). According to Nyathi (2018:129), the process of ensuring rigour and trustworthiness is a criterion for achieving quality in a qualitative

study by reducing bias and subjectivity. This stipulates that a study without a solid feeling of rigour will lose its credibility and validity. I implemented a few pointers in order to enhance the trustworthiness of the study. The pointers that were applied in the study included using multiple data resources to help check findings, verifying raw data in ensuring that the interpretations of what the participants have shared are correct, controlling of bias, avoiding generalisation, choosing quotes carefully, maintaining confidentiality and anonymity as well as stating the limitations of the study upfront (Maree, 2010:115).

As stipulated in Chapter 1, Section 1.10, Lincoln and Guba (1985) developed dependability, credibility, transferability and confirmability as trustworthiness criteria to ensure rigour of qualitative findings, and these criteria are discussed next.

### **3.4.1 Credibility**

Richards (2005:41) defines credibility as a way of aligning every step in the research process, paying attention to the research question, data and method, as well as ensuring that each step is accounted for in the analysis of data. Furthermore, Graneheim and Lundman (2004:110) believe that credibility establishes whether or not participants' original data and is a correct interpretation of the participants' original view. Credibility in this study involves a thorough description of the phenomenon under investigation as well as mentioning what the study intends to achieve by stating the study's aims and objectives (see Chapter 1 Section 1.5). I made a careful selection of the participants based on the knowledge of the participants with regards to the phenomenon under investigation within the school setting (Graneheim & Lundman, 2004:109). I followed the suggestion where I observed extended time period with the participants based on the fact that as rapport increases, participants may volunteer different and often feel open to share sensitive information than they did at the beginning of the research project (Krefting, 1991:217). To clarify the credibility of the information to be gathered, I had committed myself to the selection of participants (see Section 3.4.1), preparation of interview instruments such as audio-recorders and interview guides (see Section 3.4.2.1) and triangulation. I used the audio-recording in all the interviews I had, this assisted me in not missing any information that the participants provided. This also prevented assumption and misinterpretation of information by the participants, information becomes credible.

### **3.4.2 Transferability**

Polit and Hunger (1999:717) describe the transferability as the extent to which the research findings can be transferred to other settings or groups. To enhance transferability, I aimed to offer a rich and vigorous presentation of the research findings together with appropriate quotations (Graneheim & Lundman, 2004:110). Guba (1981:86) suggests that in order to ensure transferability of qualitative inquiry, the researcher must “collect-thick descriptive data” which allows comparison of the contexts to which transfer might be contemplated. The thick description of data emerged from prolonged semi-structured interviews as well as non-participant observations (to be addressed further in Chapter 4). In this study, the data gathered were obtained through the purposive selection of teachers who are knowledgeable of the issues under investigation. This implies that when the researcher provided a detailed description of the enquiry and the purposive selection of participants, it facilitates transferability of the inquiry (Anney, 2015:278).

### **3.4.3 Dependability**

A dependable research finding stipulates that even if the research was to be redone by another researcher, the findings would yield similar results. Furthermore, the results would be based on accurate findings from the participants and not be generalised or made-up by the researcher. Cohen, Manion and Morrison (2011) describe dependability as involving participants in order to evaluate the findings, interpretation and recommendations of the study to make sure that they are all supported by the data received from the informants of the study. A purposive selection of participants was employed in the study, whereby the collected data consisted of audio files and the content transcribed in order to ensure that the inquiry audits could be established any time (McMillan & Schumacher, 2006:326).

### **3.4.4 Confirmability**

Confirmability evaluates data and interpretations of the findings to determine that they are not based on the researcher’s imagination, but is clearly derived from the data (Tobin, & Begley, 2004:392). Based on the qualitative nature of the study, I applied six stages to ensure confirmability. Lincoln and Guba (1985:320-321) mention that the stages are raw data, data reduction, process notes, personal notes, instrument

development and drafts of the final report. To achieve confirmability, the audit trail offers visible evidence from the process and product that the researcher did not simply find what he/she set out to find (Bowen, 2009:307). I used a reflective note book which assisted in tentatively interpreting and planning data collection (Wallendorf & Belk, 1989:77). Nyati (2018:138) explains that this reflective account adds value because it demonstrates the combination of a range of strategies which are able to reduce bias and subjectivity, to ensure rigour and trustworthiness of a qualitative study and its findings, hence overall quality of the study.

### **3.5 ETHICAL MEASURES**

A qualitative researcher focuses on exploring, examining and describing people and their natural environment (Orb, Eisenhauer & Wynaden, 2001:93). In conducting research there are certain ethical principles in which the researcher needs to adhere to as they act as a guideline of conducting the research in the correct manner. According to Capron (1989), any type of research should be guided by principles of respect for people, beneficence and justice. I adhered to the ethical principles that underpinned this study. Firstly, to comply with the University's ethical requirements, I applied for ethical clearance, which was granted by the College of Education at UNISA (see Appendix A).

Kvale (1996:13) mentions that in a qualitative research study, the ethical principle has to be honoured by obtaining informed consent from the participants. The informed consent means making reasonable balance between over-informing and under-informing the participants regarding the research study. Therefore, the permission to conduct research was granted and received from the Potgietersrus circuit manager (see Appendix B). An informed consent form was signed and returned, serving as an acknowledgement of being satisfied with the criteria of the consent forms. The participants were informed of their rights and one of them indicated that they have a right to withdraw from participating in the research. Any questions by participants regarding the study were addressed. Explaining the aim and objectives of the study and answering any enquiries from participants created an atmosphere of honesty and transparency. Signed consent forms to do the interview were voluntarily provided by participants prior to the study (See Appendix E). For security purposes, all the information acquired from participants were kept in the researcher's office inside a



locked cabinet. Recorded interviews were transcribed and kept in a password-protected hard drive.

One of the ethical measures that I considered was the prevention of harm to the participants. According to Leedy and Ormrod (2005:101) it is crucial that participants are not exposed to any psychological or physical harm during the research study. Orb *et.al* (2001:93) cautions that though the level of risk to participants varies from each individual study, it is vital that a researcher applies appropriate ethical principles. However, I was aware that particularly during interviews; participants may experience psychological discomfort or stress. This was dealt with through referring the participants for counselling and doing follow-up calls and visits.

It was vital that the information they provided be dealt with utmost confidentiality and privacy. Confidentiality is synonymous to privacy, confidentiality means that no personal information is to be revealed except in certain situations (Richards & Schwartz, 2002:138). De Vos, Strydom, Fouché & Delpont (2011:118) define privacy as the intention to mind one's own business concerning that which is not proposed for others to watch or investigate. The ethical criteria outlined in the Ethical Clearance certificate is that it is the responsibility of the researcher to inform the participants that their personal information will be anonymous and the information they provide will not be used to exploit them as privacy as well as confidentiality will be applied.

### **3.6 CONCLUSION**

This chapter provided an account of the way in which the empirical investigation in this study was conducted. Firstly, the rationale for the empirical research was evaluated, in which I emphasised on reasons why I deemed the empirical research to be appropriate for this study. The interpretive paradigm that underpinned this study was discussed, as well as the qualitative research approach and the research design which entailed an exploratory case study. The chapter explored the purposive sampling method applied for in the selection of participants. The chapter evaluated the data that had been collected using semi-structured interviews as well as the triangulation through non-participant observations. I then explained how I had analysed the data that had emanated from the interviews. In the penultimate section I discussed how I had ensured the validity and the reliability of the study and how Lincoln and Guba's

criteria for trustworthiness had been realised in the study. The chapter concluded with a discussion on the ethical considerations of the study.

The next chapter offers an in-depth discussion of the findings emerging from the empirical investigation supported appropriate participant quotations.

## CHAPTER 4

### DATA ANALYSIS, FINDINGS AND DISCUSSION OF DATA

#### 4.1 INTRODUCTION

The previous chapter discussed the research methodology that this study employed. The chapter further dealt with outlining the empirical characteristic of this research study. In addition, the chapter dealt with various sections that described the rationale for gathering, storing and analysing the data.

This chapter provides the research findings of the semi-structured interviews, non-participant observation and summary of the findings. The aim of this chapter is to extensively analyse all the data collected from the six teacher-participants who were selected from the public secondary schools within the Potgietersrus circuit. The non-participant observation determined how the schools were integrating ICT in their schools and the availability of the ICT tools in the schools. The chapter indicates the profiles of participants and the themes and subthemes that emerged from the interview data. There is also a summary of this study's empirical findings. The details of the interviews that were recorded transcribed and analysed and the results that were found based on the data collected, are presented.

#### 4.2 RESEARCH FINDINGS

The focus of this section is on providing the findings as well as a thorough report on the empirical enquiry as a means of answering the main research question, namely *“What are the Potgietersrus circuit secondary school teachers’ perceptions of the integration of ICT in the classroom?”* It presents the findings of interviews with six participants, as well as the observations from the selected secondary schools.

##### 4.2.1 Profile of Participants

To differentiate among and provide information about the participants, their detailed profiles are captured and listed in the table below:

**Table 4.1: Details of the participants**

Participant	Gender	Age	Qualifications	Years of teaching experience	Subjects taught by the teacher
Teacher01 (T01F)	F	55	Advanced Certificate in Education (FET)  Senior Teachers Diploma (STD)	15	Mathematics (Grade 8)  Maths Literacy (Grade 10 and 12)
Teacher02: (T02M)	M	32	BSc (Mathematics and Physics)  PGCE (Physical Science and Mathematics)	6	Mathematics (Grade 9)  Physical Science (10, 11 and 12)
Teacher03 (T03F)	F	26	Degree in Chemical Engineering  Masters in Chemical Engineering  PGCE (GET and FET Mathematics)	1	Natural Science (Grade 9)  Mathematics (Grade 8)  Physical Science (Grade10)
Teacher04 (T04M)	M	27	BEd (Geography and Sepedi)  BEd (Hons) in Curriculum Studies	4	Geography (Grade 10 and 12)  Sepedi (Grade 10)
Teacher05 (T05F)	F	54	BSc (Maths and Information Systems)	20	Mathematics (Grade 12)  History (Grade 10, 11 and 12)
Teacher06 (T06M)	M	58	Higher Education Diploma (Geography and Afrikaans)	30	Geography (Grade 12)  Afrikaans (Grade 8, 9 and 10)

(Source: Self compiled)

Table 4.1 shows that there were three female participants and three male participants. The qualification level of the participants ranged from Advanced Certificate in Education (ACE) to Bachelor of Education (BEd), which indicates the professional scale of each teacher-participant interviewed. The teacher-participants' teaching experience ranged from 1 year to 30 years. As stipulated in the table above, the

participants are named Teacher 01 to Teacher 06 respectively, to protect their identities. The interviews were conducted in three schools, which I labelled as School A, School B and School C. This assisted in keeping track of the participants as well as retaining their anonymity. As per the heading, the findings from the interviews and the non-participant observation are discussed in the next section. Below is a discussion of themes from the data as informed by the research questions.

#### 4.2.2 Discussion of Themes

As mentioned in the previous section, this discussion is about what emerged from the interview data. The main aim was to understand the perceptions of secondary school teachers in the Potgietersrus circuit in integrating ICT for teaching and learning in the classroom. The analysis of the interviews revealed certain themes and subthemes which have been divided into five broad sections. After the discussion each theme and its subtheme, it is followed by recursive literature to confirm and corroborate with the findings of the study. The themes emerged from the transcriptions (one of the participants' transcripts is included in Appendix G), these themes and subthemes are indicated in Table 4.2 below and further in-depth discussion follows after table.

**Table 4.2: Themes and subthemes**

Themes	Sub-themes
1. Teachers' perceptions on the integration of ICT in the classroom	<ul style="list-style-type: none"> <li>a. Availability of ICT tools</li> <li>b. ICT skills and training</li> <li>c. ICT integration</li> </ul>
2. The Implementation of ICT policy to guide teaching and learning	<ul style="list-style-type: none"> <li>a. South African ICT policy in education</li> <li>b. School-based ICT policy</li> </ul>
3. Primary purposes of ICT integration	<ul style="list-style-type: none"> <li>a. ICT as a teaching tool</li> <li>b. Professional development and subject content knowledge using ICT</li> <li>c. Learner assessment and ICT</li> <li>d. Benefits of ICT for teaching and learning</li> </ul>
4. ICT integration challenges experienced	<ul style="list-style-type: none"> <li>a. ICT tools</li> <li>b. ICT training and support</li> </ul>

Themes	Sub-themes
	c. Traditional method of teaching
5. Recommendations for the effective use of ICT	a. Recommendations and guidelines b. ICT intervention and support

(Source: Self compiled)

**Teachers' perceptions on the integration of ICT in the classroom** is the first theme that materialised from the first research question which asked: *What are the Potgietersrus circuit secondary school teachers' perceptions on the integration of ICT in the classroom?* The objective of this research question was to understand the perceptions of secondary school teachers from the Potgietersrus circuit in integrating ICT for teaching and learning. It is mandatory for the objective to be visited thoroughly as it unpacks layers of the study. This theme is from the main question, which leads to three sub-themes and include availability of ICT tools, ICT skills and training as well as ICT integration experience, which are discussed shortly.

**The implementation of ICT policy to guide teaching and learning** emerged as the second theme, inspired by the second research question: *What are teachers' perceptions of ICT policies as a guide to teaching and learning?* The objective of this theme was to explore the perceptions of teachers with having to implement the ICT policy as a guide to teaching and learning. Two sub-themes emerged from this theme's objective. These themes were South African ICT policy in education and ICT policy within the school.

Thirdly, the **primary purposes of ICT integration** emerged as the third theme, inspired by the third research question: *What are the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning?* The objective of this theme was to determine the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning. Four sub-themes emerged from this theme's objective and were ICT as a teaching tool, professional development and subject knowledge using ICT, learner assessment and ICT and benefit of ICT for teaching and learning.

Fourthly, **ICT integration challenges experienced** emerged as the fourth theme materialising from the research question: *what challenges do teachers experience in*

*the integration of ICT for teaching and learning?* The objective of this theme was to explore challenges that teachers experience in the integration of ICT for teaching and learning. From this theme, four sub-themes had emerged which included ICT tools, ICT training and support and traditional teaching methods.

Finally, the **recommendations for the effective use of ICT** emerged as the final theme from the research question: *what recommendations can be made regarding the effective integration of ICT in teaching and learning?* The objective of this theme was to determine recommendations that can be made regarding the effective integration of ICT in teaching and learning. Two sub-themes emerged from this theme, which were recommendations and guidelines and ICT intervention and training.

The themes and sub-themes are discussed next.

#### **4.2.2.1 Theme 1: Teachers' perceptions on the integration of ICT in the classroom**

Sub-themes that emerged under this theme are revealed in Table 4.2 (see Section 1.4). Such sub-themes are availability of ICT tools, ICT skills and training and ICT integration which will be discussed in this section. These themes are each analysed as they are respectively listed in Table 4.2 above.

##### **Sub-theme a: Availability of ICT tools**

This theme is aimed at the quantity of ICT tools available in the schools. As mentioned in Chapter 2 Section 2.3.2, the quality and quantity of ICT tools available will differ in each and every individual school. The integration of educational technologies is quite broad as it includes a variety of tools such as the television, cell-phones, tables, computers, interactive whiteboards and projectors in the digital classroom revolutionising teaching and learning in schools (Msila, 2015:1974). Even though the schools may not have the same quantity of ICT tools, exploring their availability assists in determining the shortage of ICT tools that exist in the schools.

The teacher-participants were asked about the quantity of ICT tools available at their respective schools. The majority of the teacher-participants had varying responses even though they were from the same schools.

T01F (School A) shared that

*“...the school has Wi-Fi connection; four laptops allocated for each departmental stream. The departmental stream consists of four streams which includes the languages stream, humanities, maths and science as well the commercial stream. The school has a computer lab, even though I do not know how many computers are in the computer lab but what I know is that the computers are mainly used by grade 12 learners in the maths and science stream to do their school related work. In the administrators’ office there are two laptops, one desktop computer, one printer and one photocopy machine”.*

Although T01F and T02M are from the same school (School A), their responses were not entirely similar. T02M remarked that:

*“...I am only aware of one laptop assigned to our maths and science department as well as the computers in the computer-lab. I am not sure how many computers are in there because I hardly use the computer-lab. The laptop assigned to our department is in the possession of our Head of Department (HOD). Whenever a teacher from the maths and science department is in need of it, then they seek permission from the HOD. The school also has two photocopy machines that are meant to be used by the teachers”.*

T03F (School B), who was also responsible for looking after the computer lab at School B, reported that:

*“...the school has two mobile whiteboards which are normally used in substitute to the chalkboards, one overhead projector and an interactive whiteboard in the computer-lab for grade 10, 11 and 12 class maths and science. The computer lab has 10 desktop computers in total; there are desks and chairs allocated to each computer”.*

Although not accurate about the number of computers in the school, T04M (School B) added that:

*“...the school has a secured Wi-Fi connection which is only accessible to the teachers as the school management team felt that learners would misuse the internet access if provided with the internet connection. In the administrator’s office there are three laptops with one printer. The school also has the photocopy*



*room and there are four photocopy machines but one is broken as well as one printer”.*

T06M (School C) stated that:

*“...most of the classes at the school have projectors and smart boards. We also have Wi-Fi connection primarily used by teachers and the administrative staff to receive and send emails. In the past we had a computer lab which was used for computer lessons, unfortunately we don't have that anymore because it was too expensive for the school to maintain the computers. The admin office has two desktop computers and a laptop; teachers normally bring their own computers to school if they wish to use them for lessons”.*

T05F (School C) agreed with the response of T06M (School C), that the school had smart boards and an overhead projector in all the 15 classrooms. T05F (School C) further mentioned that *“though our school does not have any computer-lab but there is a computer and a printer in our staff room”.*

It was discovered that the majority of the teacher-participants were only aware of the ICT tools they made use of despite the actual quantity available in their schools. It emerged that the teacher-participants relied mostly on using their personal laptops due to the insufficient number of computers available to accommodate all the teachers at the schools.

### **Sub-theme b: ICT skills and training**

Teachers that receive proper ICT training and skills will be able to adequately integrate ICT confidently in the classroom for teaching and learning purposes. Tedla (2012:200) further adds that ICT resources alone cannot enhance teaching and learning, as teachers need to be thoroughly equipped with ICT skills in order to integrate with their pedagogical knowledge. The majority of the teacher-participants acknowledged that ICT enhances teaching and learning; however, without proper ICT training they are unable to integrate ICTs in their pedagogical practices. In this theme, the teacher-participants were interviewed on the specific ICT training they had received in order to explore their level of ICT skills.

T01F (School A) and T03F (School B) mentioned that they are on the EDTP-SETA ICT training programme sponsored by the Department of Basic Education and WITS. T01F (School A) explained that:

*“...on the EDTP-SETA ICT training bursary programme we are going to be trained on using Microsoft word, Excel and PowerPoint. The program as we were told is supposed to run for three months and so far, we have done two sessions on Saturdays. On the first two sessions we were given laptops and an induction on the training program. Though I have basic computer skills I feel that being on this programme will develop my ICT skills in terms of using ICT for teaching and learning”.*

In Chapter 2 (see Section 2.3.4), Makgato (2012:1399) explains that the benefit of integrating ICT as a tool to enhance teaching and learning can be observed in the way it can be used to encourage and support real life related problems for teaching and learning both in and outside the classroom. It is crucial that teachers that receive ICT training are aware of the benefits of receiving the ICT training and the purpose of acquiring ICT skills.

T03F (School B) further commented that:

*“it is concerning that a majority of the older teachers that I met at the ICT training sessions seem to be interested only in receiving laptops and not optimistic on the skills they will gain from the programme”.*

The integration of ICT is effective when the ICT training and skills are aligned with the subject content in a manner that enhances teaching and learning. T04M (School B) shared that:

*“...I have not been a teacher for that long, so I have not received any ICT training since being employed by the Department of Education. The only ICT training I got was during my first year of tertiary, the ICT modules involved ways on using Microsoft Word, Excel, PowerPoint and Pastel. However, getting training would assist me in knowing ways to use ICT in my subject content especially for a teacher that teaches languages”.*

T06M (School C) noted that:

*“...I was born in a generation where technology was not as popular and used as it is now. At university we did not have any ICT training courses. When I became a teacher there were no ICT tools, we just made use of the chalkboard and textbook method of teaching. For the years I have been a teacher, I have never received any form of ICT training from the Department of Education”.*

The interview findings revealed that apart from the EDTP-SETA ICT training programme, all the teacher-participants were not aware of other ICT training initiatives provided mainly online by the Department of Education. This was realised when Teacher06M (School C) first shared that *“I have never received any ICT training and I am not aware of any form of ICT training provided to teachers by the Department of Education besides the EDTP-SETA ICT training programme”*. Further elaborating about training was that the EDTP-SETA ICT training came in the form of a bursary and not all teachers who applied were selected. The Department of Education together with non-government organisations (NGOs) developed initiatives such as the School Net SA, which provides online, mentor-based programmes that provide in-service training to teachers on how to integrate ICT into the curriculum and its management. Teachers need to be made aware of such initiatives and encouraged to make use of them.

### **Sub-theme c: ICT integration**

In Chapter 2 Section 2.3.3, Alkahtani (2017:33) highlighted the fact that the integration of ICT can enhance work and education by delivering lessons with interesting and enjoyable real-world examples and stimulating visual illustrations from an extremely wide range of sources. This theme aims to discover the perception teacher-participants have on the integration of ICT in the classroom. The teacher-participants were asked to offer their perceptions regarding ICT integration in the classroom as a tool to enhance teaching and learning. This gave more perspective on the extent to which the teacher-participants integrated ICT in their lessons and the experience with having to integrate ICT in their lessons.

T02M (School A) felt that ICT integration serves an effective tool to enhance teaching and learning, elaborating that most learners enjoy the use technology and they become interested in the lesson whenever a teacher uses technology. However, T06M (School C) reported that:

*“...the use of ICT in teaching and learning is time consuming. In our school the major factor that prevents us from integrating ICT is that we do not have the necessary resources and according to our school policy learners are not allowed to bring their cell phones to school. Meaning that, if we don't have enough computers and the school prohibits learners from bringing cell phones to school it will be impossible to accommodate all learners in using ICT for lessons with lack of proper ICT resources”.*

T01F (School A) felt that the use of ICT can be effective especially for subjects that learners found to be complicated such as physical science and those that include a lot of theory such as history.

T05F (School C) proffered that:

*“...being a history teacher, I normally like using resources besides the textbook, the reason is that, history has a lot of theory, so learners tend to lose concentration quickly. Upon the realisation I decided to change the textbook and chalkboard dominated method by integrating ICT, I started to download videos from YouTube in connection to what I would be teaching and share with the learners”.*

It emerged from the interviews that the integration of ICT was highly influenced by the perception that teacher-participants had towards ICT. When asked about the experience of integrating ICT in the classroom, T05F (School C) expressed that

*“the experience was remarkable and interesting, as the learners were intrigued by what they saw and the learners were asking more questions, even with learners that would not normally participate in class”.*

T04M (School B) mentioned that:

*“I once downloaded a video for my grade 11 learners which focused on Earths Energy Balance and I was astonished at the concentration of the learners. I had made a small class test for the learners and no learner failed the test and almost half of the learners got all the answers correct”.*

#### **4.2.2.2 Theme 2: The implementation of ICT policy to guide teaching and learning**

Table 4.2 indicates the two subthemes, which are South African ICT policy in education and School-based ICT policy. These themes are discussed below:

##### **Sub-theme a: South African ICT policy in education**

In Chapter 2 Section 2.5, it was mentioned that the goal of the e-Education policy is to ensure that each and every South African manager, teacher and learner in the general (GET) and further education and training (FET) bands is ICT capable, is able to use ICTs confidently and creatively to help develop the skills and knowledge as they need to become lifelong learners, achieve personal goals and be full participants in the global community (DBE, 2004). The South African education policy states that “All South African learners must be ICT capable by 2025/2030” (RSA, 2004). Teacher-participants were asked whether they shared the same vision with the policy makers and the Department of Education.

T01F (School A) believed that it was possible for the South African Department of Education to achieve the goal of ensuring all learners from the GET to FET be ICT capable, only if they pay closer attention to the types of challenges faced in the schools that may hinder the goal from being achieved. However, T02M (School A) and T03F (School B) felt that it would be challenging for the Department of Education to achieve the 2025/2030 goal considering that most of the schools that they knew did not have sufficient ICT tools and learners were not exposed to technology in the schools. T05M (School C) added that:

*“this can only be achieved in urban public schools because I feel that urban schools have better access to more facilities than rural public schools. I also think that the Department of Education takes longer to provide rural schools with certain resources than urban schools”.*

T04M (School B) believed that:

*“...the policy by the Department of Education in ensuring that schools have ICT’s and that they are properly managed to benefit the learners is plausible, that’s only if the Department of Education puts more effort in ensuring that all*

*South African schools are provided with adequate ICT tools. The government needs to take into consideration the types of individual challenges faced by the schools especially rural schools because they lack a lot of opportunities for development than urban schools”.*

Though T01F (School A) and T04M (School B) felt that it was possible for the Department of Education to achieve the goal of ensuring that learners are ICT capable by the year 2025/2030, it was evident from the above responses of the other teacher-participants that not having sufficient ICT tools in schools made them sceptical about the goal not being able to be achieved.

### **Sub-theme b: School-based ICT policy**

A school-based ICT policy ensures that ICT is integrated across the curriculum. The school-based ICT policy is vital as it acts as a guideline for each individual school based on the specific possessions and challenges experienced when integrating ICT for teaching and learning (DTPS, 2014). The fact that not all schools face similar challenges regarding the integration of ICT as well as curriculum-related matters, having a school-based policy can help in improving or addressing the challenges experienced. Even though the schools may not apply certain ICT policy regulations drafted by the Department of Education, having a school-based ICT policy that suits the environment and setting of the school could be more effective. The teacher-participants were asked whether their schools had an ICT policy that acts as a guideline on how to effectively integrate ICT within the school.

T01F (School A) and T02M (School A) confirmed that they were not familiar with the existence of any ICT policy in their school. T06M (School C) added that

*“...though I am not particularly sure what the school-based ICT policy should entail, but I believe that had my school made use the ICT policy as a guideline on how to integrate ICT effectively, the computer-lab would still be functional even today. I feel that an issue that through the school-based ICT policy, the school would have prioritised the utilisation of ICT and the proper maintenance of the ICT tools in the computer-lab”.*

The above response confirmed findings of Tondeur, Van Keer, Van Braak and Valcke (2008:374) that teachers in schools, which have an explicit ICT policy plan that

stresses shared goals, use educational technologies more regularly in their classrooms. T04M (School B) felt that it is the responsibility of the school leadership to ensure that teachers are aware of ICT policy regulations and implement them.

T03F (School B) reported that:

*“...our school has a policy which addresses a lot of issues that affects the school and the manner of dealing with such issues. Though it is my first time hearing about the ICT policy, I would not necessarily say that our school has such a policy. What I know is that our school has an ICT regulation which stipulates that learners are not allowed to bring cell phones to school or even have access to the school Wi-Fi unless requested so by a teacher or the principal. If a request is made to the learners to bring cell phones or tablets to the school, then the specific teacher has to collect them before his or her period and hand them to the learners during his or her period and finally after school”.*

The information above highlighted the importance of proper ICT policy planning in all schools, as this assists teachers in being aware of the manner of integrating ICT in the classroom for teaching and learning purposes. Although the school leadership should be in control of regulating the school-based ICT policy, it is crucial that teachers are also involved in the planning of the ICT policy.

#### **4.2.2.3 Theme 3: Primary purposes of ICT integration**

Table 4.2 reveals that four sub-themes emerged from this theme. These themes are: ICT as a teaching tool, professional development and subject content knowledge using ICT, learner assessment and ICT and the benefits of ICT for teaching and learning. These themes are each be analysed below:

##### **Sub-theme a: ICT as a teaching tool**

In Chapter 2 Section 2.2.3, Dibaba and Babu (2015:11) highlight that proper integration of ICT enables teachers and learners in the developing world to no longer depend solely on physical media such as printed textbooks which are often outdated. ICT provides access to experts, professionals and leaders in their fields of interest around the world. Modern teaching and learning is no longer confined or restricted to just the classroom. In this theme, teacher-participants were asked whether they

viewed the use of ICT tools as a better method of teaching learners as compared to the traditional method of teaching.

T06M from School C emphasised that:

*“I hardly use any ICT during my lessons, the reason being that I have been using the traditional method of teaching for many years. I am used to it and for some time now, the traditional method has worked for me in terms of achieving good results in my subjects”.*

However, in Chapter 2 Section 2.3.2, findings by Ogundile *et al.* (2019:63) revealed the use of the traditional method of chalk and talk dominating Nigerian schools has led to students lagging dangerously behind in the trend of changes in the world. In this regard, T05F (School C) felt that:

*“...the integration of ICT in teaching and the traditional method of teaching are both crucial as no other one outweighs the other, I prefer to sometimes use downloaded videos and computerised questionnaires for learners as a supporting tool especially of topics learners find difficult to understand. But most of the time I use the chalkboard and textbook in my lessons”.*

T01F (School A) and T03F (School B) said that they tended to use the traditional method of teaching making use of it most of the time during their lessons. They however felt that being on the EDTP-SETA ICT programme and going through the programme’s induction process has made them realise how interesting the use of ICT can be to teaching and learning. On the other hand, T02M (School B) and T04M (School B) believed that the integration of ICT is a better method of teaching learners as compared to the traditional method of teaching. T04M (School B) further emphasised that:

*“...the benefit of using ICT is that you save time and normally when using the traditional method of teaching a lot of the time is consumed by writing notes on the chalkboard. With ICT a teacher is able to do more during lessons”.*

The above discussion clearly highlights the varying views of the teacher-participants based on the traditional method of teaching and the use of ICT as a teaching method. The majority of the teacher-participants have highlighted the impact that ICT has on



learner concentration and performance. Even though they have not disregarded the crucial role that the traditional method still plays on teaching and learning, they recognised the virtual role ICT has on modern teaching and learning.

### **Sub-theme b: Professional development and subject content knowledge using ICT**

Living in modern digital times means that teachers can learn from each other from anywhere in the world on how to present lessons on specific subject content. The enormous data available over the internet enables the teacher to outsource more information than just relying solely on information provided in the prescribed school textbook. The teacher-participants were asked on whether they used the internet to develop their professional or subject knowledge.

T02M (School A) established that:

*“the interesting thing about educational videos is that they are not just informative to the learners but to me as well. Through these educational videos I have learnt ways of teaching certain topics better and being able to interpret them in a manner that learners can easily understand”.*

T03F (School B) shared that:

*“...I joined the physical science WhatsApp group consisting of all the grade 10 physical science teachers in the Potgietersrus circuit. The interaction through this social network is effective because I get to learn from other teachers who are more experienced than me in the field of teaching physical science. On the group we share relevant information relating to the subject content and we even advice each other on teaching certain topics, this has helped me develop professionally as well as gaining confidence as a teacher”.*

Siemens (2008:2) describes this as a network of learning, where teachers use ICT to engage with other teachers in the same school, neighbouring schools or other countries in which they disseminate and share knowledge of their subject content and clarify issues that they may be encountering.

T06M (School C) maintained that *“I barely use the internet, the only time I use the internet is when I search for previous question papers from the Department of Basic*

*Education portal*". In Chapter 2 Section 2.2.3, Harasim cautions that teachers who use ICT in making traditional didactic teaching much easier and more convenient are missing out on opportunities to introduce better, different or more advanced ways of learning.

It emerged from the above responses that the teacher-participants had differing experiences with the use of ICT. It was brought to light that teachers can learn from each other through social networking, and that learning through ICT is not only restricted to physical interaction.

### **Sub-theme c: Learner assessment and ICT**

This sub-theme refers to the findings that emerged from teacher-participants' responses in relation to integration of ICT to conduct learner assessments. Mdlongwa (2012:4) indicates that using ICT to conduct learner assessments assists learners in becoming creators of their own knowledge in their own light. Furthermore, learners who continue to use ICT in doing their assessment tasks such as projects and assignments, begin to cultivate a culture of personal information management, independent learning and working without supervision. Teacher-participants were asked on whether they gave their learners tasks which prompted the use of the internet.

T03F (School B) and T04M (School B) acknowledged that they sometimes gave their learners tasks that prompt the use of the internet but preferred to give them as group assessments. T04 (School B) said: *"I prefer to give my learners tasks as a group because most of the learners at the school are from less privileged backgrounds and do not have any access to ICT tools or the internet"*.

T02M (School A) recognised that:

*"...it is challenging to give learners tasks that prompt them to use the internet because not all learners have access to computers, cell phones or the internet; this becomes a setback in itself. The other issue is that due to the lack of sufficient ICT tools at the school and the computer-lab being restricted for grade 12 learners worsens the challenge as I cannot let the learners use the computer-lab to do their tasks"*.

On the other hand, T01F (School A) reported that:

*“...I have not given my learners tasks that prompt the use of the internet, reason being that I teach Mathematics and Mathematical Literacy. These subjects revolve around solving equations and formulas, in that sense I find it unnecessary to give learners tasks that require internet usage when they can find the information in the textbook”.*

T05F (School C) explained that she preferred to give learners assignments or projects that required them to do research over the internet. Furthermore, requesting that the learners type their assignment or projects instead of handwriting them, she believes that this develops their typing skills which will benefit them in the future. T06M (School C) indicated that *“I have never given learners tasks that prompt them to use the internet, I always stick to the textbook in every task that I give my learners or I use previous question papers”.*

The interview brought to light the point that socio-economic problems accompany lack of sufficient ICT tools in schools and heighten the challenge of the effective integration of ICT. Teacher-participants had to take into consideration the socio-economic backgrounds of their learners, limiting their intentions to utilise ICT for assessments.

#### **Sub-theme d: Benefits of ICT for teaching and learning**

Livingstone (2012:3) explains that the intention of the Basic Department of Education was to integrate ICT in the South African educational system as a way to enhance teaching and learning. However, there are conflicting views and opinions amongst scholars on the benefits that ICT has on teaching and learning as well as the performance of learners in the classroom (Noor-UI-Amin, 2013:7). In this theme, teacher-participants were asked whether they regard the use of ICT having any benefits to teaching and learning in the classroom. Teacher-participants' responses differed and the majority responded based on their experience with having to integrate ICT in their lessons.

T02M (School A) stated that

*“...I find the use of ICT in teaching and learning to be beneficial because gaining the concentration of learners can be a challenge but ever since I decided to*

*integrate ICT in some of my lessons, the concentration level of my learners has increased as well as the interest in my subject. Even the learners that normally do not pay attention during my lessons become intrigued and concentrate more”.*

T03F (School B) and T05F (School C) agreed that the integration of ICT in the classroom is beneficial to both the learners and the teachers. T05F (School C) emphasised that *“the performance of my learners has improved remarkably and the interest learners have towards the subject I teach has improved”.*

On the other hand, T06M (School C) argued that *“I would never say that integrating ICT is beneficial or not because I have never implemented it in my lessons”.* T04M (School B) added that:

*“...though I have never used ICT in my lessons but from what I have observed from teachers who are able to integrate ICT in their lessons, I do agree that ICT integration is beneficial to teaching and learning but with lack of ICT tools it can be hard to recognise”.*

#### **4.2.2.4 Theme 4: ICT integration challenges experienced**

Table 4.2 revealed the four subthemes that emerged under this theme. In this, teacher-participants were asked to discuss the challenges they faced that could hinder the effective integration of ICT in the classroom. The following sub-themes emerged from the responses of the teacher-participants: ICT infrastructure, ICT training and support, ICT integration to subject content and traditional methods of teaching. These sub-themes are each discussed below:

##### **Sub-theme a: ICT tools**

In Chapter 2 Section 2.2.3, Salam *et al.* (2018:258) determine that the financial constraints experienced by developing countries, compels the government in those countries to prioritise the educational budget on the rehabilitation and maintenance of school buildings and teachers' salaries. One of the challenges that the teacher-participants experienced was the lack of ICT tools available in their respective schools.

When asked of the challenges experienced with not having sufficient ICT tools at the school, T02M (School A) posed that:

*“...there are seven teachers in the maths and science department and only one laptop is allocated to the department. Not all the teachers have access to personal laptops, there are times were teachers want to use the departmental laptop at the same time and that creates a challenge on who should use the laptop before the other”.*

On the other hand, T03F (School B) explained that

*“...our school has a large enrolment of learners; the minimum amount of learners you can find in a class is 65 learners. The school has only one computer-lab with 10 computers in it, it becomes virtually impossible and frustrating for a teacher to accommodate all the learners in a computer-lab that has limited resources”.*

T04M (School B) observed that:

*“...sometimes the problem of schools not integrating ICT is not only on the poor provision of ICT from the education department but due to lack of commitment from leadership in the school. Our school does not have a lot of ICT tools available and some require software update but when our school leadership is informed about this there is nothing done”.*

Ekwe *et al.* (2016:2) suggest that leadership is often an important factor in the successful integration of ICT into the schools' instructional practices and curriculum (see Chapter 2 Section 2.3.2). T06M (School C) proposed that:

*“...not all the computers from the computer-lab are totally broken; some of them just need to be repaired. Suggestions have been made to leadership about repairing the computers but I feel that the school does not financially prioritise the provision and maintenance of ICT”.*

School leadership that believes that the integration of ICT as a tool to enhance teaching and learning will more likely ensure that teachers are motivated to integrate ICT in the classroom, unlike school leadership with an differing view that is less optimistic about the way ICT can enhance teaching and learning.

### **Sub-theme b: ICT training and support**

In Chapter 2 Section 2.3.3, Dzansi and Amedzo (2014:347) suggest that once computers have been set up in schools, they need regular support and maintenance as this is a specialised role that should not be left solely to the teachers. Based on the responses of the teacher-participants during the interviews, the concern that emerged was that teachers were not receiving proper ICT training and support from the Department of Education. Teacher-participants were asked about the challenges they encountered in integrating ICT in their responsibilities due to lack of ICT training and support.

T06M (School C) stated that it is difficult for older teachers that have not been trained on how to use ICT to suddenly start implementing ICT in their lessons. It is vital to mention that ICT training is crucial for all teachers, particularly older teachers who are not from digital age. T04M (School B) expressed the concern that:

*“...the problem with the provision of ICT training program by the EDTP-SETA, WITS and the Department of Education is that it is provided in a form of a bursary. All teachers deserve to be trained in order to develop the ICT skill required to use ICT in the classroom”.*

When asked whether the ICT trained teachers from EDTP-SETA programme utilised the ICT skills they had gained, T02M (School A) protested that:

*“...the ICT trained teachers have not shared with other teachers on what they have learnt at the program. None of the teachers make use of the ICT skills they have gained for teaching and learning purposes”.*

Thus, it emerged from the interview that the lack of training and continuous support affected the attitude that teachers had towards the integration of ICT. In Chapter 2 Section 2.3.3, Chigona and Chigona (2010:3) caution that lack of confidence, anxiety and the fear of embarrassment in front of learners who are more technologically savvy than their teachers, forms part of some of the reasons behind teachers' reluctance to integrate ICT in teaching and learning. Based on the responses of the teacher-participants, they emphasise that ICT training is crucial for all teachers as this will empower teachers to confidently use ICT without any fear.

### **Sub-theme c: Traditional methods of teaching**

When discussing the challenges, the teacher-participants experienced with integrating ICT, two of the teacher-participants admitted that they were familiar with teaching learners in the traditional way and that they felt comfortable with this traditional way of doing things. By this, they meant using the textbook and chalkboard in every lesson. The sense of fear involved in moving into a new digital era of doing things emerged from the discussion with the participants.

T06M (School C), who has been working as a teacher for thirty years, explained that he did not feel comfortable teaching his learners using ICT for example, the interactive whiteboard and a data projector. He stated that:

*“...I am aware that learners are fond and intrigued by this ICT tools but I find them very complicated to use and to figure them out. I have always been bad with using technology and even if I try to use ICT in my lessons, it will just be disastrous as I also fear that I would embarrass myself in front of my learners. The traditional method of teaching forms part of my comfort zone because I feel it is suitable for my ways of teaching and being creative in my lessons”.*

T05F (School C), who recognised the value of integrating ICT in lessons, admitted that though she had been slowly trying to make use of ICT in her lessons, she acknowledged that it was still partly challenging for her to use it.

It emerged from the responses discussed above that two of the teacher-participants experienced a sense of fear with having to integrate ICT in the classroom and also as a result of having to move away from what they were comfortable with and used to do. Even though they acknowledged that there were benefits to integrating ICT in the classroom for teaching and learning purposes, they did admit that it was not easy to move away from the traditional of teaching.

#### **4.2.5 Theme 5: Recommendations for the effective use of ICT**

Table 4.2 indicates the sub-themes as Recommendation and guidelines, ICT intervention and support. In this theme, teacher-participants made suggestions and recommendations that the Department of Education should consider in order to solve the challenges experienced in the schools regarding the integration of ICT. The

research study that considers the recommendations of the participants assists in solving the research questions.

### **Sub-theme a: Recommendations and guidelines**

In this theme, teacher-participants were asked on whether they had any recommendations or guidelines on the integration of ICT in the classroom for teachers who are not interested in integrating and the schools.

T02M (School A) and T04M (School B) felt that the Department of Education should provide sufficient ICT tools in the schools. T02M (School A) suggested that:

*“no school is the same as the other; they differ in the number of teachers and enrolment of learners, the provision of ICT tools by the Department of Education should be enough to accommodate all the teachers and the learners”.*

T03F (School B) added that:

*“having only one laptop allocated to each departmental stream is not enough; this causes teachers to become reluctant to use the laptop when they think of the whole process of having to request for it first as well as the possibility of not having access to laptop”.*

T04F (School B) recommended that the school management team (SMT) should play a crucial role in ensuring that they provided ICT tools that are effectively utilised. She further mentioning that a school management team that is optimistic about what the revolutionary change ICT can have on teaching and learning, can positively affect the way teachers view ICT.

T05F (School C) commented that:

*“...regulating a school-based ICT policy would assist in changing the perception that teachers have towards the integration of ICT. I feel that the ICT policy will also act as a guideline on how the school should manage and maintain available ICT tools in the schools”.*

T01F (School A) felt that the school management team does not have any idea on how to control and manage ICT related issues, but if the school had a policy that all



teachers were made aware of and agree with its regulations, then it would be beneficial to the school.

The above discussion with the teacher-participants clearly highlighted that they had extremely strong views on the lack of sufficient ICT tools and how the shortage of ICT tools in the schools affect the attitudes of the teachers in integrating ICT. In addition, they believed that schools should implement the ICT policy to guide teaching and learning and teachers should be provided with the necessary support from the school management team.

### **Sub-theme b: ICT intervention and support**

In this theme, teacher-participants made recommendations of the ICT interventions and support they felt their schools should be provided with by the Department of Education.

T05F (School C) suggested that:

*“...ICT training is very crucial to all teachers especially those that have never received any form of ICT training, that is why I recommend that ICT training be introduced to all teachers in the form of workshops”.*

T01F (School A) believed that:

*“...teachers who are ICT trained will feel more confident in their ability to ICT for teaching and learning. The provision of ICT training by means of a bursary, like the one provided by EDTP-SETA, has more disadvantages than advantages. Teachers who are eager to be trained end up not being selected for the ICT training and some lose faith in reapplying after the first failed attempt of not being selected for the training”. On the other hand, T04M (School B) conquered that “the provision of ICT by means of a workshop done on a regular basis, for example, twice a month would be effective. I strongly believe that ICT training through workshop would allow all the teachers to be trained”.*

T06M (School C) suggested that:

*“our school has old computers and keyboards that are non-functional, just lying around in one of the classes we once used as the computer lab. Without proper*

*software updates and technical support, the computers become slow, infected by viruses and eventually stop working. I feel that the Department of Education should take such issues into consideration because ICT tools change with time and so does the software”.*

T02M (School A) proposed that:

*“our school does not have a lot of ICT tools but the ones we have can make some difference if utilised effectively. In most cases, teachers rely on the management to implement certain things. If the management does not take ICT as a useful tool for teaching and learning then the integration of ICT at the school becomes dire. I recommend that the Department of Education should intervene through supervisory measures at least once a month and school managers are guided on the skill of ensuring that they have a positive attitude towards ICT. The intervention from the Department of Education would make a huge difference than just merely providing the schools with ICT but no further intervention”.*

It emerged from the interviews that teacher-participants were clearly of the opinion that it was pivotal for teachers to undergo ICT training on a regular basis in the form of a workshop to refresh their skills as they believed that this type of training would be more useful than once-off training. They further highlighted the significance of continuous technical maintenance of the ICT tools.

In addition to the semi-structured interviews, for the purpose of triangulation I conducted non-participant observations as a method of data collection. Data collected during the observation is discussed in the next section.

### **4.3 NON-PARTICIPANT OBSERVATION**

I engaged in non-participant observation by observing the environment and behaviour of the participants in the selected schools. Non-participant observation assisted me in gaining an in-depth understanding as well as determining the extent to which ICT is used in the schools considering the quantity and quality of the available ICT tools. During the observation, I made use of note taking with the purpose of analysing and comparing data obtained from interviews and thematic analysis. I made use of the observation checklist (see Appendix H) which assisted me on what to observe at the schools.

I had selected three schools from the Potgietersrus circuit which I observed, I labelled the schools as School A, School B and School C. T01F and T02M are from school A, where as T03F and T04M are from School B and finally T5F and T06M are from School C. All the observed schools are government schools.

The first school I observed was School A. The first thing I observed from the school was the computer-laboratory, which was locked and the key stored in a locked drawer in the principal's office. The computer-lab had 15 desktop computers with desks and chairs allocated to each computer; there was also an interactive whiteboard and an overhead projector. I observed that the computer-lab was insufficient to accommodate more than 20 learners. Based on the enrolment of more than 1000 learners at the school and with classes containing no less than 60 learners, it would be a challenge to accommodate a class. All the computers, the interactive whiteboard and the overhead projector were functioning properly. The school had Wi-Fi which confirmed the response of T01F. However, I noticed that the Wi-Fi connection was very slow and took a long time to access information from the internet. The admin office, which is close to the principal's office, had one desktop computer and two laptops. The four laptops which were allocated to the schools' departmental streams were placed in a locked store room in the principal's office.

The second school I observed was School B. I observed that the school was a big school which consisted of 35 teachers and an enrolment of 1325 learners. Just like the first school, I observed the computer-laboratory of the school first. The key to the computer-lab was placed in a locked drawer belonging to T03F, as she had the responsibility of looking after the computer-lab. The laboratory consisted of ten desktop computers, one interactive whiteboard and an overhead projector. There was also a chalkboard in the laboratory, as I was made aware that computer-lab was a Grade10 classroom before it was turned into a computer-laboratory. All the ICT tools in the computer-lab were functioning well; however, the room was small and based on my observation, would probably only accommodate a maximum of 15 learners. This was a setback considering that the school had a minimum of 65 learners in a class. The school had Wi-Fi connection and just like School A, the school had a problem with slow internet connectivity. The school had two mobile whiteboards which were placed in the Grade 12 classes because Grade 12 teachers preferred to use them more than lower grade teachers. The administrator's office had just one laptop and one desktop

computer, contradicting the response by T04M that there were three laptops. The administrator's office also had a printer which was wirelessly connected to the laptop in the office. Teachers were able to print and make copies from the photocopy room, as they did not have access to the printer in the administrative office. The photocopy room had four photocopy machines, but only three of them were working. There also was one printer, confirming the response of T04M.

The final school I observed was School C. The school had 15 classrooms consisting of three classes in each grade, from Grades 8 to 12. Confirming the response of T06M, all the classes had smart-boards and overhead projectors. School C was not as big in terms of the enrolment of learners and there were 25 teachers allocated to the school. The school did not have a computer-lab but I observed that the ten computers were placed in a room with old unused textbooks. The administrator's office had two desktop computers, one laptop, a printer and one photocopy machine, which were only made use of by the admin clerks. The only computer and printer available to the teachers were placed in a staff room. The school had two separate WIFI connections; there was one that covered the administrator's and principal's office and the other one covered that teacher's staff rooms.

The three selected schools had varying characteristics such the enrolment of the learners, number of teachers and the size of the schools. Through the observation I was able to learn the common challenges experienced in the schools. Common challenges experienced include schools not having sufficient ICT to accommodate all the learners and teachers as well as the poor connectivity.

#### **4.5 SUMMARY OF FINDINGS**

It is evident from the interviews that every teacher-participant had his/her own unique view or perception regarding ICT in the schools and the challenges that hinder the effective integration of ICT for teaching and learning purposes. The relevance of integrating ICT is to prepare learners to be active participants in the information society, to make teaching and learning more relevant, innovative and convenient. Though the integration of ICT is still at its infancy, there are teacher-participants who are more skilled in the use of ICT than others, even without the provision of ICT training from the Department of Education. The data collected from conducting the interviews, revealed that lack of ICT skills created a sense of feeling inferior for some teachers

and a fear of being humiliated in front of learners who are technologically advanced. Findings revealed that teacher-participants are aware of the importance of introducing ICT training to all teachers and felt that the ICT training should be provided regularly through the form of a workshop instead of a bursary. Teacher-participants felt strongly about the continuous support and maintenance of ICT tools from the Department of Education. Though the teacher-participants were not fully aware of the ICT policy, they however recommended that the school management team should take into consideration the pivotal role that the school-based ICT policy would play. It emerged from the findings that inadequate provision of ICT tools is a challenge experienced by all the three selected schools; leading to some teachers having to use their personal laptops whenever they wanted to integrate ICT in their lessons. Two of the schools had laptops, but it emerged from the findings that priority in the usage of the computer-labs was given to learners in the FET and Senior Phase (which is Grades 10 to 12). Although all three the schools had WiFi connections, it emerged that two of the schools experienced a problem with connectivity.

#### **4.6 CONCLUSION**

The chapter presented a detailed account of the findings that emerged from the semi structured interviews and non-participant observation. The chapter first dealt with the presentation of the empirical findings as well as the synthesis of data collected into themes that assisted in answering the research question. This chapter discussed the main themes and sub-themes that emerged from the research questions. The first theme included the teachers' perceptions on the integration of ICT in the classroom in which teacher-participants revealed the available ICT tools in their respective school, level of ICT skills and training as well as perception of integrating ICT in the classroom. The theme on ICT policy to guide teaching and learning emerged. As regard to this theme the teacher-participants expressed their view on the vision of Department of Education addressed in their ICT policy as well as their knowledge of the school-based policy. The theme related to exploring the primary purposes of ICT integration emerged. Themes relating to the challenges that teachers experienced with having to integrate ICT were identified, which included lack of sufficient ICT tools, lack of skills and ICT training as well as the fear of teachers to move away from the traditional method of teaching. The chapter concluded with an explanation of the themes in respect of the recommendations that the teacher-participants made regarding the

integration of ICT in the classroom for teaching and learning purposes, namely, recommendations and guidelines and ICT interventions and support.

The next chapter concludes the research with a summary; it draws conclusions and offers recommendations.

## **CHAPTER 5**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 INTRODUCTION**

This study's previous chapter dealt with a discussion and analysis of the collected qualitative data. Certain themes and sub-themes emerged from the interviews that were covered in that chapter. The non-participant observation was also discussed.

This chapter concludes the study by providing an overview of the research. Firstly, the summary of the literature review is discussed, after which the findings from the empirical study follows. Thereafter, there is a section on the synthesis of the research findings. The synthesis aimed to highlight and compare any major similarities and contradictions that this study's literature review and the empirical study encountered. This study's limitations are stated and lastly, the study concluded with recommendations and suggestions for further research.

#### **5.2 SUMMARY OF THE LITERATURE REVIEW**

The literature review in Chapter 2 dealt with the connectivist theoretical framework which underpinned this study (see Section 2.2). I found the connectivist theory suitable for this study because it is a theory for the digital age and it supports the integration of ICT as it views teaching and learning not being restricted to the classroom but can be achieved through a social network from anywhere in the world through the use of ICT (Siemens, 2004).

As discussed in Section 2.2, the connectivist framework, which served as the theoretical lens of the study, views learning as a network phenomenon influenced by technology and socialisation (Siemens, 2006). The study intended to explore strategies that positively influence the manner in which teacher-participants viewed ICT as a tool to enhance teaching and learning. From the insights gained in the literature study, it is noted that the connectivist theory provided information which endorses ICT usage in schools and compels teachers to integrate ICT in the classroom and their pedagogical practices. There are other theories discussed in the study that developed prior to the connectivist theory which influenced the development of the Connectivist theory (see Section 2.2.1). The three theories addressed in the

study included the behaviourist learning theory (Section 2.2.2.1) which believes that learning happens through repetition of assessments until the favourable outcome or understanding is achieved (Harasim, 2012:10). Furthermore, the behaviourist teacher plays the dominant role and the learner becomes the passive participant. The second theory is the cognitivist learning theory (Section 2.2.2.2) describes learning as a mental activity than entails internal coding and structuring of information by the learner, using what Piaget (1983) refers to as 'schemas'. The final theory discussed was the constructivist theory (Section 2.2.2.3), which believes that learners have to be active participants in their own learning so it is up to the constructivist teacher to ensure that learners become knowledge constructors who will have the ability to identify, analyse, think critically about their views and those of other learners as well as the ability to solve problems (Shelly *et al.*, 2010:379). The constructivist learning theory has certain pedagogical beliefs similar to the connectivist theory; hence they believe that learning can be achieved through social interaction and networking.

Chapter 2 also gave an in-depth overview of the literature about ICT from an educational perspective (see Section 2.2.3) and how it can be integrated with the aim of preparing learners to be active participants in the information and knowledge society. It also addressed the potential benefits that ICT has to teaching and learning, as well as supporting the Department of Basic Educations' decision to implement ICT in the South African educational system as a tool to enhance teaching and learning. The chapter evaluated the principles of the connectivist theory, highlighting the meaning of learning and knowledge from a connectivist context (see Section 2.2.4). The connectivist theory was evaluated taking into consideration critiques from other scholar regarding the theory (see Section 2.2.5).

The reviewed literature explored the different types if ICT tools used for teaching and learning purposes (see Section 2.3). This section aimed at revealing the holistic overview of ICT in the educational setting. It also discussed the utilisation of the digital classroom as well as the use of ICT around the globe taking into account the steps and efforts by the selected countries in having to integrate ICT in their educational systems particularly at secondary school level. Furthermore, the chapter also presenting the manner in which ICT can be utilised in a digitally enhanced classroom (Section 2.3.1). The literature highlighted the significance of ICT usage in schools



prioritised by educational department all over the world (Section 2.3.2). The cited countries included Nigeria and Chile. These countries were compared based on planning and implantation of ICT integration in their respective schooling systems. The literature also reviewed the challenges faced by schools in developing countries that hinder the effective integration of ICT in the classroom (Section 2.3.3). Moreover, the potential of ICT to enhance teaching and learning was discussed (Section 2.3.4) by creating a learner-centred pedagogy which allows learners to be actively involved in learning activities as well as providing opportunities to plan their learning at their own pace (UNESCO, 2015).

The presence of ICT policies and the effective planning and implementation thereof is of importance for the effective use of ICT in the school environment. Section 2.4 explored ICT in education policies of USA, Tanzania, Kenya and South Africa. The purpose was not to compare the selected countries, but to establish how these countries implemented the ICT policy in their educational systems and some of the setbacks they have experienced. Furthermore, it highlighted the potential of ICT to change the way teaching and learning takes place.

### **5.3 SUMMARY OF THE EMPIRICAL STUDY**

This section consisted of a brief section on the research methodology, followed by a summary of the findings from the empirical research, which is discussed below.

#### **5.3.1 Research Methodology**

As mentioned in Section 3.2, the research methodology is the core value of the study, therefore must give sense to the study through its selected methods.

This chapter had sections that defined the justification for gathering, storing and analysing data, with the purpose of answering this study's five research questions. I made use of the interpretivist paradigm for this study as it assisted me in getting rich understanding of the life-world experience of the teacher-participants (see Section 3.3.1). The research approach that underpins this study is the qualitative research approach, I made use of this qualitative research approach as this approach gave me the best opportunity to understand the innermost deliberation of the lived experiences of the teacher-participants of this research study (see Section 3.3.2).The research

design elaborated the phenomenological case study which were used as this study's empirical research type (see sections 3.3.3).

Section 3.3.4 highlighted the methods applied in this study for the collection of data. Concerning the selection of participants, six teacher-participants were purposefully selected for the study based on their level of teaching experience within the educational system, meaning the number of years that the teacher-participant has been teaching as well as the subject stream and grades they teach (see Section 3.3.4.1). In Section 3.3.4.2, I described the data collection methods applied in this research study. Furthermore, I explained the two data collection methods applied for the purpose of this study, which were the semi-structured interviews and the non-participant observation. The teacher-participants were interviewed using semi-structured interviews (see Section 3.3.4.3) which were audio-recorded and then transcribed. For the purpose of triangulation, I made use of the non-participant observation which was done after school hours in order not to disturb lessons (Section 3.3.4.4). Before conducting the interviews with the teacher-participants I made use of pilot testing in order to test the interview guide as well as determine whether the questions resulted in data that would answer the research question (see Section 3.3.4.5). Data analysis discussed how I organised and analysed the collected data after it had been transcribed (see Section 3.3.4.7).

The interview guide was prepared in advance before sending the consent form to the teacher-participants. Trustworthiness was covered in section 3.4. Subsequently, credibility (Section 3.4.1), transferability (Section 3.4.2), dependability (Section 3.4.3) and Confirmability (Section 3.4.4) were covered collectively in this section. Finally, a section presenting the ethical measures (see Section 3.5) detailed how the ethical measures for all the different stages underpinned this study and it was explained how they had been dealt with throughout the study. The ethical clearance was obtained from both the CEDU and UNISA to conduct the research study and permission from the Circuit manager was obtained in order to access the selected schools for the study. Following Babbie's (2010:64) cautionary advice, it is essential and fundamental for the researchers to know what is appropriate and improper conduct throughout the scientific enquiry is. The next section discusses the findings derived from the empirical research.

### 5.3.2 Findings based on the Empirical Research

The semi-structured interviews and the non-participant observation informed the study and all the data were collected against the backdrop of the research objectives of the study. The data collected indicated that there were significantly varying views and perceptions by the teacher-participants regarding ICT in the educational setting.

The themes identified in this study were discussed in Chapter 4. The various main themes that emerged in Chapter 4 were dealt with in section 4.2.2.1 to 4.2.2.5. These themes emerged from the teacher-participant's interview responses on their perception regarding the integration of ICT as a tool to enhance teaching and learning.

The teacher-participants' responses towards the first theme, *teachers' perceptions on the integration of ICT in the classroom*, from the interviews, teacher-participants viewed the integration of ICT as a way to make teaching and learning more convenient and a tool to make a move away from the traditional chalk-and-talk method of teaching. They highlighted that ICT integration is beneficial when it comes to teaching subject content that learners find difficult to understand and subjects that include a lot of theory. Teacher-participants stated that by downloading education videos relating to the subject matter, not only benefits the learners but more often assists teachers on the improvement of teaching certain topics. Teacher-participants perceived the integration of ICT as an effective tool to enhance teaching and learning, particularly as learners' levels of concentration and participation improves when ICT integrated in the classroom.

The second theme *the teachers' perception of the ICT policy to guide teaching and learning* (see Section 4.2.2.2) revealed that all the teacher-participants are of the opinion that the development of a school-based policy was significant to ensure that implementation of ICT in the teaching and learning process is guided. The South African education policy states that "All South African learners must be ICT capable by 2025/2030" (RSA, 2004), however, it seemed that many teacher-participants were not aware of an ICT policy, whether from the Department of Education or a school-based policy. The teacher-participants believed that the school leadership should ensure that teachers are aware of the ICT policy and that the policy should be based on each school's individual ICT needs and availability.

The third theme was *primary purposes of ICT integration* (see section 4.2.2.3). From the lecturer-participants' interviews, it emerged that ICT integration challenged the continuous existence of the traditional method of teaching. Unlike the traditional method of teaching that relies strictly of the chalkboard and textbook, ICT makes teaching and learning much more interesting and convenient to already technologically savvy learners. Though some teacher-participants revealed that most of the teachers were still using the traditional method of teaching, they had yet to understand the ways in which ICT can make teaching and learning more interesting, learner-centred and appropriate to cater for the large enrolment of learners currently found in public schools. Only one school, School C, had smart boards and overhead projectors in all its classes, from Grades 8 to 12 in contrast to the other two schools, School A and School B, where their classroom only had chalkboards, a number of limited interactive whiteboards and mobile whiteboards.

The fourth theme *ICT integration challenges experienced* (see Section 4.2.2.4) revealed a number of challenges. Teacher-participants revealed that they are aware of the positive contributions that ICT have on teaching and learning, but due to insufficient provision of ICT tools, lack of ICT skills and training, proper integration of ICT is challenging particularly in rural schools (see Section 4.2.2.1). Many schools do have ICT tools available in the schools which included laptops, desktop computers, smart boards, interactive whiteboards, and overhead projectors. However, only two schools, Schools A and School B had designated computer-labs but it emerged that the space and desktop computers were insufficient to accommodate the large enrolment of learners in the schools. One school, School C had had a computer-lab, but due to financial constraints, the school found it to be expensive to maintain. It was also noted that many computers were not repaired, but just stored in a class containing old textbooks, which means that schools were not equipped with technical staff members who would ensure that ICT equipment was working and maintained.

The fifth and final theme, *recommendations for the effective use of ICT* (see Section 4.2.2.5), offered recommendations such as ICT technical support and that ICT training should be accessible to all teachers through workshops ensuring that all teachers are on board with ways of integrating ICT. Though all the schools had a Wi-Fi connection, teacher-participants from School A and School B complained about the problem with slow connectivity, as aspect confirmed while conducting observations. Furthermore,

some teacher-participants recommended that it would be essential if the Department of Education assigned people to visit the schools individually to find out what challenges the schools faced. Teacher-participants also recommended the need for consistent maintenance of software and upgrades relating to ICT enhancement of teaching and learning.

It did appear from my observation, that the three younger teachers were interested in the topic of study and found it a platform to voice the challenges that they faced in implementing ICT in the teaching and learning process. Nonetheless, the majority of teacher-participants were positive regarding ICT integration in their schools and were eager to show me around as well as airing their concerns. However, one older teacher-participant tended to have a negative attitude towards ICT revealing that ICT is not for him.

The next section discusses the synthesis of the research findings.

#### **5.4 SYNTHESIS OF THE RESEARCH FINDINGS**

Having discussed the literature review and data collected, the similarities and contradictions that were discovered in the findings are discussed in this section. The apparent primary similarity between the literature review and the findings from the empirical study relates to how generally, the teachers perceive the integration of ICT as a tool to enhance teaching and learning. The teacher-participants believe that the integration of ICT can be an effective tool to enhance teaching and learning if the schools are equipped with relevant and sufficient ICT tools and that teachers undergo ICT training and become skilled at using ICT in their teaching (Section 4.2.2.1). Herselman (2003), Jedeskog (1999), Kante and Savani (2003), Rae *et al.* (2006) and Ward (2003) all confirm that integrating ICT in a manner that enhances teaching and learning cannot be achieved on its own but should be accompanied by ICT skilled teachers as well as adequate personnel that have the appropriate skills to provide technical support (Section 2.3.3).

Regarding the ICT policy as a guide to teaching and learning, the literature revealed that the Department of Education (DoE) developed the ICT policy with the aim of expanding the use of ICTs to prepare South Africa to compete in the global economy (DoE, 2004). Vandeyar (2013:4) emphasised that the e-Education policy places the

primary responsibilities at school level on management and administrators to promote the use of ICT, with the realisation that ICT is a 'transformative tool' for education (Section 2.3.3). The findings from the empirical research, revealed that teacher-participants were not aware of the Department of Education's ICT policy or the use of the school-based ICT policy (section 4.2.2.2), which does not align with literature. However, the teacher-participants acknowledged the pivotal role that the ICT policy could play in schools regarding the integration of ICT to guide teaching and learning as well as effective ways of dealing with ICT-related matters.

The empirical findings based on teacher-participants' perception of the primary purpose of integrating ICT, revealed that teacher-participants believed that the integration of ICT in the classroom helps in getting the attention of learners and preparing them to be active participants in the information society. In addition, teacher-participants are aware that integrating ICT for teaching and learning purposes becomes more effective than the traditional method of teaching, as ICT does not confine teaching and learning to just the classroom. Even though some teacher-participants sometimes gave learners assessments that would prompt them to use the internet, poor social backgrounds of some learners and little access to ICT tools, limited the manner in which they could completed the assessments which prompted the use of working in groups (Section 4.2.2.3). Kop and Hill (2008:1) highlight the importance and relevance of the connectivist theory based on its socio-technological nature which allows teachers and learners to connect and form networks of learning communities and platforms for accessing, interaction, sharing, thinking and distribution of current knowledge (Section 2.2.1). The lack of social networks between learners and teachers, contradicts the principle of the connectivist theory which believes that learning does not reside in one location and that learning may reside in non-human appliances.

Shiohira *et al.* (2018:1) acknowledge that keeping up with the latest technology gadgets and their maintenance does require financial capabilities in which developed countries have had the advantage as compared to developing countries (Section 2.2.3). The findings of the empirical study relate to the literature as teacher-participants identified the challenge of not having being equipped with sufficient ICT tools in their schools due to the financial constraints in addition, to the difficulty of maintenance of the available ICT tools within the schools (Section 4.2.2.4). This was further supported

by the observation which illustrated that the available computers needed software update and maintenance and more computers were needed in order to accommodate the large enrolment of learners (Section 4.3). The other challenge that emerged from the empirical study which aligns with the findings of the literature is that some of the teacher-participants are still comfortable in utilising the traditional method of teaching, expressing that they were comfortable with this method of teaching and not really willing to change. This finding is confirmed by Naqvi (2018:32) who found that there are teachers that still fully implement the traditional method of teaching as well as using ICT to support traditional learning methods.

The information above highlights that there are links and contradictions between what was discovered in the literature review and the findings of the empirical study.

## **5.5 CONCLUSIONS IN RELATION TO THE RESEARCH QUESTIONS**

The aim of this study was to understand the perceptions of secondary school teachers from the Potgietersrus circuit in integrating ICT for teaching and learning.

The main research question was supported by the following sub-questions:

- What are teachers' perceptions of ICT policies to guide teaching and learning?
- What are the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning?
- What challenges do teachers experience in the integration of ICT for teaching and learning?
- What recommendations can be made regarding the effective integration of ICT in teaching and learning?

These sub-questions are discussed below:

### **Sub-question 1: What are teachers' perceptions of ICT policies as a guide to teaching and learning?**

In attempting to answer this research question, I referred to the literature review as well as the empirical research findings from the teacher-participants. In Section 3.5, Hawkrige (2006:59) stipulates that the purpose of driving educational policies to ICT in education is to justify the introduction and use of computers and the internet for information processing and electronic communication between individuals and

countries especially in African countries. Furthermore, Hawkrige (2006:59) identified four rationales with the aim of highlighting the importance of the use of ICT in African schools since schools are ideal places for preparing learners for life and for being effective members of the knowledge and information society. Similar to any other policy, whether school-based or from the Department of Education, the ICT policy in education acts as a guideline on how ICT should be managed within the schools and the manner in which ICT related issues should be handled. Schools have to be significantly aware and have knowledge of the ICT policy and what it entails in order to utilise the policy. However, the teacher-participants revealed that though they have knowledge of the role that ICT plays in their schools, they were not informed on the existence of the ICT policy.

The pivotal role that the ICT policy has on education locally and from a global context, motivated the South African Department of Education to develop the e-Education policy which sets out the intention that all learners must be ICT capable by the year 2025/2030 (RSA, 2004). The teacher-participants agreed that there was a possibility of that being achieved, only if the Department of Education dealt with ICT challenges experienced by individual schools, particularly those situated in rural areas. Some teacher-participants even suggested that the Department of Education should start by ensuring that in each and every school, teachers together with the school management team are aware of ICT-related resources and are guided by the ICT policy to ensure that the implementation of ICT enhances the teaching and learning process.

**Sub-question 2: What are the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning?**

Section 2.4.2 cites Dae *et al.* (2010:29) when asserting that countries that have introduced ICT in their educational systems realise that ICT has the potential to develop an educated and lifelong society aimed at demonstrating techniques for the future participation in the information society. Learners, who are exposed to ICT, develop high order thinking skills throughout their educational experiences, by being exposed to numerous technological channels used to obtain information. Aktaruzzaman, Shamim and Clement (2011:117) highlight that it is vital that learners possess these qualities as they are deemed essential in preparing them for their future



workplace in the network society where ICTs are ubiquitous. In Section 2.4.4, Tarus *et al.* (2015) agree that ICT has the ability to transcend time and space in a manner that enables teaching and learning to be accessed at any time of the day without limitations. Teachers can communicate or share educational information with learners outside of the classroom, which makes teaching and learning more convenient as it is not strictly confined to the classroom.

It emerged from the empirical research findings that some teacher-participants acknowledged the crucial impact that ICT has on teaching and learning, with some making use of ICT in their lessons with similar purposes to those described in the literature. Some of the teacher-participants revealed that they not only implement ICT in their lessons whenever given the chance to but give learners tasks that prompt them to use the internet in order to expose these learners to the world of technology. The teacher-participants explained that they used educational videos to show learners especially for subject content that learners found difficult to understand. The teacher-participants revealed that integrating ICT in the classroom such as the use of educational videos assists in holding the attention of the learners. It seems that learners tend to remember and concentrate on what they can see and hear through the use of ICT resources instead of the information being just communicated to them.

The major concern was that the teacher-participants intended to use ICT as part of their everyday teaching and learning but due to lack of sufficient ICT tools in the schools to accommodate the large enrolment of learners, it was nearly impossible to do so. The other challenge is that some learners are from less privileged homes, and do not have access to any technological devices such as computers, tablets, cell phones or the internet. This becomes a challenge if learners are given tasks that toned the use the internet considering that even the schools are not fully equipped with the ICT tools they can access and utilise.

### **Sub-question 3: What challenges do teachers experience in the integration of ICT for teaching and learning?**

The main challenge that teacher-participants raised was not having enough ICT tools at the schools. The limited resources were generally being used for certain grades in the FET Phase as well as the maths and science stream. To solve the problem, some teachers who are eager to integrate ICT in the classroom, would use their personal

laptops for the lessons. However, not all teachers have personal laptops besides the limited ones at their respective schools.

The lack of ICT technical support in the schools was seen as a challenge that the teacher-participants experienced with having to integrate ICT. Many schools have out-of-date computers which no longer functioned and many working computers had software that had not been updated. When computers and other ICT tools give problems, technical support is needed so it becomes challenging for teachers to figure out how to deal with the technical problem. Some teacher-participants develop a sense of fear of integrate ICT in their lessons, because they fear being humiliated in front of the learners if some technical problem was to occur and they are unable to solve it.

Teacher-participants revealed that even though their schools have Wi-Fi connections, they experience challenges with the connectivity due to poor network. One teacher-participant explained that the Wi-Fi connection was so slow that whenever a teacher wanted to download any educational videos for the learners, it either took a long time to download or most of the time they failed to download. All the teacher-participants expressed their frustration at not being able to utilise the Wi-Fi as a beneficial tool in teaching and learning.

#### **Sub-question 4: What recommendations can be made regarding the effective integration of ICT in teaching and learning?**

Teacher-participants recommended that the Department of Education should invest in the provision of ICT tools in all public schools. The Department of Education should ensure that sufficient ICT tools are provided to the schools, to cater for all learners as well as free accessibility for all teachers. Furthermore, they recommended the consistent upgrading of software and maintenance of ICT tools which will enhance the implementation of ICT in teaching and learning. They also recommended that ICT training should be prioritised by the Department of Education, suggesting that it should be provided in the form of continuous workshops instead of a bursary programme. Observations and monitoring of the schools should be executed in order to ensure that the teachers apply the ICT skills gained from the provided training in an effective manner. This method would assist in notifying the Department of Education immediately of the challenges experienced in the schools that hinder the effective integration of ICT.

## **Main research question: What are the Potgietersrus circuit secondary school teachers' perceptions on the integration of ICT in the classroom?**

Teacher-participants viewed ICT as a useful tool for teaching and learning, when utilised properly. Many public schools in the Potgietersrus circuit consist of classes that have a huge number of learners. Integrating ICT in the classroom enables all learners to be accommodated during the lessons and time is not wasted on writing notes on the chalkboard. This gives the teacher more time to focus on ensuring that learners understood what they have been taught.

In this study, teacher-participants view ICT as an essential tool used in gaining the attention of learners. Most learners have a tendency of losing focus or concentration during lesson but at times where ICT is utilised, learners' concentration and participation level increases. Teacher-participants perceived ICT as a useful tool to develop learners in the rural schools academically and technologically, as they become active participants in the information society as the rest of the learners around the globe.

### **5.6 LIMITATIONS**

Noble and Smith (2015:1) mention that the major challenges and criticisms of the qualitative research is that it depends on the researcher findings which are merely a collection of personal opinions subject to research bias. The deciding factor in the research findings depends on the views and perspective of the researcher; this implies that all qualitative research has limitations. Despite the manner in which this study was planned and carried out, it still has its limitations which will be briefly discussed.

The first limitation was related to the sample size of the selected teacher-participants. The number of the selected teacher-participants included six teachers from three schools, taking into consideration that the Potgietersrus circuit has nine schools of which seven are public schools. This serves as a limitation to the study based on the fact that the selected sample size is relatively small, on the contrary, a large number of participants might have contributed to more variety in the findings as well as enriching the findings. Another limitation was the insecurity of some of the teacher-participants when they were expressing their views. This might have had an impact on the way they expressed their views. A further limitation was the availability of the

teacher-participants. Teacher-participants contacted for the interview, where either occupied with Grade 12 catch up lessons for learners or preparations of lessons. An appointment had to be made with each individual teacher on the specific time they would be available to conduct the interview.

Despite the limitations mentioned, I am confident that this study will positively influence the perceptions of teachers regarding the integration of ICT in the classroom as a tool to enhance teaching and learning. In addition, it will offer a contribution to the body of knowledge on the integration of ICTs in the classroom.

## **5.7 RECOMMENDATIONS**

This study's recommendations are based on the themes identified in Chapter 4 Section 4.3. The Department of Basic Education introduced ICT to the South African educational system with the intention to enhance teaching and learning (see Section 2.2.3). Based on the interview and observations carried out in this study, leading to the findings, the study has recommendations that are related to the integration of ICT. Based on the findings of this study, recommendations are made to the Department of Basic Education, school leadership and teachers.

### **5.7.1 Recommendations for the Department of Basic Education**

The study revealed that lack of sufficient ICT implementation is accompanied by teachers' lack of ICT skills which may influence the attitudes that teachers have towards the integration of ICT for teaching and learning. According to Bladergroen *et al.* (2012:107), the realisation of educational innovation through ICT integration in teaching and learning depends on teachers' ICT proficiency in the effective use of ICT. It is suggested that the Department of Basic Education develops a strategic plan that will ensure that all schools have enough ICT tools; the plan can be effective if the schools that lack ICT are identified in each and every province. The recommendation is that unused ICT tools that are not functional should be repaired and those that are not broken are donated to other schools in need. One of the strategic plans that the Department of Basic Education can implement, is the ICT policy regulation as policy plays a vital role in the regulation of activities and gives the directive to practitioners. Apart from schools not being aware of the ICT policy by the Department of Basic Education and what it entails, the ICT policy in education is at odds with what is

realistically happening in the schools. It is thus crucial that the ICT policy takes into consideration the socio-economic status at some South African public schools. It is recommended that the Department of Basic Education regulates policy guidelines that take into account the South African background rather than being crafted in terms of the developed countries which have ICT skilled teachers and the means to successfully utilise ICT. Teachers who are not ICT skilled might feel diffident in the integration of ICT, creating a negative attitude towards ICT. Tella *et al.* (2007:10) explain that insufficient ICT knowledge and lack of technical support are issues that hinder teachers' readiness to integrate ICT in their lessons. The recommendation from the study is that all teachers be provided with proper ICT training and continuous technical support.

### **5.7.2 Recommendations for School leadership**

The study suggests that school leadership be trained separately from the teachers and be equipped with the proper skills and strategy on how to manage ICT in their respective schools. School leadership has the managerial strength to ensure that ICT becomes part of their school's curriculum and teachers fully integrate ICT in their lessons.

Research findings revealed that the existing challenge concerning lack of school-based ICT policy and plans, results in the non-use of available ICT facilities. This study recommends that school leaderships should ensure that the integration of ICT in the schools aligns with the ICT policy and that teachers are also involved as well as knowledgeable on the school-based ICT policy. This means that when formulating the ICT policy, school leaders have to involve the teachers as a way of developing an understandable policy and a clear implementation plan that lays out the school's objectives for integrating ICT.

### **5.7.3 Recommendations for Teachers**

Teachers need to be enlightened about the significance of integrating ICT in 21<sup>st</sup> century teaching and learning. Most learners nowadays are knowledgeable about technology and it is vitally important for teachers to combine the technology they enjoy and the education they are expected to receive. Though from a realistic point of view, many teachers lack ICT skills due to never being trained to integrate ICT in teaching

and learning. The study recommends that teachers allow themselves to learn from their learners on how to use ICT effectively, as this will assist the teachers in gaining the ICT skills and confidence in integrating ICT. The study further recommends that teachers should not rely solely on the textbook and chalkboard method of teaching but consider the use of Massive Open Online Courses (MOOC) which would help improve the teacher's professional development and better knowledge on curriculum related topics.

## **5.8 SUGGESTIONS FOR FURTHER RESEARCH**

This study focused exclusively on teachers' perceptions on ICT integration in teaching and learning in the classroom and there is a need for in-depth investigation of ICT integration by looking at the issues that hinder the effective integration of ICT in teaching and learning within the South African context. The study suggests the inclusion of large samples teachers from various schools in the rural areas within the Limpopo province and similar contexts for further exploration of ICT integration in the respective schools.

The study recommends that further research focus be placed on South African principals' ICT leadership, as the study revealed that most principals were not aware of their roles and influence as ICT leaders and how to manage ICT in their schools. The other finding that needs further consideration is the division between what the ICT policy entails and the realistic implementation in the classroom setting.

## **5.9 CONCLUSION**

The aim of this study was to explore teachers' perception on the integration of ICT as a tool to enhance teaching and learning in the classroom. This chapter provided an overview of this research study, including addressing the aim and objectives of the study. This was backed up by a brief overview of the manner in which the connectivist theory as the theoretical lens of this study was covered, the literature review and the summary of the empirical study. The synthesis of the research findings was also presented. This study highlighted and compared similarities and contradictions that this study's literature review and the empirical study uncovered. This study's research questions formed the basis of its conclusion. In addition, this study's limitations were

indicated. Finally, recommendations and suggestions for further research were indicated.

The major challenge facing this study is issues experienced within the schools that hinder the successful integration of ICT in teaching and learning. These obstacles include insufficient ICT access within the schools as well as unfamiliarity of the ICT policy which may have a negative impact on the way ICT is perceived and utilised by the teachers.

Teachers who were not ICT trained expanded challenges pertaining to ICT integration. The advantage of using ICT for teaching and learning purposes is that it is no longer confined to just the classroom. Moreover, since ICT serves as an additional tool for teaching and learning, it affords learners and teachers an opportunity to enhance their teaching and learning online. This study utilised the connectivist theory as it is a theory for the digital age, emphasising that learners can take control of their own learning, in addition, teachers can shift from the traditional method of teaching and still achieve better learner performance outcomes. Even though this research study only focused on six teacher-participants, it could provide a snapshot of similar challenges or successes experienced by other South African rural schools.

The advantage of ICT is that it can be accessed anywhere and are used across the globe. If utilised to its full potential, ICT has the potential to act as a powerful tool to enhance teaching and learning in the classroom. It is essential that learners are exposed to ICT in order to prepare them to be active participants in the 21<sup>st</sup> century environment.

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# APPENDICES

## Appendix A: Ethical Clearance Certificate



### UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2020/02/19

Ref: **2020/02/19/46755926/08/AM**

Name: Ms MM Sethosa

Student No.: 46755926

Dear Ms MM Sethosa

**Decision:** Ethics Approval from  
2020/02/19 to 2023/02/19

**Researcher(s):** Name: Ms MM Sethosa  
E-mail address: Mahlatsethosa8@gmail.com  
Telephone: 072 866 6144

**Supervisor(s):** Name: Prof, Geesje Van den Berg  
E-mail address: Vdberg@unisa.ac.za  
Telephone: 012 429 4895

**Title of research:**

**Teachers' perceptions on ICT integration in the classroom: A case study of secondary schools in the Potgietersrus circuit, Limpopo Province.**

**Qualification:** MEd Curriculum Studies

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2020/02/19 to 2023/02/19.

*The **low risk** application was reviewed by the Ethics Review Committee on 2020/02/19 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.



3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date **2023/02/19**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

*Note:*

*The reference number **2020/02/19/46755926/08/AM** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,



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



**Prof PM Sebate**  
**ACTING EXECUTIVE DEAN**  
Sebatpm@unisa.ac.za

Approved - decision template – updated 16 Feb 2017

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## **Appendix B: Application to Conduct Research: Circuit Manager**



### **THE CIRCUIT MANAGER**

#### **REQUEST FOR PERMISSION TO CONDUCT RESEARCH**

I, SETHOSA MAHLATSE MPONANA, student no: 46755926 hereby submit my request to conduct research at your school. I am a student at the University of South Africa and am presently enrolled for a Master's degree in Education (specializing in Curriculum Studies) under the supervision of Prof. Geesje van den Berg. My topic is: Teachers' perceptions on ICT integration in the classroom: A case study of secondary schools in the Potgietersrus circuit, Limpopo Province.

The purpose of the study is to determine how teachers feel about the integration of ICT in the classroom as a tool to enhance teaching and learning. My preferred participants for the research study will be two teachers consisting of one male and one female from your institution. Confidentiality and anonymity of all the participants and schools will be maintained, I will ensure that the investigation does not interrupt the smooth running of the school.

For more insight regarding the study, kindly contact my supervisor, whose details are listed below:

**Prof. Geesje van den Berg**

**Chairperson of Department: Curriculum and Instructional Studies**


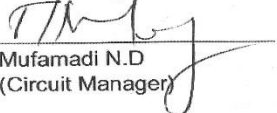
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**AJH van der Wall Building 6-72**

**University of South Africa Tel: 012 429 4895**

**E-mail: [vdberg@unisa.ac.za](mailto:vdberg@unisa.ac.za)**

## Appendix C: Approval to Conduct Research: Circuit Manager

 <p><b>LIMPOPO</b> PROVINCIAL GOVERNMENT REPUBLIC OF SOUTH AFRICA</p> <p>DEPARTMENT OF <b>EDUCATION</b></p> <p>MOGALAKWENA DISTRICT POTGIETERSRUS CIRCUIT</p>
<p>Enq: Masoga M 5<sup>th</sup> March 2020 015 491 6019</p>
<p>To: Ms Sethosa M.M P.O. Box 123 MAHWELERENG 0626</p>
<p><b>SUBJECT: REQUEST FOR PERMISSION TO CONDUCT RESEARCH:</b></p> <ol style="list-style-type: none"><li>1. The above matter refers:-</li><li>2. Potgietersrus Circuit Management acknowledge receipt of your letter requesting permission to conduct research in our selected schools.</li><li>3. This Circuit office grant you permission to conduct research to schools as indicated in your letter.</li><li>4. The Circuit Office always provide support to educators regarding conducting research to our schools.</li><li>5. We further wish you success in your studies.</li><li>6. Thanking you in advance</li></ol>
<p> Mufamadi N.D (Circuit Manager)</p>

## Appendix D: Letter of Consent to Participants (Teachers)



Dear Prospective Participant

My name is Sethosa Mahlatse Mponana, a Master's in Education student at the University of South Africa under the supervision of Professor Van Den Berg, a chairperson in the Department of Curriculum and Instructional Studies. You are invited to participate in a research about teachers' perception on Information and Communication Technologies (ICT) integration in the classroom. The purpose of this study is to determine ICT usage in teaching and learning and the factors that impede on the full and effective integration of ICT's in the Potgietersrus circuit secondary schools.

Interviews will be audio-recorded but neither your name nor any other identifying information will be associated with the audio recording or the transcript. The identity of the participants will be anonymous and what will be said during the interview will be kept in the strictest confidentiality. Your participation is voluntary and you may withdraw from participating without any consequence. The interview will take approximately 30 to 45 minutes of your time to complete. There will be no compensation for participating in this study. There are no identified risks for participating in this study.

By signing this consent form you are voluntarily agreeing to the participation of the research.

For any enquiries concerning the study, please contact:

Ms. Sethosa Mahlatse Mponana

Cell phone number: 072 866 6144

E-mail: Mahlatsethosa8@gmail.com

Thanking you in advance for your participation in this research.

## Appendix E: Consent for Participation



I, \_\_\_\_\_ (participant's name and surname), give my consent to partake in this research study.

All information regarding the research study has been explained to me and I was given the chance to ask questions.

I understand that my participation is voluntary and that I have the right to withdraw from proceeding with the interview at any time (if applicable).

I give consent to the recording of the interview by the researcher.

I have received a signed copy of the consent agreement.

---

Signature (Participant)

---

Date

---

Researcher's Name & Surname

---

Date

---

Signature (Researcher)

## Appendix F: Teacher's Interview Guide

### INTRODUCTION

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

### BIOGRAPHICAL INFORMATION OF THE PARTICIPANTS

Teachers' responses to gender, qualifications, name of the school, subject/s taught by the teacher, as well as years of experience teaching.

Participant	Gender	Age	Qualifications	ICT skills	Subject/s taught by the teacher	Years of experience teaching
RESPONSE(R):	R:		R:	R:	R:	

### INTERVIEW QUESTIONS

Teachers' response to all questions I asked.

1. What are the Potgietersrus circuit secondary school teachers' perceptions of the integration of ICT in the classroom?

**Interviewer:** What ICT tools are available at your school?

**Interviewee:**

**Interviewer:** Have you received any training on the integration of ICTs in your teaching activities? If yes, how long was the training?

**Interviewee:**

**Interviewer:** What is your perception regarding ICT integration in the classroom as a tool to enhance teaching and learning?

**Interviewee:**

**Interviewer:** Have you ever integrated ICT in your lessons?

**Interviewee:**

**Interviewer:** To what extent have you implemented ICT in your lessons?

**Interviewee:**

**Interviewer:** What was your experience with having to integrate ICT in your lessons?

**Interviewee:**

2. What are teachers' perceptions on ICT policies as a guide to teaching and learning?

**Interviewer:** The South African education policy states that "All South African learners must be ICT capable by 2025/2030. Do you share the same vision with the policy makers and the department of education?"

**Interviewee:**

**Interviewer:** Does the school have an ICT policy which acts as a guideline on how to effectively integrate ICT within the school?

**Interviewee:**

3. What are the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning?

**Interviewer:** Does the use of ICTs prove to be a better method of teaching learners as compared to the traditional methods of teaching?

**Interviewee:**

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

**Interviewee:**

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

**Interviewee:**

**Interviewer:** Do you regard using ICTs as having any benefits to teaching and learning in the classroom?

**Interviewee:**

4. What challenges do teachers experience in the integration of ICT for teaching and learning?

**Interviewer:** What challenges do you encounter in integrating ICTs in your responsibilities?

**Interviewee:**

Interviewer: What other factors are seen as challenges by other teachers?

Interviewee:

5. What recommendations can be made regarding the effective integration of ICT in teaching and learning?

Interviewer: Please share with me any recommendations or guidelines for the integration of ICT in the classroom.

- For teachers who are not interested in integrating ICT
- As well as the schools

Interviewee:

Interviewer: Is there anything you would want to add with regards to ICT integration?

Interviewee:

Interviewer:

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

Interviewee:

## **Appendix G: Participants Interview Transcripts**

### **TEACHER 03F**

Q: Good morning, I am Mahlatse Sethosa. I am currently undertaking a research study based on teachers' perception on ICT integration in the classroom. This interview is conducted to seek and gather information pertaining to how teachers feel about the integration of ICT in the classroom as a tool enhance teaching and learning. In this interview I would like you to air your views and opinions with regards to the topic at hand. I have chosen you to participate in this interview, reason being that at your school you use and have access to ICT. I will not use your name to ensure anonymity and all the information you provide will be kept in confidence. I will not use your name in any case of your particulars or personal information. I encourage you to answer all questions as this will help me to gain a better understanding of what I am researching. Remember that you are not under any obligation to take part in this research study and in order to continue with this interview, I need your consent to proceed. If you do not wish to continue, you can stop the interview as you wish. I am going to refer to you as Teacher03F (T03F) and thank you for agreeing to participate in this interview.

R: Okay.

Q: So do you accept?

R: I do accept it.

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

R: Female

Q: Age?

R: 26

Q: Qualification?

R: I have a Degree in Chemical Engineering, Masters in Chemical Engineering I obtained from University of Limpopo and PGCE specialising in Mathematics in the GET and FET phase, which I obtained from UNISA.

Q: Okay, do you have any ICT skills?

R: Yes I do have and the ICT skills I have I gained during my University days and because I tend to use the computer a lot for surfing the internet and other things so I would say my ICT skills are not too bad.

Q: Great, which subjects do you teach and the grade?

R: Currently I teach Natural Science grade 9, Mathematics grade 8 as well as Physical Science grade 10.



Q: Okay, and how many years of teaching experience?

R: I have been teaching for a little over a year, I would say a year and five months.

**Q: Okay, now we can start with the interview questions. We have five interview questions and then each question have sub-questions. So, you answer the sub-questions. So, the first one is about how do secondary school teachers in the Potgietersrus circuit perceive the integration of ICT in the classroom? What is your perception of the integration of ICT as a tool to enhance teaching and learning?**

R: I think that it is good to integrate ICT in my lesson because learners nowadays don't like to read and they relate more academically on what they can see or experiment with. I think using ICT for teaching and learning makes the lesson meaningful.

Q: Okay, what ICT tools are available at your school?

R: The school has two mobile whiteboards which are normally used in substitute to the chalkboards; we have two of them at the school. The school has one projector and an interactive whiteboard in the computer-lab which is prioritised to be used by grade 10, 11 and 12 learners in maths and science stream. The school has WI-FI secured connection which is accessible to only teachers, as the management felt that learners would use the connection inappropriately if they were allowed access.

Q: Okay, so the lower grades are not allowed access to the computer-lab?

R: No, they are only allowed access to the computer-lab from grade 10. I think it is because they feel they are too young to use technology.

Q: Okay, have you received any training on the integration of ICT? If yes, how long was the training?

R: Do you mean from the Department of Education or prior to being a teacher?

Q: Well, it's ok to mention them both if you have received any ICT training before being a teacher and after.

R: I had received ICT training during my first year at University for a year. Work wise, it's only now that I had been selected for the EDTP-SETA ICT training in which we will be taught on how to use ICT in our lessons. So far we have attended two sessions and the program will run for three months.

Q: Okay, what is your perception regarding ICT integration in the classroom as a tool to enhance teaching and learning?

R: Personally, I think that ICT adds value to teaching and learning if used effectively especially that learners of today are obsessed with technology.

Q: Interesting, have you ever integrated ICT in your lessons?

R: Yes I have, especially in Physical Science.

Q: Okay, to what extent have you implemented ICT in your lessons?

R: Normally what I do is, the day before the lesson I would download educational videos on YouTube relating to the subject content I would be teaching and I would share with learners during the lesson.

Q: Do you download the videos using the school WIFI?

R: Our school WIFI tends to be problematic due to the slow network and most of the time whenever I try to download the videos they fail to download. What I do is download the videos I want at the internet café.

Q: Alright, what was your experience with having to integrate ICT in your lessons?

R: It was very interesting I must admit, it was very different from the usual textbook and chalkboard form of teaching. The learners were also very quiet, which I find sometimes hard to do especially when you are teaching. They were so interested in what they were seeing and it was easier for them to recall what they learnt from the videos and answer questions I asked with enthusiasm.

Q: Great, do you use the videos in your lessons regularly?

R: As often as I can especially in subject content that learners find to be complicated or difficult to understand.

**Q: Okay. We are finished with the first question. Now we will move on to the second one. What are teachers' perceptions on ICT policies as a guide teaching and ? Do you have any knowledge of the ICT policy by from the Department of Education?**

R: To be honest I do not have any knowledge of what the ICT policy is and what it entails. It is my first time hearing about it.

Q: I understand, so the ICT policy acts as a guideline for schools on how to effectively integrate ICT in the school as a tool to enhance teaching and learning.

R: Oh okay, I get it now

Q: The South African education ICT policy states that "All South African learners must be ICT capable by 2025/2030. Do you share the same vision with the policy makers and the department of education?

R: Ja, I think it is possible, however I think there would be a lot that needs to be considered by the Department of Education in order to achieve that.

Q: What are some of the things you think the Department of Education needs to consider?

R: Firstly, I think the Department of Education should visit schools especially schools in the rural and semi-rural areas to observe the lack of ICT most schools in those areas experience. The other thing is that the provision of ICT is provided on the learner enrolment in order to accommodate all learners or even yet create computer labs.

Q: Okay, does the school have an ICT policy which acts as a guideline on how to effectively integrate ICT within the school?

R: Eh, not that I know of. I just know that learners are not allowed to bring cell phones or tablets unless given permission by the teacher.

Q: Okay, if learners are given permission to bring cell phones to school, do they have access to them the whole time they are at school?

R: No, only during the lesson and after school when they knockoff.

**Q: Only after school. Okay, now we are done with question two. Now we move on to the third question. What are the primary purposes of integrating ICT in the classroom as a tool to enhance teaching and learning? Why have you decided to integrate ICT in your lessons as a tool to enhance teaching and learning?**

R: Well for me it was a matter of trying to be innovative in my lessons and the other thing is being a new teacher in the times where technology is globally used made me realise how much value it can add to teaching and learning.

Q: How long have you been using ICT for teaching and learning?

R: I think five months after being employed and what's funny is that I was a bit scared at first because a lot of teachers where not really kin in using the available ICT tools in their lessons, so I it was sort of doing something that was rarely done at the school.

Q: Okay, do you think the use of ICTs proof to be a better method of teaching learners as compared to the traditional methods of teaching?

R: What do you mean by the traditional method teaching?

Q: The traditional method of teaching is teaching that is primarily based on using the textbook and chalkboard as you have mentioned, less or no form of ICT is used as a tool to enhance teaching and learning. Furthermore, the teacher plays a dominant role in the classroom and the learners become passive participants.

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

Q: How do you mean when you say it works for them?

R: I mean, for instance grade 12 teachers using the traditional method of teaching are still able to get their learners to get impressive results even without the use of ICT. So imagine how beneficial it will be if they ICT was introduced to their teaching and learning.

Q: Okay, do you use the computer and the internet to develop your professional or subject knowledge?

R: Like I had mentioned before, I enjoy surfing the internet because it assists me a lot in gaining information I was not aware about. So from a professional point of view, I use the internet to gain more insight on how to be a better teacher and also on how to make my lessons interesting. There is a lot of information that one can get from the internet and some are very interesting and assist in developing you to become a better teacher.

Q: Okay, do you give learners tasks which prompt the use of the internet?

R: No really, reason being that most of the learners we have at our school are learners from less privileged backgrounds, some do not have cell phones and some would not be able to afford going to the internet café. So giving them tasks that prompts them to use the internet would be challenging to others.

Q: So how do you normally bridge the gap between learners who are not capable of accessing the internet?

R: I would give them such tasks in a group mixing those who have cell phones or tablets and those who do not have at all. With the permission from my HOD I would let them bring their cell phones to school, by allowing the WIFI access on that day then they are able to do their research together during my lesson. This is good because no student is left behind.

Q: No student is left behind, okay. Do you regard using ICTs as having any benefits to teaching and learning in the classroom?

R: Eh, I think ICT can be beneficial to teaching and learning only if utilised properly and the schools have enough ICT tools to accommodate all the learners.

Q: How do you mean when you say by being utilised properly?

R: I mean ICT must not be used to take the role of the teacher in the classroom. For example, using downloaded educational videos to teach the learners without the teacher interacting with the learners to check their understanding and elaborate further on what they have observed from the videos.

**Q: I agree, now we are done with question three. We are now moving to our second last question, which is question four. What challenges do teachers**

**experience in the integration of ICT for teaching and learning? What challenges do teacher at your school face with having to integrate in the classroom for teaching and learning?**

R: I think most of the challenges that the teachers face are based on the lack of ICT in the schools. I feel that having the shortage of ICT in which teachers can use any time for teaching and learning tends to be discouraging, as you might find the 10 teachers who do not have personal laptops want to use the school laptop as well as the projector for lessons but because ICT is limited than only one teacher can get to utilise it. So it becomes like a first come first serve kind of a thing.

Q: Interesting, has there been any attempts or efforts by the school management to get more laptops or computers for the school?

R: Actually nah not that I know of, the quantity ICT in the school has been the same from the time I started working here till now

Q: Okay, what challenges do you encounter in integrating ICT in your responsibilities?

R: Well for me personally, the fact that i a new teacher from university I have all this innovative ideas on how to use technology in my lessons to benefit the learners but because you are teaching in an environment where ICT is not a priority. It becomes discouraging to place those ideas into action due to lack of support.

Q: You feel that if the school was open to using the ICT actively the perception of other teachers at your school would change regarding the integration of ICT and those that are already eager to integrate ICT in teaching and learning will open that opportunity to use ICT?

R: Definitely, I find it encouraging you know.

Q: What other factors are seen as challenges by other teachers?

R: Some teachers most especially teachers who have been teaching for many years fear the use of using ICT as they were never trained on how to use ICT and they think trying to use ICT for teaching and learning will just cause them to be embarrassed in front of learners who are technologically skilled.

Q: Okay I understand you, how do feel should be done in order to change their mind-set?

R: Definitely yes, I really think if they were to get proper training and continuous support either through technical support or continuous training then their level of optimism about ICT might improve.

**Q: Okay, I hear you. We are done with question 4, now we move on to the last question, which is question 5. What recommendations can be made regarding the effective integration of ICT in teaching and learning? What**

**recommendations would you make to the Department of Basic Education to ensuring that school facing similar challenges as your school become motivated to ensure the integration of ICT for teaching and learning in the classroom?**

R: Most importantly, I think rural schools should be provided with sufficient ICT tools the same way urban schools are. Moreover, when providing ICT tools to schools they should consider the unique characteristics of each school, such as enrolment of learners and number of teachers at the school. The other thing is that the Department of Education wants us to integrate ICT in the classroom but yet a lot of teachers I know since I started teaching have not been trained on how to use ICT; they do not have the necessary ICT skills. So if training is provided, then the outcome could be more positive. I feel EDTP-SETA ICT bursary training is not beneficial to all teachers; instead I recommend that the ICT training should be done in the form of workshops for all teachers.

Q: For all teachers, okay. Do you have any recommendations or guidelines for teachers who are not interested in integrating ICT for teaching and learning in the classroom?

R: I would recommend that a skill is not gained without continuous practice; they must give the use of ICT a chance as it is beneficial to our learners and it makes teaching and learning more convenient. Our learners especially in the rural areas deserve to be exposed to technology so they can also be at the same level as other learners from private or urban schools. Some teachers are fearful of just touching a mere laptop but fear does not help in anything, hence technologically skilled teachers might mean better performing learners. Software and technical support to maintain the ICT are provided.

Q: I hear you. What recommendations or guidelines do you have for schools that are not interested in integrating ICT or utilising the available ICT tools in the school?

R: The schools' management has to ensure that their school receives the necessary IT tools, make sure that once they are received they are not kept in a room somewhere to acquire dust. They should make sure they are fully utilised by the teachers and the learners.

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

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

Q: Thank you so much for your time.

R: Pleasure.

Q: Thank you so much.

R: It was a really interesting interview and would like to thank you otherwise for choosing me for the interview

## Appendix H: Observation Checklist



Observation Checklist	Comment
<b>SELECTED SITE</b>	
1 Does the school have a computer laboratory/centre	AVAILABLE.
2. Are there any desks and tables in the computer laboratory/centre?	There is an around the classroom type of a desk which accommodated all the computers and there were 10 chairs placed on each computer.
3. Does the computer laboratory/centre have proper security	The computer laboratory has butler proof on the door and the windows. Whenever it is not used, it is locked and the keys are kept in a locked drawer in the principal's office.
4. Availability of electricity	AVAILABLE.
<b>ICT EQUIPMENT</b>	
1 How many computers or tablets in the computer laboratory/centre	10 computers.
2. Is there internet connection?	Secured WIFI connection.
3. Interactive whiteboard and overhead projector	1 interactive whiteboard and 1 overhead projector.
4. Proper functioning of computers or tablets.	Yes all the computers were functioning.
5. Updated computer software	Out-dated Microsoft software version (Windows 8).



## Appendix I: Turnitin Report

**Appendix J: Proof of Editing**

**To whom it may concern**

This letter serves to confirm that editing and proofreading was done for:

**MAHLATSE MPONANA SETHOSA**

**Curriculum Studies**

**University of South Africa**

**Master's Dissertation**

**TEACHERS' PERCEPTIONS ON ICT INTEGRATION IN THE CLASSROOM:**

**A CASE STUDY OF SECONDARY SCHOOLS IN THE POTGIETERSRUS  
CIRCUIT, LIMPOPO PROVINCE**



Cilla Dowse  
19 January 2021

**Cilla Dowse**

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